						SLR-0	QA	-1
Seat No.						S	ət	Ρ
	B.Sc	c. (Semeste	r – I) (New) (CE ENGLISH Literary Vo	BCS) Exar (COMPUL oyage (222	nination: N .SORY) 221101)	larch/April-202	3	
Day & Time:	& Date : 09:00	e: Tuesday, 18 0 AM To 11:00	-07-2023 AM			Max. Ma	ırks:	: 40
Instru	uction	<b>is:</b> 1) All quest 2) Figures	ions are compuls to the right indicat	ory. e full marks:				
Q.1	Multi 1)	<b>ple choice qι</b> Mahatma Ga and bone. a) Gaya c) Delhi	i <b>estions:</b> ndhi said, "Within	ten miles ra b) d)	dius of Puri Mumbai	_ you will see skir	I	08
	2)	Payeng's For accidentally. a) dogs c) elephant	est got disclosed, s	when a her b) d)	d of wild monkeys boars	entered into it		
	3)	In the city the a) spinning c) horses	grandmother of k wheel	hushwant ۵ b) d)	Singh kept he cows neighbours	rself busy with the		
	4)	Tagore emph a) intolerar c) hatred	asized that a mar ice	n needs b) d)	to conque patience haste	er one's freedom.		
	5)	Love came to a) Fantasy c) Fame	asking fo	or the queen b) d)	of the flower Flora Futura	S.		
	6)	When the fath a) playing c) dancing	ner went to his sor	n's room, the b) d)	e son was slumbering painting			
	7)	The word 'pro a) -ly c) -ion	otect' requires	as a su b) d)	iffix to form a -ship -ful	meaningful word.		
	8)	<sup>•</sup> <u>He</u> went to h sentence is _ a) a verb c) a pronot	is father's office y  ın	esterday.' T b) d)	he underlined an adjective a modal	l word in the		

Page **2** of **2** 

# SLR-QA-1

### Q.2 Answer any four of the following.

- a) What tactics were used by Mahatma Gandhi for making Khadi popular?
- b) How did Jadav Payeng begin his work at Maioli Island?
- c) Describe the tragic end of Khushwant Singh's "The Portrait of a Lady".
- d) How did Rabindranath Tagore want God to help him?
- e) Describe the process which gave birth to the Lotus.
- **f)** What is the symbolic meaning of the title "The Toys" of the poem by Coventry Patmore?
- **Q.3 a)** Write a detailed note on the process of communication. **10**

#### OR

- **b)** What are the seven features of effective communication?
- **Q.4** Define intrapersonal skills and write a detailed note on them.

10

Instr	uctio	ons: 1) 2 3 4	) All questions are comp ) Draw neat diagrams a ) Figures to the right inc ) Use of logarithmic tab (At. Wts. H = 1, C = 12	oulsory. nd give equatio dicate full marks les and calculat 2, O = 16, N = 1	ns wherever necessary. or is allowed. 4, Na = 23, Cl = 35.5)	
Q.1	Cho	oose t	he most correct altern	hative.		08
	1)	a) c)	Abscissa axes	b) d)	 ordinates none of these	
	2)	The expre a) c)	units of velocity constar essed as (concn.) <sup>n-1</sup> ,(time) <sup>-1</sup> (concn.) <sup>1-n</sup> .(time) <sup>-1</sup>	nt, k depends or b) d)	n the order of reaction (n) and (time) <sup>n-1</sup> .(concn.) <sup>-1</sup> none of these	d is
	3)	Sink a) c)	represents rese hot cold	rvoir. b) d)	warm none of these	
	4)	No m a) c)	nachine has effic 10% both (a) and (b)	iency. b) d)	100% none of these	
	5)	Pc, ∖ a) c)	/c and Tc are known as Gas constants critical constants	; b) d)	velocity constants none of these	
	6)	In all of rea a) c)	simple reactions, the ra actants. increases remains same	ate of reaction _ b) d)	with increase in conce decreases none of these	ntration
	7)	The s a) c)	symbol ∫ represents th Integration both a and b	e sign of b) d)	differentiation none of these	
	8)	Exclu a) c)	uded volume is t 1 3	imes the actual b) d)	volume of molecules. 2 4	
Q.2	Ans a) b) c) d) e) f)	Wha Defir Defir Defir Defir Defir Defir	ny four of the followin t is isotherm? ne ideal and non ideal g ne order of reaction. ne spontaneous process ne molecularity of reaction ne graph and graph pap	ng as. s. on. per.		08
						Page <b>1</b> of <b>2</b>

#### Physical Chemistry (22221106) Day & Date: Wednesday, 19-07-2023 Max. Marks: 40 Time: 09:00 AM To 11:00 AM

B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 CHÉMISTRY (Paper-I)

Seat No.

SLR-QA-2

Set Ρ

#### Q.3 Write short notes on any two of the following

- a) Write a short note on second law of thermodynamics.
- **b**) Mention four simple rules of integration.
- c) Write short note on joule Thomson effect.

#### Q.4 Answer any two of the following

- a) Explain deviation of real gases from Boyle's law
- b) Explain efficiency of heat engine. Calculate the % efficiency of steam engine operating between 373k and 298k.
- c) For a certain first order reaction the time for half change is 60 seconds. How much time will be required for the completion 3/4<sup>th</sup> reaction?

#### Q.5 Answer any one of the following

- a) Explain in detail Andrew s isotherm for CO<sub>2</sub> gas.
- **b)** Define second order reaction and derive the rate constant equation for second order reaction with equal concentration.

80

08

B.Sc. (Semester – I) (New) (CB COMPUTER S Fundamental of (	CS) Exa CIENCE Comput	mination: March/April-2023 E (Paper - I) er (22221120)
Day & Date: Wednesday, 19-07-2023 Time: 12:00 PM To 02:00 PM		Max. Mar
Instructions:1) All questions are compulsor 2) Draw neat diagrams and giv 3) Figures to the right indicate 4) Use of logarithmic table and	y. /e equatio full marks calculator	ons wherever necessary. s. r is allowed.
<ul> <li>Q.1 Multiple choice questions:</li> <li>1) Which of the following devices p computer and the outer world?</li> <li>a) Compact</li> <li>c) Drivers</li> </ul>	rovides th b) d)	ne communication between a I/O Storage

Seat No.

#### 2) Which of the following is the device used for converting maps, pictures, and drawings into digital form for storage in computers?

- Image Scanner a) b) Digitizer
- MICR d) Scanner c)
- Secondary storage virtually has an unlimited capacity because the cost per 3) bit is very low \_\_\_\_\_. False

d)

- True a) b)
- 4) The dots on the magnetic tape represent
  - **Decimal digits** Binary digits a) b) Hex digits d) Oct digits c)
- Which of the following uses multiple hard disk platters mounted on a single 5)
  - central shift? Hard disks a) Disk drives b)
  - Disk packs Compact disks d) C)
- 6) The physical devices of a computer
  - a) Software b) Package System Software c) Hardware d)
- 7) Word processing software is a type of application software \_\_\_\_\_. b) False
  - True a)
- Who is the father of Computers? 8)
  - a) James Gosling **Charles Babbage** b) **Bjarne Stroustrup**
  - **Dennis Ritchie** c)
- Q.2 Answer any four of the following.
  - What is Worksheet? a)
  - What is Pseudo code? b)
  - Define hardware and software. C)
  - What is joysticks? d)
  - Define algorithm. e)
  - What is Secondary Storage? **f**)

Max. Marks: 40

**08** 

80

# SLR-QA-3





Q.3	<ul> <li>Write short notes on any two of the following</li> <li>a) Compiler</li> <li>b) CRT Monitor</li> <li>c) Plotter</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) How to import and export data in Excel?</li> <li>b) Explain block diagram of computer.</li> <li>c) Explain the types of computer.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following</li> <li>a) Define Programming Language. Explain types in detail.</li> <li>b) What is Mail merge? How to create it? Explain all steps in details.</li> </ul>	08

Seat No.			Set	P		
	B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 CHEMISTRY (Paper – II)					
Day 8	k Date	e: Thursday, 20-07-2023	Max. Marks: 4	10		
Instru	uctio	<ul> <li>ns: 1) All questions are compuls</li> <li>2) Draw neat diagrams and</li> <li>3) Figures to the right indica</li> <li>4) Use of logarithmic table a (At. Wts.: H=1, C=12, O =</li> </ul>	sory. give equations wherever necessary. ate full marks. and calculator is allowed. =16, N= 14, Na =23, Cl = 35.5			
Q.1	Cho 1)	<b>ose the correct alternative fro</b> The MOT has been developed a) Pauling and Slater c) K. Fajan	om given option. d byin 1931. b) Huckel, Hund and Mullikan d) H. Bethe	)8		
	2)	According to MOT the oxygen a) Unstable c) Paramagnetic	molecule in nature. b) Diamagnetic d) Antiferromagnetic			
	3)	The observed bond angle in H lone pairs. a) four c) three	l₂O is 104.5° is due to presence of b) one d) two			
	4)	The geometry of Ammonia₃ mo a) tetrahedral c) pentagonal bipyramidal	olecule is b) square planer d) pyramidal			
	5)	The limiting radius ratio for squ a) >1.0000 c) 155- 0.225	uare planer geometry is b)			
	6)	In H₃N:BF₃ adduct the two mol a) coordinate c) ionic	lecules are held together bybond. b) covalent d) metallic			
	7)	Compared with other bonds a) van der Walls c) metallic	forces are very weak. b) hydrogen bonding d) ionic bonding			
	8)	The size of anion is its a a) equal to c) less than	atomic size. b) greater than d) None of these			
Q.2	Ansv a) b) c)	wer any FOUR of the following What is the trend of reactivity in Define hydrogen boding with su Draw the MO diagram of Hydro	<b>g.</b> In the periodic table? uitable example. ogen molecule.	8(		

- d) What is the shape of PCI₅ molecule and what are the bond angle in it?
  e) Draw the unit cell structure of CsCl.

Q.3	Writ a) b) c)	e the short notes on any TWO. Shapes of 'd' orbitals. Geometry of BF₃ molecule. Formation of ionic bond.	08
Q.4	Ans a) b) c)	<b>wer any TWO of the following.</b> Distinguish between atomic and molecular orbital. Explain in brief, Born —Haber's cycle. Discuss in brief, Hund's rule and Pauli's exclusion principle.	08
Q.5	Ans a) b)	<b>wer any ONE of the following.</b> Discuss in detail unit cell structure of rock salt. Explain bond order, stability and magnetic property of nitrogen molecule molecular orbital theory.	08

			SLR-QA	<b>\-5</b>
Seat No.			Set	Ρ
I	B.Sc	c. (Semester - I) (New) (CBCS) Examination: March/A COMPUTER SCIENCE (Paper–II) Programming Using C (22221121)	pril-2023	
Day 8 Time:	k Dat 12:0	te: Thursday, 20-07-2023 00 PM To 02:00 PM	Max. Marks	: 40
Instru	uctio	<ul> <li>ans: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessar</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>	ry.	
Q.1	Mult 1)	tiple choice questionshas fix value that never changes.a) Operatorb) Variablec) Constantd) Keyword		08
	2)	a)Keywordb)Variablec)Operatord)All of these		
	3)	is allowed in Scanf () function. a) Format Code b) Variable c) & d) All of these		
	4)	'C' language is programming language. a) High-level b) Low-level c) Middle-level d) None of these		
	5)	is / are control structures in 'C' language. a) For b) While c) Do-while d) All of these		
	6)	a) - b) @ c) \$ d) #		
	7)	<ul> <li>Which of the following is wrong related with identifier?</li> <li>a) Should not be keyword.</li> <li>b) Should consist from alphabets and digits.</li> <li>c) Should start with digit.</li> <li>d) White spaces are not allowed.</li> <li>a I b II C III d IN</li> </ul>	V	
	8)	Which of the following is not type of logic? a) Sequence logic b) Selection logic c) Iteration logic d) Multiwey logic		
Q.2	Ans a) b) c) d) e) f)	wer any four of the following. What is array? Define structure. What is self referential variables. Define local & global variables. Define pointer. What is identifier?		08

# Seat

Q.3	<ul> <li>Writ short notes on any two of the following.</li> <li>a) Command line arguments.</li> <li>b) Recursion.</li> <li>c) File opening modes.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following</li> <li>a) Explain call by value and call by reference.</li> <li>b) Write a program to delete any element from an array.</li> <li>c) Explain nested structure.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain any four string handling functions with program.</li> <li>b) Write a program to display addition of matrix.</li> </ul>	08

Seat No.		Set P	
	B.S	(Semester - I) (New) (CBCS) Examination: March/April-2023 PHYSICS (Paper – I) Mechanics and properties of Metter (22224404)	
Day & Time:	k Date 09:00	Friday, 21-07-2023 Max. Marks: 40 AM To 11:00 AM	
Instru	uctior	<ul><li>1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li></ul>	
Q.1	Multi 1)	Ie Choice Questions       08         Moment of inertia of a spherical shell about its tangent is       7	
		a) $\frac{2}{3}MR^2$ b) $\frac{7}{5}MR^2$	
		c) $\frac{5}{3}MR^2$ d) $MR^2$	
	2)	Aoment of inertia in rotational motion is analogous to the in ranslation motion.	
		a) momentum b) Force c) Mass d) acceleration	
	3)	The equivalent length of simple pendulum of a compounded pendulum for ninimum time period having radius of gyration 40 cm is a) $L = 40 cm$ b) $L = 80 cm$ c) $L = 120 cm$ d) $L = 20 cm$	
	4)	The time period of compound pendulum is maximum when a) $l = k$ b) $l = 0$ c) $l = 2k$ d) $l = 3k$	
	5)	The ratio of shearing stress to shearing strain is called a) Young's modulus b) Bulk Modulus c) Modulus of rigidity d) Poisson's ratio	
	6)	The theoretical limiting values of Poisson's ratio are a) -1 and +0.5 b) +1 and -0.5 c) -1 and -0.5 d) -1 to +1	
	7) The tendency of liquid surface to contract is due to the property called		
		a) surface tension b) moment of inertia c) Viscosity d) Elasticity	
	8)	Bernoulli's equation deal with the law of conservation of a) Mass b) Momentum c) Energy d) work	
Q.2	Ansv	er any four of the following 08	

#### Q.2 Answer any four of the following

- Calculate the moment of inertia of a circular disc having diameter 10 cm and mass 500 gm about an axis passing through centre and perpendicular to its a) plane.
- b) Draw schematic diagram of Kater's pendulum.
  c) Define Young's modulus and bulk modulus for elastic material.

- d) State any two factors affecting surface tension.
- e) Define viscosity of liquid.

#### Q.3 Write short notes on any two of the following

- a) What is Bifilar Pendulum. Obtain expression for time period in bifilar pendulum.
- **b)** Poisson's ratio for a rubber tube is 0.35. When it is loaded at one end the change in volume is 1.8 cc and change in length is 1.1 cm. Calculate the area of cross section of the tube.
- c) Describe Jaeger's method to determine surface tension of the liquid.

#### Q.4 Answer any two of the following

- a) The excess pressure inside a soap bubble of radius 1 cm is balanced by oil column of 2mm. Find the surface tension of the soap solution if the density of oil is 800 kg/m<sup>3</sup>.
- **b)** Show that shear strain is equivalent to compression and extension strain.
- c) Show that the center of suspension and center of oscillation of a compound pendulum are interchangeable.

#### Q.5 Answer any one of the following

- a) Derive an expression for moment of inertia of a spherical shell about one of its diameter.
- **b)** Obtain Poiseuille's equation to determine the coefficient of viscosity of liquid.

08

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Seat	
NO	

B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 MICROBIOLOGY (Paper-I)

Introduction to Microbiology and Microbial Diversity (22221114)

Day & Date: Friday, 21-07-2023 Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat diagram whenever necessary.

#### Q.1 Choose the correct alternatives from the options.

- The Technique of antiseptic surgery was introduced by 1)
  - a) Robert Koch b) Louis Pasteur d) Har Govind Khorana
  - Joseph Lister c)
- 2) Bacterial sporulation and spore germination were first independently described by
  - Joseph Lister a)
  - Antony Van Leeuwenhoek c)
- 3) The book Micrographia was written by
  - a) Robert Koch
  - Ernst Ruksa c)
- NCCS Stands for 4)
  - National Center for Computer Science a)
  - National Center for Cell System b)
  - National Center for Cell Service c)
  - National Center for Cell Science d)

Smallest Infectious agent consisting of small RNA is called as 5)

- Virus b) Virion a)
- c) Viroids d) Prions
- 6) The Method by which size of bacterial cell is measured is called as .
  - a) Pure Culture b) Streak Plate Method
  - Micrometry d) Cytometry c)
- In Prokaryotic cell \_\_\_\_\_ is absent. 7)
  - Histones a) Mitosis c)

8)

- b) Meiosis
- d) All of the Above
- are the criteria used for bacterial classification and identification.
  - a) **Morphological Characteristics**
  - **Biochemical Characteristics** b)
  - **Molecular Characteristics** c)
  - All of the above d)

- b) Robert Koch and Cohn
- d) John Needham
- b) Robert Hook
- d) Antony Van Leeuwenhoek

Set

Max. Marks: 40

#### Q.2 Answer Any Four of the Following. 08 a) Define Biogenesis? **b)** Define Taxonomy? c) Draw the four different shapes of Bacteria. d) Describe in Short about the Work carried out in NIV. e) Write in short the contribution of Alexander Fleming. Q.3 Write Short Notes on any two of the following. 08 a) Define Virus and Write in short about Phytophage, Zoophage and Bacteriophage with their examples. b) Describe in short about the contribution of MartinusBeijerinck and Sergei Winogradsky. c) Describe in short Germ theory of disease. Answer Any Two of the following. 08 Q.4 a) Describe in short about any four branches of Microbiology. b) Describe in short about biochemical criteria for bacterial classification. c) Describe in short about morphological characters of Fungi. Q.5 Answer Any one of the Following. 08 a) Describe in detail about contribution of Louis Pasteur and describe in short about swan neck flask experiment. b) Describe in short about the morphological characters of Rickettsia, Mycoplasma, Algae and Actinomycetes.

B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 PHYSICS (Paper – II) **Optics (22221105)** 

Day & Date: Saturday, 22-07-2023 Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of logarithmic table or nonprogrammable calculator is allowed.
- 4) Neat diagrams must be drawn wherever necessary.

#### Q.1 Multiple choice questions.

- According to the Fermat's principle, the value of the first order differentiation 1) of time of traverse t with respect to the path length x is .
  - extremum b) maximum a)
  - minimum c) d) zero
- 2) For a convex lens having large aperture, the parallel incident ray near to an edge is called
  - a) marginal ray
  - co-axial ray c)
- If f is focal length of an eye lens in the Huygen's eyepiece then the distance 3) of separation between an eye lens and the field lens is \_\_\_\_\_.
  - 4f a) b) 3f
  - c) 2f d) (2/3) f

An eye-piece in which cross-wires are used is called . 4)

- a) achromatic eye-piece
- b) positive eye-piece d) negative eye-piece
- c) chromatic eye-piece
- In the Helium-Neon Laser, the type of pumping used is . 5)
  - a) thermal b) optical
  - d) thermo-electric electrical c)

#### In comparison with the laser source of light an ordinary source of light have 6)

- less beam divergence and less beam directionality a)
- more beam divergence and more beam directionality b)
- less beam divergence and more beam directionality c)
- d) more beam divergence and less beam directionality
- An axial chromatic aberration of the convex lens having dispersive power  $\omega$ 7) = 0.024 and focal length f= 10 cm is
  - b) 2.4 cm 0.24 cm a)
  - 0.0024 d) 24 cm c)
- The value of grating element for a plane transmission grating having 15000 8) lines per inch is
  - b)  $1.693 \times 10^{-4}$  cm d)  $1.413 \times 10^{-4}$  cm a)  $1.593 \times 10^{-4}$  cm c)
    - $1.613 \times 10^{-4}$  cm

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Max. Marks: 40

08

- b) paraxial ray
- d) axial ray

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## Q.2 Answer any FOUR of the following.

- a) What are the different applications of Spectrometer?
- **b)** For the interference pattern obtained in wedge shaped thin film, write the formula of fringe width.
- c) What is population inversion in production of the Laser?
- **d)** In Newton's Rings experiment, the wavelength of source of light 6000A<sup>0</sup> is used and the diameter of 15<sup>th</sup> dark ring 0.6 cm is noted. Calculate the radius of curvature of a Plano-convex lens.
- e) Calculate the maximum order of diffraction for the plane transmission grating having 18000 lines per inch when wavelength incident light is 6458 A<sup>0</sup>.

## Q.3 Write short notes on any TWO of the following.

- a) Hyegen's Eye-piece
- **b)** Spherical Aberration
- c) Ruby Laser

## Q.4 Answer any ONE of the following.

- a) By using the Fermat's Principle prove that an angle of incidence is equal to an angle of reflection.
- **b)** Describe the Einstein's Coefficient of absorption of radiations and stimulated emission of radiations.
- c) Calculate the focal length of Ramsden's Eye-piece and the position of crosswires when the distance of separation between field and eye lens is 8 cm.

## Q.5 Answer any ONE of the following.

- a) Derive the formula for the radius of n<sup>th</sup> Newton's Ring and describe the Newton's Rings experiment to determine the wavelength of monochromatic source of light.
- **b)** Describe the procedure of construction of a plane diffraction grating and an experiment of a plane diffraction grating to determine wavelength of monochromatic source of light.

#### 08

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Seat			Set	Ρ
	B.Sc	c. (Semester - I) (New) (CBCS) Examination: March/April-20	23	
		Cell cytology and Microbial Techniques (22221115)		
Day & Time:	Date 12:00	e: Saturday, 22-07-2023 Max. N 0 PM To 02:00 PM	/larks	: 40
Instru	iction	<ul> <li><b>1)</b> All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>		
Q.1	Choc 1)	<ul> <li>best the correct alternative and rewrite the following sentences.</li> <li>Lipopolysacchride is part of</li> <li>a) gram positive bacterial cell wall</li> <li>b) gram negative bacterial cell wall</li> <li>c) pili</li> <li>d) endospore</li> </ul>		08
	2)	A substance which increases affinity of stain for object is calleda) Mordantb) Stainc) Chromophored) Auxochrome		
	3)	The organs of motility in bacterial cell is a) pili b) flagella c) nucleoid d) cell membrane		
	4)	Primary stain used in gram staining is a) basicfuchsin b) Haematoxylon c) Crystal violet d) Safranin		
	5)	Bacterial ribosome is         a) 80S       b) 70S         c) 60S       d) 40 S		
	6)	In electron microscope, is used as an objective lense. a) Magnetic coils b) Superfine glass c) Aluminium foils d) Electrons		
	7)	<ul> <li>is the correct order of chemicals used in a gram staining procedu</li> <li>iodine, ethanol, crystal violet, safarnin</li> <li>crystal violet, iodine, ethanol, safarnin</li> <li>crystal violet, ethanol, idodine, safarnin</li> <li>afarnin, ethanol, idodine, crystal violet</li> </ul>	ire.	
	8)	Three dimensional view of specimens are provided by microscopa) scanning electronb) phase contrastc) dark fieldd) transmission electron	е	

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Q.2	<ul> <li>Answer any four of the following:</li> <li>1) What is acidic stain? give examples.</li> <li>2) Define resolving power of microscope.</li> <li>3) Define sanitization</li> <li>4) What is protoplast?</li> <li>5) Give the functions of pili of bacteria</li> </ul>	08
Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Ultrastructure of endospore</li> <li>b) Sterilization by Phenol and phenolic compounds</li> <li>c) Cell wall staining</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Write in detail about fluid mosaic model.</li> <li>b) Discuss about Cell wall of Gram-positive bacteria.</li> <li>c) Principle, working and application of Transmission electron microscope (TEM).</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Write in detail on Structure, composition and Functions of flagella.</li> <li>b) Write essay on, Differential staining.</li> </ul>	08

	B.Sc. (Semester – I) (New) (CBCS) Examination: March/April-2023 STATISTIC (Paper - I) Descriptive Statistics - I (22221108)							
Day & Time:	& Date : 09:00	: Sur ) AM	nday, 23-07-2023 To 11:00 AM		Max. Marks	: 40		
Instru	uction	l <b>s:</b> 1) 2) 3)	All questions are compulsory. Figures to the right indicate full n Use of logarithmic table and calc	narks culato	r is allowed.			
Q.1	Multi	ple c	hoice questions:			08		
	1)	Age	of person is					
		a)	An Attribute	b)	A discrete variable			
		c)	A continuous variable	d)	None of these			
	2)	The are	histogram of a frequency distribu	tion c	annot be drawn, if the classes			
		a)	 Of unequal width	b)	Of open-end classes			
		c)	Inclusive classes	d)	None of these			
	3)	Whie	ch is not suitable measure to calc	ulate	average speed of train?			
		a)		b)	GM None of these			
		C)		u)	None of these			
	4)	Med	ian is equivalent to	<b>b</b> )	D-			
		a) c)	P <sub>50</sub>	(d	All the above			
	5)	ln ca	se of consistent data, no class fr	∽) oquor	ocy can be			
	5)	a)	Positive	b)	Negative			
		c)	Both (A) and (B)	d)	Neither (A) and (B)			
	6)	The	range of group of numbers -10, -	8, 1, 1	1, 19 is			
	,	a)	1	b)	26			
		c)	24	d)	29			
	7)	lf 25	% of the items are less than 30 a	nd 25	% are more than 70, the Q. D. is			
		<u>a)</u>	20	b)	30			
		c)	70	d)	10			
	8)	The	second moment about mean is 1	6, the	standard deviation will be .			
	,	a)	16	b)	4			
		c)	2	d)	0			
Q.2	Ansv	ver a	ny four of the following.			08		
- <b>,</b> . <b>-</b>	a)	Defin	e Class limits and midpoint.					

- **b)** For two positive observations a and b show that  $G.M. = \sqrt{A.M. \times H.M.}$
- c) Define Range and coefficient of range.
- d) Define positive association and negative association.
- e) Define Bowley's coefficient of skewness and state its limits.

SLR-QA-10 Set P

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## Q.3 Write short notes on any two of the following

- a) Distinguish between inclusive and exclusive methods.
- **b)** What is effect of change of origin and scale on central moments?
- c) What is meant by consistency of data? State the conditions of consistency for one attribute A.

## Q.4 Answer any Two of the following.

- a) Show that sum of squares of deviation taken from mean is minimum.
- **b)** Show that standard deviation is always greater than or equal to mean deviation about mean.
- **c)** For any frequency distribution show that  $\beta_2 \ge 1$

## Q.5 Answer any one of the following

- a) Define mode and derive the formula for mode in case of continuous frequency distribution.
- **b)** Obtain the first four central moments in terms of central moments.

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Seat							Set	Ρ
	B.Sc	c. (S	emester –	· I) (New) (CBCS ZOOLOGY	6) Exar (Pape	nination: March/Aµ r - I)	oril-2023	
	Animal Diversity I (22221122)							
Day & Time:	Day & Date: Sunday, 23-07-2023         Max. Marks: 40           Time: 12:00 PM To 02:00 PM         Max. Marks: 40							
Instru	<ul> <li>nstructions: 1) All questions are compulsory.</li> <li>2) Draw neat labelled diagrams wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>							
Q.1	Multi	iple c	hoice ques	tions:				08
	1)	Whi	ch of the foll	owing locomotory o	organell	e is present in Amoeba	?	
		a) c)	Cilla Flagellum		d)	Pseudopodia Tentacles		
	2)	Syco	on belong to	which of the follow	ing clas	S.		
		a)	Calcarea		b)	Hexactinellida		
		c)	Demonspo	ngia	d)	Crustacea		
	3)	Divis	sion of labou	ur between the seve	eral indi	vidual is known as	·	
		a) c)	Polymorphi	y ism	(d b)	Polyfunctions		
	4)	Тар	eworm belor	ng to which of the fo	ollowing	phylum		
		a)	Porifera Platybelmir	othes	b)	Cnidaria Nemathelminthes		
	5)	U) Mot		nules	oristics	of Phylum		
	5)	a)	Porifera		b)	Cnidaria		
		c)	Platyhelmir	nthes	d)	Annelida		
	6)	Whi	ch of the foll	lowing animal is inc	luded ir	class Arachnida?		
		a) c)	Limulus Spider		d)	Eurypterus		
	7)	Clar	opidei ne enaile ar	ad slugs are include	u) din wh	ich of the following Phy	lum	
	')	a)	Annelida		b)	Arthropoda	ium	
		c)	Mollusca		d)	Echinodermata		
	8)	Whi	ch of the foll	lowing animal is inc	luded ir	class Asteroidea?		
		a) c)	Sea star Asterina		d)	Astropecten		
		0)	Asternia		u)	ColdSter		
Q.2	Ansv	ver a	ny four of t	he following.				08
	a) b)	Defin	t the classes	s of pnylum Arthrop hism	oda.			
	c)	Signi	ficance of le	ech.				
	d)	Defin	e complete	metamorphosis (He	olometa	bolous).	nco	
	e)		r me part of	water vascular syst		ea siai anu iis siyniiiCa		

Q.3	Wr a) b) c)	ite short notes on any two of the following. Give an account of general characters of phylum Cnidaria. What is holozoic nutrition? Give two examples from Protozoa. Describe the parasitic adaptations in Ascaris.	08
Q.4	An	swer any two of the following.	08
	a)	Give an account of general characters of phylum Annelida upto classes.	
	b)	Give an account of the life cycle of <i>Taenia solium</i> .	
	C)	Describe in detail the economic importance of Mollusc.	
Q.5	An	swer any one of the following.	08
	a)	Describe the different methods of locomotion in Protozoa.	
	b)	Describe the canal system of Sycon.	

Seat			
No.		Set F	)
	B.Sc	. (Semester – I) (New) (CBCS) Examination: March/April-2023 STATISTICS (Paper – II) Elementary Probability Theory (22221109)	
Day 8 Time:	Date 09:00	: Monday, 24-07-2023 Max. Marks: 40 ) AM To 11:00 AM	0
Instru	uction	<ul> <li>s: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of Calculator is allowed.</li> </ul>	
Q.1	Multi 1)	ple choice questions:0The events which consists only one sample point is calleda)a)Elementary eventb)Sure eventc)Impossible eventd)None of these	8
	2)	An unbiased coin tossed once, and then the two events head and tail area) mutually exclusiveb) exhaustivec) equally likelyd) All (A), (B) and (C)	
	3)	<ul> <li>Two events are said to be independent if;</li> <li>a) each outcome has equal chance of occurrence</li> <li>b) there is no common point in between them</li> <li>c) one does not affect the occurrence of the other</li> <li>d) both the events have only one point</li> </ul>	
	4)	If A and B are two events such that $A \subset B$ , thena) $P(A) = P(B)$ b) $P(A) \ge P(B)$ c) $P(A) \le P(B)$ d) None of these	
	5)	If $P(A)$ is probability of an event A then most appropriate sentence isa) $P(A) \ge 0$ b) $P(A) \le 1$ c) $0 \le P(A) \le 1$ d) None of these	
	6)	$P(A \cap B^{c}) = \$ a) $P(A) - P(A \cap B)$ b) $P(B) - P(A \cap B)$ c) $P(A) - P(B^{c})$ b) $P(B) - P(A \cap B)$ d) None of these	
	7)	If $A \subset B$ then $P(A B)$ is a) 0 b) 1 c) $\frac{P(A)}{P(B)}$ d) $\frac{P(B)}{P(A)}$	
	8)	If A and B are independent events with $P(A) = 0.4$ and $P(B) = 0.5$ then $P(A \cup B)$ is equal toa) 0.65b) 0.70c) 0.1d) 0.25	
Q.2	Ansv a) b) c)	ver any four of the following.0Define finite sample space.0Define union of two events.0Define axiomatic definition of probability.0	8

**d)** Define pairwise independence of events. **e)** If  $A \subset B$  then find  $P\left(\frac{\bar{A}}{B}\right)$ 

Page 2 of 2

#### Q.3 Write short notes on any two of the following

- a) Write down the sample space for the following events.
  - 1) A leap year will have 53 Sundays
  - 2) A non-leap year will have 53 Sundays
- **b)** A class of 100 students appeared for two examinations 60 passed the first examination, 50 passed the second examination and 30 passed both examinations. Find the probability that a student selected at random has failed in both the examination.
- c) If A and B are mutually exclusive events. Then show that

1) 
$$P(A/B) = 0$$
  
2)  $P(A/B) = {}^{P(A)}$ 

$$P\left(\frac{A}{\bar{B}}\right) = \frac{C}{1 - P(B)}$$

#### Q.4 Answer any Two of the following.

- a) If  $\Omega = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} A = \{1, 3, 5, 7\} B = \{6, 7, 8, 9\} C = \{2, 4, 8\}$ . List the elements of the subset of  $\Omega$  corresponding to the following events
  - 1)  $(\overline{A} \cap B)$
  - 2)  $(\overline{A} \cap B) \cap C$
- **b)** With usual notation prove that
  - 1)  $P(\varphi) = 0$
  - 2)  $P(\bar{A}) = 1 P(A)$
- c) If A, B, C forms the partition of the sample space. And 3P(A) = 2P(B) = 6P(C) then find P(A).

#### Q.5 Answer any one of the following

- a) Define apriori definition of probability. Prove that the apriori definition leads to a probability measure.
- **b)** If *A*, *B*, *C* are any three events defined on sample space  $\Omega$  with P(A) > 0 then prove that  $P(B \cup C/A) = P(B/A) + P(C/A) P(B \cap C/A)$ .

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No.							Set	Ρ
	B.Sc	:. (Sem	nester – A	I) (New) (CBCS ZOOLOGY nimal Diversity	8) Exan (Paper y – II (2	nination: March/A <sup>·</sup> – II) 22221123)	pril-2023	
Day 8 Time:	Date 12:00	e: Monda ) PM To	ay, 24-07- 0 02:00 PN	-2023 M		·	Max. Marks	: 40
Instru	uction	<b>is:</b> 1) Al 2) Fi	l question gures to t	s are compulsory. he right indicate fu	ll marks			
Q.1	Multi 1)	ple cho Pneum a) Pi	<b>ice ques</b> latics bon lsces	<b>tions:</b> es are present in _	 b)	Reptiles		08
	2)	a) Bl c) Ba	is the flyir ue whale at	ng mammals.	b) d)	Shrew Kangaroo		
	3)	In Clas a) Τι c) Cr	s reptiles urtle rocodile	has four ch	ambered b) d)	d heart. Sphenodon Wall lizard		
	4)	a) M c) Pe	_ is also k yxine etromyzor	nown as Lancelet ne	b) d)	Amphioxus Herdmania		
	5)	In bony a) 2 c) 4	/ fishes	pairs of gills a	are prese b) d)	ent 3 5		
	6)	lsinglas a) Ai c) Sł	ss is prep r bladder kin of fish	ared from	b) d)	Fins of fish Scales of fish		
	7)	The lim a) Sa c) Tr	nbless am alamnder ree frog	phibian is	b) d)	Toad Ichthyophis		
	8)	Whales a) In c) Ce	s and dolp sectivore etacea	ohins are the memb	bers of o b) d)	rder Primate Chiroptera		
Q.2	Ansv a) b) c) d) e)	<b>ver any</b> Anura General What is Lamprey Spheno	four of tl l features adaptive y don	<b>ne following.</b> of Order- Chrocod radiation.	ilia			08

#### Q.3 Write short notes on any two of the following

- a) Write a short note on economic importance of fishes.
- b) Write general features of the Class- Aves.
- c) Distinguishing Characters of venomous and non-venomous snake.

#### Q.4 Answer any Two of the following.

- a) Difference between Order Condrichthyes and Order Osteichthyes
- **b)** Describe the morphological flight adaptations in birds.
- c) Write general features of the Class- Mammals and describe general features of order Chiroptera with suitable examples.

#### Q.5 Answer any one of the following

- a) Describe the types of snake venom. Add a note on symptoms and first aid treatment of snake bite.
- b) Describe the various kinds of anatomical flight adaptation in the birds.

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Seat No.		Set P	)					
ļ	B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Paper – I) Algebra (22221116)							
Day & Time:	Day & Date: Tuesday, 25-07-2023 Max. Marks: 40 Time: 09:00 AM To 11:00 AM							
Instru	uction	<ul><li><b>ns:</b> 1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li></ul>						
Q.1	Choc 1)	The rank of the matrix $\begin{bmatrix} 2 & 0 & 3 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is a) 1  b) 2	3					
	2)	c) $3$ d) $4$ If rank of $[A] = rank$ of $[A:B] =$ number of unknowns, then non-homogeneous system of linear equations $AX = B$ possess a) No solution b) Infinite solution c) Unique solution d) Trivial solution						
	3)	The eigen value of matrix $\begin{bmatrix} 0 & 4 & 3 \\ 0 & 5 & 2 \\ 0 & 0 & 1 \end{bmatrix}$ area) $8,4,3$ b) $3,2,1$ c) $4,5,0$ d) $8,5,1$						
	4)	The argument of a complex number $Z = 1 + \sqrt{3}i$ is a) $\frac{\pi}{2}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$						
	5)	If $x + \frac{1}{x} = 2\cos\theta$ then $x^3 + \frac{1}{x^3} = $ a) $2i\sin 3\theta$ b) $3\cos 3\theta$ c) $2\cos 3\theta$ d) $3i\sin 3\theta$						
	6)	For any number Z, $sin(iz) = $ a) $i sin z$ b) $sinh z$ c) $i sinh z$ d) $sin z$						
	7)	The value of $\cosh z - \sinh z = $ . a) $e^{iz}$ b) $e^{-iz}$ c) $e^{z}$ d) $e^{-z}$						
	8)	Let <i>G</i> be a non empty set together with binary operation $*$ satisfying the property $a * (b * c) = (a * b) * c, \forall a, b, c \in G$ is called as a) Closure property b) Associative Property c) Existence of identity element d) Existence of inverse						

### Q.2 Attempt any four of the following.

a) Reduce the following matrix to Normal form

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 2 & 2 \\ 2 & 3 & 4 \end{bmatrix}$$

**b)** Solve 
$$x + 2y - 3z = 2$$
  
 $2x + 3y + z = 4$ 

$$2x + 3y + z = 4$$
$$3x + 4y + 5z = 8$$

- **c)** Find all values of  $(-1)^{1/3}$
- **d)** Separate the complex number  $(i)^i$  in to real and imaginary parts.
- e) Show that that the set N of all natural numbers (i.e. 1, 2, 3, 4,...) is not group with respect to the multiplication operation.

## Q.3 Attempt any two of the following.

a) Find all eigen values and eigen vectors of the matrix.

$$A = \begin{bmatrix} 1 & 3\\ 4 & 5 \end{bmatrix}$$

- **b)** If  $\alpha$  and  $\beta$  are roots of the equation  $x^2 2x + 4 = 0$  then show that  $\alpha^n + \beta^n = 2^{n+1} \cdot \cos\left(\frac{n\pi}{3}\right)$
- c) 1) Show that the identity element in a group is unique.
  - 2) Show that the inverse of each element in a group is unique.

### Q.4 Attempt any two of the following.

- a) Investigate for what values of a and b the equations
  - x + 2y + 3z = 4; x + 3y + 4z = 5; x + 3y + az = b have
    - i) no solution
    - ii) unique solution
    - iii) infinite number of solutions
- **b)** If  $cos(\alpha + i\beta) = x + iy$  then prove that,

i) 
$$\frac{x^2}{\cosh^2\beta} + \frac{y^2}{\sinh^2\beta} = 1$$

ii) 
$$\frac{x^2}{\cos^2 \alpha} - \frac{y^2}{\sin^2 \alpha} = 1$$

c) If x is real, then prove that,

i) 
$$\cosh^{-1} x = \log(x + \sqrt{x^2 - 1})$$

ii) 
$$\tanh^{-1} x = \frac{1}{2} \log\left(\frac{1+x}{1-x}\right)$$

## Q.5 Attempt any one of the following questions.

- a) i) State and prove Cayley-Hamilton Theorem.
  - ii) Find the inverse of matrix  $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & -1 \\ 2 & -1 & 0 \end{bmatrix}$  using Cayley-Hamilton Theorem.
- **b)** i) State and prove De-Moivre's Theorem.
  - ii) Find all the values of  $(i)^{1/4}$

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Seat							Set	Ρ
	B.So	c. (Se	emester - I	) (New) (CBCS BOTANY (	5) Exar (Papeı	nination: March/A <sup>r</sup> - I)	pril-2023	
			Micro	biology and Ph	nycolo	gy (22221102)		
Day 8 Time:	a Date 12:0	e: Tue 0 PM	esday, 25-07 To 02:00 PM	-2023 M			Max. Marks	: 40
Instru	ictio	<b>ns:</b> 1) 2) 3)	All question Draw neat l Figures to r	s are compulsory. abeled diagram w ight indicate full m	/herever narks.	necessary.		
Q.1	Rew	vrite th	ne following	sentences choo	osing co	orrect alternative.		08
	1)	Bacte a) c)	erial cell wall Cellulose NAM and N	is made up of IAG	 b) d)	Lipids and proteins Amino acids		
	2)	The ( a) c)	genetic mate DNA RNA and D	rial of T- Phage vi NA both	irus is _ b) d)	 RNA Nucleosome		
	3)	a) c)	_ are pleuro Viruses Bacteria	morphic.	b) d)	Mycoplasma Fungi		
	4)	In tra a) c)	nsduction th Virus Bacteria	e transfer of gene	tic mate b) d)	rial take place through Fungi RNA	۱	
	5)	Pneu a) c)	matocyst ar Chlorophyta Phaeophyta	e found in a a	b) d)	Xanthophyta Rhodophyta		
	6)	a) c)	_ is also call Chlorophyta Phaeophyta	ed as yellow gree a a	n algae b) d)	Xanthophyta Rhodophyta		
	7)	Phyc a) c)	ocyanin pigr Cyanophyta Phaeophyta	nent is found in a a	 b) d)	Rhodophyta Xanthophyta		
	8)	The f a) c)	emale sex o Archegoniu Antheridiun	rgan in evolved m m า	iembers b) d)	of algae is called as _ Oogonium Sporangia		
Q.2	Ans a) b) c) d)	wer a What Enlis What What	ny four of the scalarifor the type of	<b>he following.</b> m conjugation? spores formed in a nation?	algae.			08

e) Give any characters of Xanthophyta.

Q.3	Wri a) b) c)	<b>te short notes on any two of the following.</b> General characters of viruses. Scalariform conjugation in <i>Spirogyra.</i> General characters of Xanthophyta.	08
Q.4	Ans a) b) c)	wer any two of the following. Describe the Ultra structure of typical bacterial cell with suitable diagram. Describe the thallus structure of Nostoc. Describe the general characters of Mycoplasma.	08
Q.5	Ans a) b)	<b>wer any one of the following.</b> Give the economic importance of algae. Describe the structure of T- Phage with suitable diagram.	08

Seat No.							Set	Ρ	
E	B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2n023 MATHEMATICS (Paper-II) Calculus (22221117)								
Day & Time:	Date 09:00	: We ) AM	ednesday, 26 To 11:00 AN	6-07-2023 И	(	,	Max. Marks	: 40	
Instru	iction	( <b>s:</b> 1 2	All question Figures to t	s are compulsory he right indicate f	/. <sup>j</sup> ull mark	S.			
Q.1	Selec	t the	e correct alt	ernatives each o	of the fo	llowing.		08	
	1)	п <i>у</i> : а)	$= (ax + b)^m$ 0	then $y_n = \_\_\1$	m = n. b)	$\frac{m!}{(m-n)!}a^n(ax+b)^n$			
		c)	$n! a^n$		d)	$n! a^n (ax+b)^n$			
	2)	The	degree of th	e homogenous fu	unction ı	$\iota = \frac{x^{\frac{1}{3}} + y^{\frac{1}{3}}}{x^{\frac{1}{5}} - y} $ is			
		a)	2 15		b)	$\frac{15}{2}$			
		c)	<u>3</u> 5		d)	<u>5</u> 3			
	3)	$\int_{0}^{\frac{\pi}{2}} \sin \theta$	$n^m x \cos^n x  dx$	c = if bot	th <i>m</i> and	n are odd.			
		a)	$\frac{m-1}{m+n} \cdot \frac{m-3}{m+n-3}$	$\dots \frac{1}{n+2} \cdot \frac{n-1}{n} \frac{n-3}{n-2} \frac{n-3}{n-2}$	$\frac{5}{4}$ $\frac{3}{4}$ $\frac{1}{2}$ $\frac{\pi}{2}$				
		b)	$\frac{m-1}{m+n} \frac{m-3}{m+n-2}$	$\frac{m-5}{m+n-4}\dots \frac{2}{n+3} \cdot \frac{1}{n+1}$					
		c)	$\frac{m-1}{m+n} \frac{m-3}{m+n-2}$	$\dots \frac{1}{n+2} \frac{n-1}{n} \frac{n-3}{n-2} \dots \frac{n}{3}$	$\frac{2}{3}\frac{\pi}{2}$				
		d)	$\frac{m-1}{m+n} \ \frac{m-3}{m+n-2}$	$\dots \frac{1}{n+2} \frac{n-1}{n} \frac{n-3}{n-2} \dots \frac{2}{3}$	$\frac{2}{3} \cdot 1$				
	4)	curl a)	$(\text{grad } \phi) = \_$ $\nabla^2 \phi$		b)	0			
		c)	∇φ or grad o	ф	d)	1			
	5)	The	expansion o	of $\log(1+x)$ is	·	.234			
		a)	$x + \frac{x^2}{2!} + \frac{x^3}{3!}$	$+\frac{x^4}{4!}+\cdots$	b)	$x - \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} + \cdots$			
		c)	$x + \frac{x^2}{2} + \frac{x^3}{3}$	$+\frac{x^4}{4}+\cdots$	d)	$x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots$			
	6)	The	number of ir	ndependent varia	ble parti ה	al derivative are	<i>.</i>		
		c)	at most two	1	d)	at least two			

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### c) $\frac{32\pi}{5}$ The vector point function $\overline{F}$ is such that $div \cdot \overline{F} = 0$ then $\overline{F}$ is called \_\_\_\_\_. 8)

b)  $\frac{5}{32}$ 

d)

- b) solenoidal irrotational a)
- c) conservative d) unit vector

#### Attempt any four of the following. Q.2

 $\int_{0}^{\pi/2} \cos^{6} x \, dx = \_$ a)  $\frac{5\pi}{32}$ 

a)  $\frac{5\pi}{32}$ 

7)

- Expand  $e^x$  in power of x. a)
- b) Define continuity of a function of two variable.
- Evaluate  $\int_0^{\pi/4} \sin^7 2x \, dx$ C)
- If  $\phi(x, y, z) = 3x^2y y^3z^2$  find  $\nabla \phi$  at point (1, -2, -1)d)
- Find the value of  $\lim_{x \to 0} \left[ \frac{3^{x} 2^{x}}{x} \right]$ e)

#### Q.3 Attempt any two of the following.

- State Taylor's and Maclaurin's theorem with Cauchy's form of remainder. a)
- If z = f(x, y) and  $x = r \cos \theta$ ;  $y = r \sin \theta$  then prove that  $\left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 = \left(\frac{\partial z}{\partial r}\right)^2 + \frac{1}{r^2} \left(\frac{\partial z}{\partial \theta}\right)^2$ b)
- Evaluate  $\int_{0}^{1} x^{2} (1-x^{2})^{\frac{7}{2}} dx$ C)

#### Attempt any two of the following. Q.4

**a)** Prove that  $\nabla \cdot (\mathbf{r} \nabla r^{-n}) = \frac{n(n-2)}{r^{n+1}}$ 

- b) State and prove Euler's theorem on homogenous functions.
- **c)** Evaluate  $\int_{0}^{\infty} \frac{x^2 dx}{(1+x^2)^{7/2}}$

#### Attempt any one of the following questions. Q.5

State and prove the Leibnitz's Theorem. a)

i) If  $u = \log(\tan x + \tan y + \tan z)$  then prove that, b)

(ii) Show that 
$$\nabla^2 \left(\frac{1}{r}\right) = 0$$
 where  $r^2 = x^2 + y^2 + z^2$ 

Seat No.	t	Set	Ρ					
	B.So	c. (Semester - I) (New) (CBCS) Examination: March/April-2023 BOTANY (Paper – II) Fungi and Archegoniate (22221103)						
Day a Time	Day & Date: Wednesday, 26-07-2023         Max. Marks: 40           Time: 12:00 PM To 02:00 PM         Max. Marks: 40							
Instr	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>						
Q.1	Mult 1)	<b>iple choice questions.</b> The Ascomycetes are commonly called as a) bag fungi b) sac fungi c) black molds d) rust	80					
	2)	In ascomycetes inside ascus the usual number of ascospores is a) 8 b) 10 c) 15 d) 100						
	3)	Majority of fungi prefers to grow in in moist habit.a) darknessb) dim lightc) UV lightd) both a) & b)						
	4)	In <i>Riccia,</i> sporophyte cells undergo reduction division. a) calyptra b) nurse c) spore mother d) Jacket						
	5)	In <i>Riccia</i> sporophyte only is present. a) capsule b) foot c) seta d) all the above						
	6)	In homosporous pteridophytes, the development of gametophyte is a) exosporic b) endosporic c) mesosporic d) none of these						
	7)	The spores of pteridophytes area) diploidb) haploidc) tertrapolidd) triploid						
	8)	In Cycas, coralloid root there is association between Cycas root anda) bacteriab) fungic) algaed) blue green algae						
Q.2	Ansv a) b) c) d) e) f)	wer any four of the following. Define fungi. Occurrence of <i>Agaricus.</i> Define Pteridophytes. Draw a neat labelled diagram of T.S. of <i>Cycas</i> leaflet. Enlist any four characters of Archegoniate. Riccia belongs to which- 1. Class? 2. Division?	08					

Page 1 of 2

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) General characters of Zygomycotina.</li> <li>b) General characters of Ascomycotina.</li> <li>c) General characters of Basidiomycotina.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Enlist the economic importance of Gymnosperms.</li> <li>b) Explain in brief alternation of generation in <i>Riccia</i>.</li> <li>c) Explain in brief alternation of generation in <i>Albugo</i>.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain in detail sexual reproduction in <i>Cycas.</i></li> <li>b) Explain in detail classification of fungi up to class (as per Ainsworth).</li> </ul>	08

	<ul> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of log-tables and calculators is allowed.</li> <li>5) Use of Mobile is strictly prohibited.</li> </ul>					
Multiple choice questions.1) Which one of these is not a passive element?a) Inductorb) Transformer						
2)	c) If th resp a) c)	Battery e colour bands on a resistor are o pectively. The resistor value will b $82 \text{ K}\Omega, \pm 5\%$ $82 \Omega, \pm 20\%$	a) Grey e b) d)	Fuse $r_{r}$ , Red, Red and Golden 		
3)	An sec a) c)	oscilloscope shows five cycles of onds. The frequency of the sine-v 1 KHz 5 KHz	sine vave b) d)	-wave occurring in five milli is 25 KHz 10 KHz		
4)	If the peak value of a sine-wave is 20 volts, its RMS value will be approx					
	a) c)	 10 volt 20 volt	b) d)	14 volt 28 volt		
5)	At r a) b) c) d)	esonance, the impedance of the Purely resistive purely capacitive purely inductive partly capacitive and partly indu	serie ctive	es RLC circuit is		
6)	The statement "It is possible to simplify any linear circuit, no matter how complex, to an equivalent circuit with just single current source and paralle resistance connected to load" is the statement of theorem.a)Superpositionb)Thevenin'sc)Norton'sd)Maximum Power Transfer					
7)	Wh a) c)	ich parameters best describe the Z h	norn b) d)	nal two-port network? Y Transmission		
8)	theorem states that "In any network, if the voltage sources $V_1$ , $V_2,,V_n$ in series with internal resistances $R_1, R_2,,R_n$ respectively, are in parallel then these sources may be replaced by a single voltage					

B.Sc. (Semester - I) (New) (CBCS) Examination: March/Apri-2023 ELECTRONICS (Paper – I) **Basic Circuit Theory and Network Analysis (22221118)** 

**Instructions:** 1) All questions are compulsory.

#### Q.1

Day & Date: Thursday, 27-07-2023

Time: 09:00 AM To 11:00 AM

Seat

No.

- el
- source in series with single internal resistance.
  - Milliman's a)
  - Thevenin's c)

- b) Max. Power Transfer
- d) Norton's

SLR-QA-18

Ρ Set

Max. Marks: 40

#### 08

- Answer any four of the following.a) What do you mean by active and passive elements?
- b) Draw the equivalent electrical diagram of an ideal and practical voltage source.
- c) Explain bandwidth in brief.

Q.2

- **d)** State Thevenin's theorem.
- **e)** Write the four Y-parameter equations.

## Q.3 Write short notes on any two of the following.

- a) Explain the current-voltage phase relationship for pure inductor or pure capacitor.
- **b)** Give the classification of capacitors. Hence write the specifications and applications of any one capacitor.
- c) Explain Maximum Power Transfer Theorem.

## Q.4 Answer any two of the following.

- a) Determine the resonant frequency and bandwidth of a series RLC circuit, where
  - $R=10\Omega, C=10~\mu F$  and L=0.5~mH
- **b)** Find the voltage across A and B points i.e. 2  $\Omega$  resistor using Superposition theorem.

A 2ohm B

3ohm

A)2Amp

5ohm

201

10ohm

20ohm



10V(V



#### Q.5 Answer any one:

- a) Obtain the equation for parallel resonance frequency, bandwidth and quality factor of RLC circuit. Draw the response curve and explain.
- **b)** Obtain the h-parameters of a two-port network. Hence determine the h-parameters for given T- network.



08

08
	B.S	c. (Se	emester - I	) (New) (CB GEOGRA	CS) Exa PHY (Pa	mination: Marcl per – I)	n/April-2023
			C	Geomorphol	logy - I (2	22221124)	
Day Time	& Dat : 09:0	te: Thu 00 AM	ursday, 27-0 <sup>°</sup> To 11:00 AN	7-2023 M			Max. Marks: 40
Instr	uctio	o <b>ns:</b> 1) 2 3 4	) All question ) Figures to t ) Neat diagra ) Use of map	is are compuls he right indica ims must be di stencils is allo	ory. te full marł rawn where owed.	ks. ever necessary.	
Q.1	Sele 1)	ect the Geor a) c)	<b>e proper alte</b> morphology i Physical Economic	ernative and f s a branch of _	ill in the b Gec b) d)	<b>lank.</b> graphy. Human Historical	08
	2)	on th a) c)	is the scie e earth surfa Oceanogra Geomorpho	ntific analysis o ace. phy blogy	of origin ar b) d)	d development of t Climatology Biogeography	he landforms
	3)	a) c)	_ percent ar 29 61	ea is occupied	with land b) d)	on the earth. 51 71	
	4)	The a) c)	average den 4.5. 6.5	sity of the eart	h isb) d)	gram 3 cm. 5.5 7.5	
	5)	The ( a) c)	core of the e Sail Nife	arth is known a	as b) d)	Sima Mantle	
	6)	lgneo a) c)	ous rocks are Primary Tertiary	e also ro	ock. b) d)	Secondary Quaternary	
	7)	Foldi a) c)	ng is the res Sudden Slow	ult of m	ovement. b) d)	External Residual	
	8)	a) c)	_ is a sudde Folding Earthquake	n movement.	b) d)	Faulting Orographic	
Q.2	Ans a) b) c) d)	wer a Wha Stale Wha Wha	ny four of the tis means by the names by the names by the names by the names by the name b	ne following. y Geomorphole three layers of y fault?	ogy? the interio	r of the earth.	08

Set

Ρ

### Seat No.

Q.3	Wri <sup>:</sup> a) b) c)	<b>te short notes on any two of the following.</b> Nature of Geomorphology. Describes the types of faults. Describes of cause of volcanoes.	08
Q.4	Ans a) b) c)	wer any two of the following. Describes the types of igneous rocks. Explain the interior structure of the earth. Describes the importance of Geomorphology.	08
Q.5	Ans a) b)	wer any one of the following. What is earthquake? Explain its causes and effects. Describes the types of folding.	08

		S	LR-QA-	21			
Seat No.	t		Set	Ρ			
	B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 GEOLOGY (Paper - I) Physical Coology (22221110)						
Day & Time	& Da <sup>:</sup> : 12:(	Physical Geology (22221110) ate: Thursday, 27-07-2023 :00 PM To 02:00 PM	Max. Marks	: 40			
Instr	uctic	ons: 1) All questions are compulsory. 2) Figures to right indicate full marks.					
Q.1	Cho 1)	oose the correct alternative from the given option.The highest density in atmosphere occurs ata) Troposphereb) Stratospherec) Mesosphered) Exosphere		08			
	2)	Which one of the fallowing layers is in liquid state? a) Sial b) Sima c) Inner core d) Mantle					
	3)	The discontinuity between outer and inner core is known as a) Conrad b) Moho c) Repiti d) Lehman	_·				
	4)	According to Kant and Laplace hypothesis, Earth originated from _ a) Cold star b) Nebula c) Plasma d) magma	·				
	5)	Weathering is a process of of rocks by natural agents.a) Break downb) Compactionc) Bindingd) Deposition					
	6)	The core of the earth is composed primarily of a) abundance of Silica b) abundance of Magnes c) abundance Nife d) Ca fe	ium				
	7)	Seismograph instrument is used to record intensity of a) Volcano b) Earthquake c) Landslide d) Water flow					
	8)	Rate of weathering depends ona) Temperatureb) Moisturec) Compositiond) All of these					
Q.2	Ans a) b) c) d) e) f)	swer any four of the following. Average density of Earth. size of earth. Define Earthquake. Define Volcano. Define weathering. Which is the coldest layer of the Atmosphere?		08			

Q.3	Write a) b) c)	<b>e short notes on any two of the following.</b> Explain layers of Atmosphere. Describe rock cycle. Explain products of Volcano.	80
Q.4	Ansv a) b) c)	<b>wer any two of the following.</b> Explain Central eruption of volcano. Explain seismograph and seismograph. Explain Physical weathering.	80
Q.5	Ansv a) b)	<b>wer any one of the following.</b> Explain Nebular hypothesis. Describe Internal Structure of the Earth.	08

Seat No.		Se	et	Ρ
I	B.Sc	c. (Semester - I) (New) (CBCS) Examination: March/April-202 ELECTRONICS (Paper - II) Digital Eurodomontole (22221110)	3	
Day & Time:	Date 09:0	e: Friday, 28-07-2023 Max. Ma D AM To 11:00 AM	rks	: 40
Instru	ictio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to right indicate full marks.</li> <li>4) Use of log table and calculator is allowed.</li> <li>5) Use of Mobile is strictly prohibited.</li> </ul>		
Q.1	Mult 1)	i <b>ple choice questions.</b> The binary equivalent of decimal 122 is a) 1111010 b) 1011111 c) 1110111 d) 1110011		08
	2)	The octal equivalent of binary 1010110 is a) 86 b) 126 c) 56 d) <i>A</i> 6		
	3)	The Gray code for binary 1111 is         a) 1001       b) 1101         c) 1000       d) 1100		
	4)	Applying DeMorgan's theorem to logic equation $\overline{\overline{A + B \cdot C}}$ , we get a) $A + B + C$ b) $\overline{A + B} + \overline{C}$ c) $\overline{A} + \overline{B} + \overline{C}$ d) $A + B + \overline{C}$		
	5)	As per the basic Boolean rules of Boolean algebra, $(A + B) \cdot (A + C) =$ a) $A + B \cdot C$ b) $C + A \cdot B$ c) $B + A \cdot C$ d) $A + B + C$		
	6)	Which one of these logic equations represent Associative law. a) A. $(B + C) = A.B + A.C$ b) A + $(B + C) = (A + B) + C$ c) A + B = B + A d) A + $\overline{A} \cdot B = A + B$		
	7)	The parity of binary number 11010101 is a) Even parity b) Odd parity c) Zero parity d) Equal parity		
	8)	Which one of these units is the control unit of digital computer system? a) Input unit b) Output unit		

d) Central Processing Unit

c)

Storage unit

#### Q.2 Answer any four of the following.

- a) Give the signed binary representation of signed decimal number -14.
- b) Obtain the Excess-3 code for decimal 29.
- c) Draw the negative logic truth-table for AND gate.
- d) Apply the DeMorgan's theorem to logic equation  $\overline{\overline{A+B} + \overline{B\cdot C}}$
- e) Draw the logic diagram of Ex-OR gate as controlled-inverter.

#### Q.3 Write short note on any two of the following.

- a) ASCII Code.
- **b)** Organization of Digital Computer.
- c) Hexadecimal Number System.

#### Q.4 Answer any two of the following.

- **a)** Draw the Karnaugh map for 4-variables and apply it for the given logic equation  $\overline{ABCD} + \overline{ABCD} + AB\overline{CD} + AB\overline{CD} + AB\overline{CD} + A\overline{BCD} + A\overline{BCD}$
- **b)** Explain 4-bit parallel binary adder.
- c) Explain NOR gate as universal gate.

#### Q.5 Answer any one:

- a) Draw the pin diagrams for IC 7400, 7402, 7404 and 7486. Explain in brief.
- **b)** Explain Half and Full subtractor with proper logic diagram and truth-table.

08

## SLR-QA-22

#### 08

#### 08

			Geomorphology -	II (2	22221125)	
Day a Time	& Dat : 09:0	e: Frida )0 AM T	y, 28-07-2023 o 11:00 AM			Max. Marks: 40
Instr	uctio	ns: 1) A 2) [ 3) l	All questions are compulsory. Draw neat maps and diagram wl Jse of maps stencil is allowed.	here	ver necessary.	
Q.1	Muli 1)	tiple ch  a) F c) E	<b>oice questions.</b> weathering is carried on by veg Physical Biological	etati b) d)	on and animal. Chemical None of these	08
	2)	a) H c) \	is erosional landform of Glacier lorns ⁄ardang	s. b) d)	Eskers Waterfall	
	3)	a) F c) V	has postulated the concept of 'o R.A. Ray V.M. Davis	b) b) d)	e of erosion'. Charles Darwin A. Wegener	
	4)	Beach a) ( c) (	es are the depositional landform Glaciers Dceanic waves	is m b) d)	ade by Winds None of these	
	5)	a) F c) E	erosional landform of wind. Rapids 3arkhan	b) d)	Leaves Zeugen	
	6)	Delta i a) ( c) F	s formed due to the depositiona Glaciers River	l wo b) d)	rk of Winds None of these	
	7)	Oxidat a) E c) (	ion is type of weathering. Biological Chemical	b) d)	Physical None of these	
	8)	a) L c) E	is a function of structure, proces andscape Earthquake	ss ai b) d)	nd time. Volcano None of these	
Q.2	Ans a) b)	<b>wer an</b> What is What is	<b>y four of the following</b> . s Geomorphic Process? s weathering?			08

- What is Mushroom Rock? C)
- What is Flood Plain? d)
- What is Mass Wasting? e)
- What is Barkhan? f)

B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 **GEOGRAPHY** (Paper - II)

Seat No.

# SLR-QA-24

Set P

Q.3	<ul> <li>Write Short notes on any two</li> <li>a) Waterfall</li> <li>b) Erosion</li> <li>c) U Shaped Valley</li> </ul>	of the following.	08
Q.4	<ul> <li>Answer any two of the follow</li> <li>a) Explain the types of Chem</li> <li>b) Explain the Trio of Devis?</li> <li>c) Explain the Meanders and</li> </ul>	<b>ing.</b> lical Weathering? Ox-Bow Lake?	08
Q.5	<ul> <li>Answer any one of the follow</li> <li>a) What is mass wasting? Ex</li> <li>b) Explain the erosional land</li> </ul>	<b>ing.</b> plain the types of mass wasting? form of River?	80

Seat No.			Set	Ρ
	B.So	c. (Semester - I) (New) (CBCS) Examination: GEOLOGY (Paper - II) Paleontology (22221111)	March/April-2023	
Day & Time:	a Dat 12:0	te: Friday, 28-07-2023 00 PM To 02:00 PM	Max. Marks	: 40
Instru	uctio	<ul><li>ans: 1) All questions are compulsory.</li><li>2) Figures to the right indicates full marks.</li></ul>		
Q.1	Sele 1)	ect correct one. The remains of plants and animals in the rock is called a) Fossils b) deposit c) Lava d) Sediments	l as	08
	2)	species is extinct. a) Productus b) Turritella c) Cardita d) Trilobites		
	3)	Plants leaf preserved in rock.a) Argillaceousb) Arenaceouc) Rudaceousd) Volcanic	IS	
	4)	Micraster belongs to a) Alcyonaria b) Echinoidea c) Brachiopoda d) Gastropod	a	
	5)	A branch of geology which deals with evolution of life i a) Petrology b) Paleontolo c) Geochemistry d) Geophysic	s gy s	
	6)	Cardita belongs to a) Gastropoda b) Cephalopo c) Lamellibranchia d) Arthropoda	oda a	
	7)	Physa belongs toa) Alcyonariab) Zoanthoriac) Braehiopodad) Gastropod	a	
	8)	The mode of preservation of fossil isa) mouldb) Castec) Carbonationd) all of these	,	
Q.2	Ans a) b) c) d) e) f)	wer any four of the following. Write preservation of fossil in cold climate. Write Difference between caste and mold. What is fossil? Write preservation of fossil in amber. Write Geological period of Trilobites. Immprints		08

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Morphology of Turritella.</li> <li>b) Classification and Geological age of Spirifer and Nautilus.</li> <li>c) Morphology of Micraster.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain conditions of fossilization.</li> <li>b) Explain morphology of Trilobites.</li> <li>c) Describe morphology of Voluta and Tubipora.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain evolutionary history of horse.</li> <li>b) Explain Morphology, distribution and Significance of Gondwana flora.</li> </ul>	08

0	.		
Seat No.		Set	Ρ
	B.S	c. (Semester – I) (Old) (CBCS) Examination: March/April-2023 ENGLISH (COMPULSORY)	
Day & Time:	& Date : 09:0	e: Tuesday, 18-07-2023 Max. Marks 0 AM To 11:00 AM	: 40
Instru	uctio	<ul><li>ns:1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li></ul>	
Q.1	Mult 1)	t <b>iple choice questions:</b> Mahatma Gandhi was asked to speak on the subject of a) politics b) religion c) painting d) sports	08
	2)	Jadav Payeng started to work at the age a) 20 b) 18 c) 16 d) 14	
	3)	Rabindranath Tagore wanted to face the in his life. a) pleasures b) dangers c) bliss d) luxuries	
	4)	The Lotus flower is a product of the two flowers: rose and a) jasmine b) marigold c) lily d) hyacinth	
	5)	In the word 'international', 'inter-' is an example of a) a suffix	
	6)	The word 'develop' should take for making it a bigger word.a) -tionb) -hoodc) -mentd) -ies	
	7)	The word 'teacher' is a noun. a) proper b) collective c) abstract d) common	
	8)	He looked <u>at</u> his parents. The underlined word in this sentence is a) conjunction b) adjective c) preposition d) pronoun	
Q.2	Ansv a) b) c) d) e)	wer the following questions briefly. (Any Four) How was khadi important according to Mahatma Gandhi? Where did Jadav Payeng work and how? What happened after the grandmother of Khushwant Singh passed away? What was the reason for dispute in Toru Dutt's "The Lotus"? What did the father see when he went to his son's bedroom?	12

f) How did Rabindranath Tagore want to win his freedom?

- Q.3 a) Define communication and describe the process of communication in detail. 10 OR
  - **b)** Write a note on the Formal and Informal channels of communication.
- **Q.4** Describe a Super Market in your city with all the details.

Seat			
No.			

### B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 **CHEMISTRY** (Paper - I) Physical Chemistry (19201106)

Day & Date: Wednessday, 19-07-2023

Time: 09:00 AM To 11:00 AM

**Instructions:** 1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of algorithmic tables and calculator is allowed.
- (At. Wt. H=1, C=12, O=16, N=14, Na=23, CI=35.5)

#### Q.1 Choose the most correct alternative and rewrite the sentence:

- If the rate expression for the reaction is  $(dx/dt) = KA^{1/2}B^{3/2}$ . The overall order 1) of the reaction is
  - 3/2 b) 1/2 a)
  - c) 2 d) 3

#### 2) Van der walls equation explains the behavior of

- mixture of gases a) b) real gases
  - ideal gases d) none of the above c)

#### Efficiency of a heat engine is \_\_\_\_\_ 3)

- zero b) one a) c) less than one d) greater than one
- 4) Ostwald's isolation method is used to determine of reaction. b) molecularity order
  - a) d) velocity c) rate
- 5) The equation, y = mx + c, represents
  - Parabola b) Hyperbola a)
  - d) none of these Straight line c)

#### The unit of a in Van der walls equation is 6)

b) Nm<sup>-2</sup>(dm<sup>3</sup>)<sup>-2</sup>mole<sup>-2</sup> Nm<sup>-2</sup>(dm<sup>3</sup>)<sup>2</sup>mole<sup>-2</sup> a) d) Nm<sup>-2</sup>(dm<sup>3</sup>) mole<sup>-2</sup>

Nm<sup>-2</sup>(dm<sup>3</sup>)<sup>2</sup>mole<sup>-1</sup> c)

7) The unit of rate constant for a first order reaction is

- b) dm<sup>3</sup>mole<sup>-1</sup>sec<sup>-1</sup> dm<sup>3</sup>sec<sup>-1</sup> a) sec<sup>-1</sup> sec<sup>+1</sup> d) c)
- In a certain graph, the straight line obtained is parallel to x-axis. Hence its 8) slope is
  - a) zero b) - 1 d) 0.5 c) + 1

Max. Marks: 40

80

08

#### Q.2 Answer any four of the following:

- a) Write the kinetic equations for second order reaction, when reacting substances are at the same initial concentration and at different initial concentrations.
- **b)** Write any two rules of differentiation.
- c) Give any two statements of second law of thermodynamics.
- d) Write the reaction of hydrolysis of methyl acetate in presence of HCI.
- e) What do you mean by ideal gas and non-ideal gas?
- f) What is continuity of a state?

### Q.3 Attempt any two of the following:

- a) Explain definite integral and write one example related to chemistry.
- b) Write and explain the Joule-Thomson effect.
- c) Write a note on partial derivative.

### Q.4 Attempt any two of the following.

- a) Derive an expression for velocity constant of a first order reaction.
- b) A second order reaction where a = b is completed to the extent of 40 percent in 480 seconds. How long will it take for the reaction to go to 70 percent completion?
- c) What is an isotherm? Explain Andrew's isotherm for carbon dioxide gas.

### Q.5 Attempt any one of the following:

a) What are the requirements for liquification of gases? The critical temperature and the critical pressure for a gas 562 K and 48.6 x 1.013 x 10<sup>5</sup> Nm<sup>-2</sup> respectively.

R =  $0.08205 \text{ x} 1.013 \text{ x} 10^5 \text{ dm}^3 \text{ Pa } \text{K}^{-1}\text{mol}^{-1}$ . Find the Van der Wall's constants a and b.

**b)** What do you understand by Carnot theorem? Calculate the minimum amount of heat that must be withdrawn from the hot reservoir at 410 K to obtain work equal to 15 kJ per cycle. The lower temperature of the cycle is 290K.

80

80

Seat No.			Set	Ρ	
	B.S	Sc. (Semester - I) (Old) (CBCS) Examination: March/Apri COMPUTER SCIENCE (Paper – I) Eundamental of Computer (19201120)	1-2023		
Day & Time:	Day & Date:         Wednesday, 19-07-2023         Max. Marks: 40           Time:         12:00 PM To 02:00 PM         Max. Marks: 40				
Instru	uctio	<ul><li>ans: 1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li></ul>			
Q.1	<b>Cho</b> 1) 2)	Dose Correct Alternatives.Which of the following is the smallest unit of storage?a) GBb) KBc) MBd) TBDefault extension of power point file is		08	
	_,	a) .txt b) .pptx c) .docx d) all of these.			
	3)	To save a new text file short cut key is used. a) Ctrl + Z b) Ctrl + O c) Ctrl + V d) Ctrl + S			
	4)	The bar at the bottom of a window that holds no. of applications is l as a) title bar b) status bar c) menu bar d) task bar	Known		
	5)	Magnetic tape is storage device. a) Random b) Sequential Accessed c) Track d) None of These			
	6)	Computer Monitor is also known as a) DVU                        b) UVD c) VDU			
	7)	1Gb is equal to a) 1024 bytes b) 1024 Kb c) 1024 Mb d) 1024 Tb			
	8)	is the volatile memory of computer. a) RAM b) ROM c) Both a and b d) None of the Above			
Q.2	Atter a) b) c) d) e) f)	empt any four of the following. Define output Device? Define Application Software? Define hardware? List out ail input devices. What is Mail-merge? What is computer?		08	

Q.3	Wrii a) b) c)	<b>te short notes on any two of the following.</b> Smart art and charts Primary memory Microcomputer	08
Q.4	Ans a) b) c)	wer any Two of the following. Explain mouse and its types. How to create power point presentation file. Write any four excel functions with example.	08
Q.5	Ans a) b)	wer any one of the following questions. Write the steps of mail merge. Write the features of MS-Word.	08

NO.		
B.Sc. (	(Semester - I) (Old) (CBCS) Examination: Ma CHEMISTRY (Paper–II) Inorganic Chemistry (19201107)	arch/April-2023
Day & Date: T Time: 09:00 A	<sup>-</sup> hursday, 20-07-2023 เM To 11:00 AM	Max. Marks: 4
Instructions	<ul> <li>3: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherevers</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed 0=16, N=14, Na =23, Cl 35.5).</li> </ul>	er necessary. d. (At. Wts.: H=l, C=12,
Q.1 Fill in th	he blanks by choosing correct alternatives (eight):	0

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### ternatives (eight):

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- b) Octahedral a) Linear Tetrahedral d) trigonal bipyramidal C) The bond order of C2 molecule is
- 2) a) One b) Two c) Three d) Four 3) The bond order of Li<sub>2</sub> molecule is 2 a) 1 b) 0 d) 1.5 c) Halogens have \_\_\_\_\_ electron affinity. 4) a) Low b) Medium c) High d) Zero s-orbital has\_\_\_\_ shape. 5) a) dumb-bell b) Square c) Spherical d) triangular The co-ordination number of ion in CsC1 is 6) 8 a) b) 6 d) 5 c) 4 The crystal structure of NaC1 is 7) b) FCC a) BCC
- c) Cubic d) hexagonal 8) The geometry of water molecule is b) octahedral a) V shaped Linear d) Hexagonal c)

#### Q.2 Answer the following questions briefly (any four):

- State Aufbau principle. a)
- Draw the shape of s-orbital. b)
- What is unit cell? C)
- Draw the diagram for formation of H<sub>2</sub> molecule. d)
- Give any two limitations of VBT. e)
- Give the conditions for successful overlap of atomic orbitals. **f**)

Max. Marks: 40

SLR-QA-29

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Q.3	Wrii a) b) c)	<b>te notes on any two of the following.</b> VSEPR theory. Shape of p orbital. LCAO principle.	80
Q.4	Atte a) b) c)	empt any two the following Discuss the s-s and s-px overlapping. What are Fajan's rules? Give its significance? Explain the formation of BeC1 <sub>2</sub> molecule.	08
Q.5	Ans a) b)	wer any one of the following. What is electron affinity? Discuss its trend in a period and in a group in the periodic table. Describe the structure of rock salt with respect to unit cell, co-ordination number and stoichiometry.	08

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B.S	Sc. (Semester - I) (O COMP Progran	d) (CBCS) Examination: Ma UTER SCIENCE (Paper–II) nming Using C-I (19201121)
Day & Da Time: 12:	ate: Thursday, 20-07-202 :00 PM To 02:00 PM	23
Instructio	ons: 1) All questions ar	e compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
  - 3) Figures to the right indicate full marks.
  - 4) Use of logarithmic table and calculator is allowed.

#### Q.1 Multiple choice questions

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- 1) \_\_\_\_\_ is the name given to memory address where data is stored.
  - a) Operator b) Variable
  - c) Keyword d) Special symbol
- 2) The range of integer data type varies from \_\_\_\_\_ to
  - a) -128 to 127 b) -32768 to 32767
  - c) 3.4e-38 to 3.4e+38 d) None of these
- **3)** \_\_\_\_\_ format code is used to read long integer.
  - a) %d b) %f c) %ld d) %lf
- 4) Which of the following is a valid example of string constant?
  - a) "sizeof" b) 'emp' c) 'byte' d) 'address'
  - is the unconditional branching statement.
  - a) For b) Switch
    - c) If d) Goto
- 6) \_\_\_\_\_function not belongs to math.h header file.
  - a) clrscr() b) pow()
    - c) Log10() d) None of these.
- 7) The statement terminator is\_\_\_\_\_
  - a); b): c)# d) }
- 8) escape sequence character causes to transfer control to next
  - a) \t b) \a c) \n d) \b

### Q.2 Answer any four of the following

- a) What is debugging?
- **b**) What is flowchart?
- c) Define problem.
- d) What is tracing?
- e) What is reserve word?
- f) What is Compiler and interpreter?

SLR-QA-30



Max. Marks: 40

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Q.3	Writ a) b) c)	<b>e short notes on any two of the following</b> Table of String Pseudo Code Characteristics of algorithm	08
Q.4	Ans a) b) c)	<b>wer any Two of the following</b> Write a program to display addition of matrix. What is programming languages? Explain all types. Define error? Explain all types of error.	08
Q.5	Ans a) b)	<b>wer any one of the following</b> What are the inbuilt string handling functions? Explain any four functions in details. What is array? Explain all the types of array.	08

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B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 PHYSICS (Paper – I)

Mechanics and properties of matter (19201104)

Day & Date: Friday, 21-07-2023

Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
- 2) Figures to the right indicate full marks.
- 3) Use of logarithmic table and calculator is allowed.

(At. Wts.: H=1, 012, 0=16, N= 14, Na =23, Cl = 35.5)

#### Choose correct alternatives from the options. Q.1

- Dimensions of coefficient of viscosity are 1)
  - b)  $[M^{1}L^{1}T^{1}]$ a)  $[M^0L^1T^1]$ c)  $[M^{1}L^{-1}T^{-1}]$ d) [M<sup>-1</sup>L<sup>-1</sup>T<sup>-1</sup>]
- 2) If T is the surface tension of soap solution then the excess pressure inside the bubble of radius r is .
  - 2Ta) b) 2rr  $\frac{4T}{r}$  $\frac{T}{4r}$ d) C)

The theoretical limiting values of Poisson's ratio are 3)

- a) -1 and+0.5 b) -1 and -0.5 d) -1 and+1 c) +1 and -0.5
- The length of an equivalent simple pendulum of the compound pendulum is 4)

	•		
a)	$\frac{k^2}{1} + l$	b)	$k^2 + l^2$
	$l^2$		2
c)	$k^2 + l^2$	d)	$k^2 + l^2$
,	1	,	

- 5) If radius of spherical shell is doubled then its moment of inertia about its diameter
  - a) becomes two times b) reduces to half
  - d) becomes four times c) remains constant
- \_\_\_\_ in pressure on the liquid. Viscosity of a liquid increases with \_\_\_\_ 6) a) no change b) Decrease
  - d) none of these
- 7)
- c) Increase The elastic constants Y,  $\eta$  and K are related as  $_{3K\eta}$  b)  $Y = \frac{9K\eta}{3K+\eta}$  $C) \quad Y = \frac{6K\eta}{3K+\eta}$ d)  $Y = \frac{9K\eta}{3\eta+k}$

#### The modulus of rigidity of the material of wire can be determined using 8) \_\_\_\_\_ pendulum.

a)	bar	b)	bifilar
c)	kater's	d)	torsional

Max. Marks: 40

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#### Q.2 Answer any four of the following.

- a) Calculate the difference of pressure between the two sides of the surface of a spherical drop of water of radius 0.4 mm. Surface tension of water is 0.075 N/m.
- b) Define critical velocity and write its equation.
- c) Write the equation of moment of inertia of flywheel.
- d) Define compound pendulum and torsional pendulum.
- e) List the factors affecting surface tension.
- f) Define Young's modulus and Bulk modulus.

#### Q.3 Write short notes on any two of the following.

- a) Jaeger's method to determine the surface tension of a liquid.
- b) The effect of temperature and pressure on the viscosity of liquid.
- c) Theory of Poisson's ratio of rubber tube.

#### Q.4 Answer any Two of the following.

- a) Calculate M.I. of a circular disc of mass 500 gm and diameter 0.2m
  - i) about its diameter and
  - ii) about its centre and perpendicular to its plane.
- b) Explain the sources of errors in Kater's pendulum.
- c) The pressure inside a soap bubble balances 0.14cm of an oil column. Surface tension of the soap solution is 30 dyne/cm and density of the oil is 800 kg/m<sup>3</sup>. Calculate the radius of soap bubble.

#### Q.5 Answer any one of the following.

- a) State and prove the Bernoulli's theorem for the flow of liquids in pipes. Water flows through a horizontal pipe of varying cross-section. The velocity of flow is 60 cm/s where the pressure of water is  $7 \times 10^4$  dyne/cm<sup>2</sup>. What will be the pressure if the velocity is 40 cm/s? ( $\rho = 1$  gm/cm<sup>3</sup>)
- **b)** Derive the relation between elastic constants.

	B.S	c. (\$	Semester - I) (Old) (CBCS) E MICROBIOLOG Fundamentals of Micro	Exam Y (Pa biolo	nination: March/April-2023 aper–I) ogy (19201114)
Day & Time:	& Date 12:00	: Fri ) PN	day, 21-07-2023 I To 02:00 PM		Max. Marks: 40
Instru	uction	<b>is:</b> 1 2 3	) All questions are compulsory. ) Draw neat diagram and give equ ) Figures to the right indicate full n	ation narks	whenever necessary.
Q.1	Choc 1)	<b>ose t</b> The a) c)	<b>he correct alternatives from the</b> term "Very little animalcules" was Louis Pasteur Robert Koch	o <b>ptic</b> first f b) d)	ons. 08 time described by Robert Hook Antony Van Leeuwenhoek
	2)	Prir a) c)	nciple of active immunization was o Robert Koch Louis Pasteur	discov b) d)	vered by Joseph Lister Edward Jenner
	3)	Jos a) c)	eph Lister developed techn Vaccine development Pure Culture	iques b) d)	Antiseptic surgery Both b and c
	4)	Nuc a) c)	cleolus and Nuclear membrane is a Viruses Eukaryotic cell	absen b) d)	it in Prokaryotic cell Fungi
	5)	cell a) c)	method or technique is used fo Micrometer Micrometry	br mea b) d)	asurement of size of bacterial Nanometer Haemocytometer
	6)	Cel arra	l divides in three planes in a regula anged in cuboidal manner, this type	ar pat e of b	tern producing eight cocci acterial arrangement is called as
		a) c)	Tetrads Bacillus	b) d)	Sarcina Cocci
	7)	a) b) c) d)	criteria are used for bacterial c Morphological characteristics Cultural and Biochemical character Serological characteristics All of the above	lassifi eristic	cation. s
	8)	a) c)	is the connecting link between Archaebacteria Rickettsia	bacte b) d)	eria and viruses. Actinomycetes Fungi

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#### Q.2 Answer any four of the following.

- 1) Enlist the various branches of microbiology.
- 2) Draw the structure of typical bacterial cell and label to the specific structure and organelle of the cell.
- 3) Write the general properties of the viroids.
- 4) Write in short about economic importance of protozoa.
- **5)** Write in short about contribution of Alexander Fleming.
- 6) Define virus and give any two examples of it.

### Q.3 Write short note on any two of the following.

- a) Write note on various beneficial and harmful activities of microorganisms.
- b) Describe in short about structure of capsule of bacteria.
- c) What is Acellular microorganisms and describe in short about general properties of virus.

### Q.4 Answer any two of the following.

- a) Describe in detail about the structure of plasma membrane of bacteria.
- **b)** Write in detail about general characteristics of Archaebacteria.
- c) Enlist the various differences between prokaryotic and eukaryotic cell.

### Q.5 Answer any one of the following.

- a) Describe in detail about structure and function of Gram negative bacterial cell wall.
- **b)** Define soil microbiology and describe in detail about contribution of Martinus Beijerinck and Sergei Winogradsky.

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Time	: 09:0	0 AM	To 11:00 AM		
Instru	uctio	ns: 1) 2) 3) 4)	) All questions are compuls ) Figures to the right indica ) Neat labelled diagrams m ) Use of log table and calcu	ory. te full mark nust be drav ulator is allo	s. wn wherever necessary. owed.
<ul> <li>Q.1 Multiple choice questions.</li> <li>1) principle states that the travelling between two points will follow to route with smallest optical path length.</li> <li>a) Fermat</li> <li>b) Newton</li> <li>c) Einstein</li> <li>d) Gauss</li> </ul>					
	2)	The l a) c)	lowest existing energy stat metastable excited	e is called _ b) d)	state. normal excited ground
	3)	The ı a) c)	mode of achieving populati optical pumping chemical reaction	ion inversio b) d)	n in Ruby laser by forward basing inelastic scattering
	4)	Newt a) c)	ton's ring Demonstrate the diffraction interference	phenomen b) d)	on of polarization dispersion
	5)	A bea havir diffra a) c)	am of monochromatic light ng 6000 lines/cm and the s icted at 30°. The waveleng 4166 Å 3324 Å	is incident econd orde th of the lig b) d)	on a plane transmission grating r spectral line found to be ht is 4233 Å 4343 Å
	6)	The a a) c)	aperture is called as a perimeter length	of lens. b) d)	diameter radius of curvature
	7)	Frau wher diffra a) c)	nhofer diffraction equation in the diffraction pattern is v iction object. short medium	is used to r iewed at a b) d)	model the diffraction of waves distance from the long tiny
	8)	a) c)	_ spectrum/s can be achie 1 3	eved by pris b) d)	m spectra. 2 4

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### B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 PHYSICS (Paper – II) Optics and Laser (19201105)

Day & Date: Saturday, 22-07-2023

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Max. Marks: 40

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### Q.2 Answer any four of the following.

- a) State the methods to minimize chromatic and spherical aberration.
- **b)** Define diffraction grating and grating element.
- c) Distinguish between Fresnel and Fraunhofer diffraction.
- d) What do you mean by metastable state in laser?
- e) Draw the neat labelled diagram of Gauss eye-piece.
- f) List the applications of laser in different fields.

### Q.3 Write short notes on any two of the following.

- a) Write a note short on Newton's rings.
- b) Write a note on Einstein's coefficients and Einstein's relation.
- c) Write a note on determining wavelength of spectral lines using plane diffraction grating.

### Q.4 Answer any two of the following.

- a) Light of wavelength 5893 Å is incident on a glass plate of refractive index 1.33 such that the angle of refraction is 60°. Calculate the thickness of the plate which will make it dark by reflection.
- b) Obtain an expression fringe width of wedge shaped film.
- c) Obtain first law of reflection by Fermat's principle.

### Q.5 Answer any one of the following.

- a) Explain in brief principle, construction and working of optical bench.
- b) A lens is made up of focal length of 48 cm. Calculate longitudinal chromatic aberration if refractive index  $\mu_v$  for one colour is 1.45 and other is 1.5.

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B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 **MICROBIOLOGY** (Paper – II) **Basic Techniques in Microbiology (19201115)** 

Day & Date: Saturday, 22-07-2023 Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.

Define resolving power.

Give role of lodine in Gram- staining.

e)

**f**)

- 2) Draw neat diagrams and give equations wherever necessary.
- 3) Figures to the right indicate full marks.

#### **Q.1** Rewrite the sentences by selecting correct alternatives given below. of the compound microscope helps in gathering and focusing light 1) rays on the specimen to be viewed. a) Eye piece b) Objective c) Condenser Magnifying lens d) is example of differential staining. 2) Simple staining b) Positive staining a) Negative staining d) Acid fast staining C) Rn Cram-stanning alcohol acts as \_\_\_\_ 3) a) Fixative b) Stain Decolorizer d) Mordent c) 4) is basic stain. Crystal violet Nigrosine a) b) Eosin Congo-Rent c) d) Rn Autoclave temperature of sterilization is 5) 60°C 180°C a) b) 121°C 160°C c) d) is used for purification of water. 6) Alcohol b) Chlorine a) UV light d) heat c) Cell wall is stained by \_\_\_\_\_ 7) a) Albert's method b) Giemsa method c) Chance's method d) Baelyes method UV light is 8) agent used for Sterilization. a) Chemical b) Physical Biological d) Physico-Chemical c) Q.2 Answer any four of the following. **08** Define magnification power. a) Define sterilization. b) List chemicals used for sterilization. C) Examples of antiseptic agents. d)

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Max. Marks: 40

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Capsule staining.</li> <li>b) Streak plate technique.</li> <li>c) Introduction to electron microscope.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Write on classification of stains.</li> <li>b) Negative staining.</li> <li>c) Write on gaseous sterilization.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Power plate method.</li> <li>b) Physical method used in sterilization.</li> </ul>	08

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B.Sc. (Semester – I) (Old) (CBCS) Examination: March/April-2023 STATISTIC (Paper - I)						
Day & Time:	& Date 09:00	Sunday, 23-07-2023         Max. M           AM To 11:00 AM         Max. M	larks	: 40		
Instru	uction	<ul> <li>s:1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>				
Q.1	Multi 1)	ble choice questions: Primary data means a) Original data b) It may be result of survey c) It may be result of enguiry d) All the above		08		
	2)	Mode of a distribution can be obtained from a) Histogram b) Less than ogive c) More than ogive d) None of these				
	3)	The value of P <sub>50</sub> a) is equal to Q <sub>1</sub> b) is equal to D <sub>5</sub> c) is equal to Q <sub>3</sub> d) None of these				
	4)	If the first and last class intervals are open, then we can use as ameasure of dispersion.a) Rangeb) Quartile Deviationc) Mean Deviationd) Coefficient of Variation				
	5) If Bowley's coefficient of skewnessis and +1 then the median is equal to					
		a) Q1 b) Q3 c) Mode d) Mean				
	6)	Which of the following is suitable measure of central tendency for the dat 2, 3, -4, 6, 2? a) Only G.M b) Only A.M. c) Only H.M. d) Both A.M. and G.M.	a 0,			
	7)	Mean deviation is least when measured from a) Mean b) Median c) Mode d) Zero				
	8)	If the distribution is symmetric, then all moments are zero. a) even ordered central b) odd ordered central c) odd ordered raw d) raw and central				
Q.2	Ansv a)	<b>er any four of the following.</b> Define class mark and class interval.		08		

- **b)** Define A.M. and H.M.
- c) State empirical relation between mean, median and mode.
- d) Define quartile deviation and coefficient of Quartile Deviation.
- e) Define Raw moment and Central moment.
- f) Define Karl Pearsons coefficient of skewness.

#### Q.3 Write short notes on any two of the following

- a) Distinguish between qualitative data and quantitative data.
- **b)** Find mean of first n natural numbers.
- c) State and prove minimal property of mean square deviation.

#### Q.4 Answer any Two of the following.

- a) State and prove effect of change of origin and scale on A.M.
- b) Given that  $n = 10 \sum (X 20) = 8 \sum (X 20)^2 = 762$  Find mean, S.D. and C.V.
- c) Write a note on skewness.

#### Q.5 Answer any one of the following

- a) Define median and derive the formula for median in case of continuous frequency distribution.
- b) Obtain the first four central moments in terms of central moments.

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tio	ns: 1) 2) 3)	All questions are compulsory. Draw neat diagrams and give eq Figures to the right indicate full r	quati mark	ons wherever necessary. s.
	4)	Use of logarithmic table and cal	culat	or is allowed.
lul' )	tiple C Earth	<b>hoice Questions.</b> worm belongs to class of Polychaeta	phyli	um annelida. Oligochaeta
	c)	Hirudinea	d)	Mammalia
)	Nutriti a) c)	ion mode of amoeba is Holozoic Merozoic	b) d)	Saprophytic Desmozoic
)	, The b	ody surface of sycon is perforate	éd by	numerous pores, called a
	a) c)	 Ostia Choanopores	b) d)	Prosopyle Desmosomes
)	In Cni tentac a) c)	idaria is umbrella shaped, cles. Polyp Sepia	, cen b) d)	trally located mouth and m Medusa Ilech
)	Liver 1 a) c)	fluke is example of phylum Annelida Mollusca	b) d)	Platyhelminthes Arthropoda
)	Arthro the a) c)	opod eyes are called compound each of which functions as Oomatidium Mandibles	eyes a se b) d)	, are made up of repeating parate visual receptor. Phallomere Cochlea
)	In a) c)	class of phylum mollusca bo Aplacophora Polyplacophora	dy sl b) d)	nell is composed with 6-8 ן Monoplacophora Globosa
)	a) c)	_ bears spiny skin surface. Protozoa Echinodermata	b) d)	Annelida Mollusca
ns ) )	wer ar Write Define	<b>ny four of the following.</b> any two economic importance o e the term polymorphism	f phy	lum Mollusca.

### B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 ZOOLOGY (Paper - I)

Day & Date: Sunday, 23-07-2023

Time: 12:00 PM To 02:00 PM

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Animal Diversity | (19201122)

- 4 narginal
- 5
- 6 g units,

7` plates.

- 8
- Q.2 Α
  - a)
  - b) me me term polymorphism.
  - Name the locomotory organs and type of locomotion in paramecium. C)
  - Write two sub classes of arthropoda with an example. d)
  - What is endoparasite? e)
  - Write any two parasitic adaptations in Ascaris lumbricoides. **f**)

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Max. Marks: 40

Q.3	Wri a) b) c)	<b>te short notes on any two of the following.</b> Discuss economic importance in insects. Explain the mechanism of locomotion in amoeba. Write any four general characters of phylum Arthropoda.	08
Q.4	Ans a) b) c)	<b>swer any Two of the following.</b> Describe water vascular system in Asteroidea. Write general characters of phylum annelida. Discuss any two classes of Phylum Echinodermata.	08
Q.5	Ans a) b)	<b>swer any one of the following.</b> Explain in detail life history of Taenia solium. Describe canal system in Sycon.	08

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STATISTICS (Paper – II) Probability and Probability Distributions – I (19201109) Day & Date: Monday, 24-07-2023 Time: 09:00 AM To 11:00 AM **Instructions:** 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Use of calculator is allowed. Q.1 Choose correct alternatives from the options. The sample space of an experiment consists of 'n' points. Its power set will 1) contain . b) 3<sup>n</sup> a)  $2^{n}$ 

B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023

- c) 2n+1d) None of these
- A ticket is drawn from 25 tickets numbered 1 to 25. Define an event as: the 2) number drawn is a prime number. Then number of elements in the event is
  - a) 9 b) 10 c) 11 d) {1, 2, 3, ... ... 23}

Which of the following relation does not hold? 3)

a)  $P(\bar{A}) = 1 - P(A)$ 

5)

- b) If  $A \subset B$ , then  $P(A) \leq P(B)$ c)  $P(A \cap B) > P(A)$ d)  $0 \leq P(A) \leq 1$
- The probability that any month selected at random will have at least 4 4) Sundays is .
  - a) 1/7 b) 2/7 c) 4/7 d) 7/7
  - If  $B \subset A$  then P(B | A) is \_\_\_\_\_. a) Zero b) One
    - c)  $\underline{P(A)}$ P(B)d) P(B)P(A)
- 6) Conditional probability P(A|B) is defined only when
  - a) A is a sure event b) B is a sure event c) B is an impossible event d) B is not an impossible event

If A and B are independent and  $P(A) = 1/2 P(A \cap B) = 1/8$ , then P(B) = ...7) a) 1/4 b) <sup>3</sup>/<sub>4</sub> c) 1

- 8) A number is selected at random from 1,2,3. Define  $A = \{1,2\}, B = \{2,3\}, C = \{1,3\}$ then
  - a) *A*, *B*, *C* are mutually independent events
  - b) A, B C are pairwise independent but not mutually independent events.
  - c) A, B, C are mutually independent but not pairwise independent events
  - d) none of these

Max. Marks: 40

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d) 7/8

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### Q.2 Answer any four of the following.

- a) Explain Random experiment.
- **b)** Define Union of two events
- **c)** If P(A) = 0.6, P(B) = 0.5,  $P(A \cap B) = 0.3$  Compute  $P(\overline{A} \cap \overline{B})$
- **d)** For any two events A and B. Define conditional probability P(A/B).
- e) If A and B are independent events with  $P(A) = \frac{1}{4}$ ,  $P(B) = \frac{1}{3}$ . Find  $P(A \cup B)$
- f) Define probability mass function (p. m. f.)

### Q.3 Write short notes on any two of the following.

- With usual notation prove that
- 1)  $P(\varphi) = 0$

a)

- 2)  $P(\bar{A}) = 1 P(A)$
- **b)** If A and B are mutually exclusive events. Then show that
  - 1) P(A/B) = 0
  - 2)  $P\left(\frac{A}{\overline{B}}\right) = \frac{P(A)}{1-P(B)}$
- c) If *X* takes values -2, -1, 0, 1, 2 with probabilities 0.2, 0.1, 0.3, 0.2, 0.2 respectively. Find the probability distribution of |X|. Also find mode of |X|

### Q.4 Answer any Two of the following.

- a) A and B are two events defined on sample space  $\Omega$  such that  $P(A) = \frac{1}{4}$ ,  $P(B) = \frac{1}{5}$ ,  $P(A \cap B) = \frac{1}{7}$ .
  - Find
  - 1)  $P(\bar{A} \cup \bar{B})$
  - 2)  $P(A \cap \overline{B})$
- **b)** Write down the sample space for the following events
  - A leap year will have 53 Sundays
     A non-leap year will have 53 Sundays
- c) A r. v. X has p.m.f.

<i>X</i> :	1	2	3	4
P(x):	k	2k	2k	3 <i>k</i>

Find

1) k

2) P[X - 2 < 0]

### Q.5 Answer any one of the following.

- a) Prove that for any two events A and B
- $P(A \cap B) \le P(A) \le P(A \cup B) \le P(A) + P(B)$ **b)** A r. v. X has the following probability distribution.
  - 5 *X*: 1 2 3 4 7 6 1/8 2/64 P(x): 2/8 3/8 1/64 9/64 4/64

Find

- 1) P(2 < X < 6)
- $2) \quad P(X \ge 5)$
- 3) distribution function of *X*
- 4) Median of X.

Sea No.	t		Set	Ρ		
B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 ZOOLOGY Paper–II Animal Diversity II (19201123)						
Day a Time	& Dat : 12:0	te: Monday, 24-07-2023 00 PM To 02:00 PM	Max. Marks	: 40		
Instr	uctio	<ul> <li>ons: 1) All the questions are compulsory</li> <li>2) Draw neat diagrams and give equations wherever necessa</li> <li>3) Figures to the right indicate full marks.</li> </ul>	ry.			
Q.1	Mul <sup>:</sup> 1)	tiple choice questionsReptiles are:a) warm blooded.b) cold blooded.c) bot blooded		08		
	2)	Which of the following has a cartilagenous endoskeletona) Chondricthesb) Dipnoic) Molluscad) Bony fishes				
	3)	Most Unique mammalian character is a) Presence of mammary glands b) Four chambered Hea c) Adapted to fly or live in water d) All the above	rt			
	4)	Which of the following are flightless bird a) Emu b) Ostrich c) Cossowary d) All of these.				
	5)	Notochord is restricted to tail region only in a) Hemichordata b) Cephalochordata c) Tunicata d) None of these				
	6)	The animal who possesses notochord throughout life is a) Fish b) Amphioxus c) Bird d) Snake				
	7)	Petromyzon belongs toa) Angathab) Gnathostomatac) Protochordatad) Euchordata				
	8)	Animals giving birth to young ones are called a) Oviparous b) Viviparous c) Coelomate d) Amphibious				
Q.2	Ans a) b) c) d) e)	wer any four of the following. What is phylogeny? Indirect parental care in Amphibia. General characters of phylum protochordate Snake venom Duckbill platypus		08		

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Poison apparatus of the snake.</li> <li>b) General characters of the class Pisces.</li> <li>c) Economic importance of fishes.</li> </ul>	08	
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) First aid treatment of snake bite</li> <li>b) Direct parental care in amphibian.</li> <li>c) General characters of class Pieces</li> </ul>	80	
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Describe various kinds of flight adaptations in birds.</li> <li>b) Describe identification keys of poisonous and non-poisonous snake.</li> </ul>	08	
		<ul><li>2) Figures to the right indicate full n</li><li>3) Draw neat diagrams and give eq</li><li>4) Use of logarithmic table and calc</li></ul>	narks. uations wherever necessary. sulator is allowed.
----	------------	--	--
.1	Choc 1)	A square matrix $A = [a_{ij}]$ is symmetric	o <b>f the following.</b> c iff
	·	a) $a_{ij} = a_{ji}$ for <i>i</i> and <i>j</i> c) $a_{ij} = -a_{ji}$ for all <i>i</i> and <i>j</i>	b) $a_{ij} = a_{ji}$ for some <i>i</i> and <i>j</i> d) $a_{ij} = 0$ for all <i>i</i> and <i>j</i>
	2)	If A is a square matrix, then the matrix a) Symmetric c) Triangular	(A - A <sup>T</sup> is b) Skew-symmetric d) None of these
	3)	<pre>If rank of [A] = rank of [A : B] &lt; num linear equations AX = B possess a) Unique solution c) Infinite solution</pre>	ber of unknowns, then system of  b) No solution d) Trivial solution
	4)	Eigen values of the matrix $\begin{bmatrix} 2 & 3 & 5 \\ 0 & 3 & 5 \\ 0 & 0 & 4 \end{bmatrix}$	are
		a) 5, 5, 4 c) 2, 3, 5	b) 2, 3, 4 d) 2, 3, 3
	5)	$(\sin \theta + i \cos \theta)^n = \$ a) $\sin n\theta + i \cos n\theta$	b) $\cos n\left(\frac{\pi}{2}-\theta\right)+i\sin n\left(\frac{\pi}{2}-\theta\right)$
		c) $\cos n\theta + i \sin n\theta$	d) $\cos\left(\frac{\pi}{2} - \theta\right) + i\sin\left(\frac{\pi}{2} - \theta\right)$
	6)	Every real number is a complex numb a) 2 c) -1	ber whose imaginary part is b) 1 d) 0
	7)	The value of $(i)^i =$ a) $e^{\pi/2}$ c) $e^{i\pi/2}$	b) $e^{-\pi/2}$ d) $e^{-i\pi/2}$
	8)	The value of $\cosh z - \sinh z =$	

b)  $e^{-iz}$ 

d)  $e^{-z}$ 

MATHÈMATICS (Paper - I) Algebra (19201116)

## Q

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Day & Date: Tuesday, 25-07-2023

**Instructions:** 1) All questions are compulsory.

Time: 09:00 AM To 11:00 AM

a)  $e^{iz}$ 

c)  $e^z$ 

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B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023

Max. Marks: 40

### Q.2 Answer any four of the following

**1)** Find the rank of the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$$

2) Find the characteristic equation of the matrix  $\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ 

- 3) Find the value of  $\left(\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}\right)^2$
- 4) Find the all values of  $(-1)^{\frac{1}{3}}$
- **5)** Separate the real and imaginary parts of cosh(x + iy)

### Q.3 Answer any two of the following

- 1) Solve
  - 2x 3y + z = 0 x + 2y - 3z = 04x - y - 2z = 0
- 2) If  $\alpha$ ,  $\beta$  are the roots of equation  $x^2 2\sqrt{3}x + 4 = 0$  then prove that  $\alpha^3 + \beta^3 = 0$
- 3) If  $\cos (\alpha + i\beta) = x + iy$  then prove that a)  $\frac{x^2}{\cosh^2 \beta} + \frac{y^2}{\sinh^2 \beta} = 1$

b) 
$$\frac{x^2}{\cos^2 \alpha} - \frac{y^2}{\sin^2 \alpha} = 1$$

### Q.4 Answer any two of the following.

- 1) Test for consistency the following equations and if possible, solve x + y + z = -3; 3x + y 2z = -2; 2x + 4y + 7z = 7
- **2)** Solve:  $x^7 x^4 + x^3 1 = 0$
- **3)** Show that:  $\left[\sin(\alpha - \theta) + e^{\alpha i} \sin \theta\right]^n = \sin^n \alpha. e^{in\theta}$

#### Q.5 Answer any one of the following

1) Find all eigen values and eigen vectors of the matrix

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$$

2) If *x* is real number then prove that:

a) 
$$\cosh^{-1} x = \log \left( x + \sqrt{x^2 - 1} \right)$$
  
b)  $1 (1 + x)$ 

b) 
$$\tanh^{-1} x = \frac{1}{2} \log\left(\frac{1+x}{1-x}\right)$$

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	B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 BOTANY (Paper - I) Microbiology and Phycology (19201102)						
Day a Time	& Da : 12:	ate: Tuesday, 25-07-2023 Max. Marks: 40 00 PM To 02:00 PM					
Instr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Draw neat labeled diagram wherever necessary.</li> <li>3) Figures to right indicate full marks.</li> </ul>					
Q.1	An: bel 1)	swer the following questions by choosing correct alternative given08ow.Viruses require for growth.a) Bacteriab) Plantsc) Animalsd) living cells					
	2)	Laminarin is an energy storage material characteristic of a) Chlorophyta b) Chrysophyta c) Phaeophyta d) Pyrrophyta					
	3)	Membranous in folding in bacterial cell at which replication starts isa) Carboxysomesb) Magnetosomec) Nucelosomed) Mesosomes					
	4)	The mode of reproduction which occurs in mycoplasma is a) Budding b) Bursting c) Binary fission d) Binary fusion					
	5)	From the following the filamentous bacteria are called as a) Vibrio b) Actinomycetes c) Spirochate d) Mycoplasma					
	6)	The bacterial pili mainly contain a) Carbohydrates b) Lipids c) Proteins d) Minerals					
	7)	Usually viruses are separated into several large groups based primarily on  a) nature of the host b) nucleic acid characteristics					
		c) capsid symmetry					

- d) diameter of the virion or nucleocapsid
- Agar, which is the solidifying agent in many bacterial culture media, is part 8) of the cell wall of .
  - Chlorophyta a)
  - Pyrrophyta c)

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- b) Chrysophyta d) Rhodophyta

Q.2	Ans a) b) c) d) e) f)	wer any four of the following. What are endospores? Enlist the different type of spores formed in algae. Give classification of spirogyra. what are mycoplasma? what is selective media? Give any two mode of reproduction in bacteria.	80
Q.3	Writ a) b) c)	<b>te short notes on any two of the following.</b> General characters of viruses. Give broad outline of classification of algae. Give general characters of chlorophyta.	08
Q.4	Ans a) b) c)	wer any Two of the following. Explain the conjugation in spirogyra with suitable diagram. Explain the structure of bacterial cell with suitable diagram. Describe the thallus structure of Nostos.	08
Q.5	Ans a) b)	wer any one of the following. Give the general characters of bacteria. Explain the economic importance of algae.	08

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	B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 MATHEMATICS (Paper-II) Calculus (19201117)					
Day & Time:	k Date 09:00	e: Wednesday, 26-07-2023 AM To 11:00 AM		Max. Marks	: 40	
Instru	uction	<ul><li><b>is:</b> 1) All questions are computed 2) Figures to the right indication</li></ul>	llsory. ate full mark	S.		
Q.1	Choo	ose the correct alternatives (	each of the f	following.	08	
	1)	If $y = x^m$ then $y_n = $ if $n$	> <i>m</i> .			
		a) $0$	b)	$m! x^{m-n}(m-n)!$		
		c) $\frac{m! x^m}{(m-n)!}$	d)	<i>m</i> !		
	2)	If $\cos x = a_0 + a_1 x + a_2 x^2 + \cdot$	$\cdots$ then the va	alue of $a_4$ =		
		a) 0	b)	<u>1</u>		
		c) 1	d)	2! 1		
		3!	u)	$\frac{1}{4!}$		
	3)	An expression in $x$ and $y$ is s of $x$ and $y$ in every term is	aid to be hor	nogenous if sum of the degrees		
		a) Distinct	 b)	Same		
		c) Finite	d)	Both a and b		
	4)	If $u = x^3 - 3xy^2$ ; $v = 3x^2y - 3x^2y$	$y^3$ ; then $\frac{\partial u}{\partial y}$	$+\frac{\partial v}{\partial x} = $		
		a) 0	b)	1		
		c) <i>x</i>	d)	у		
	5)	The reduction formula for $\int_{1}^{\frac{\pi}{2}}$	sin <sup>n</sup> x dx if n i	s even, is		
		a) $n-1$ $n-3$ $n-5$ 2	b)	$n - 1 n - 3 n - 5 3 1 \pi$		
		$\frac{1}{n} \frac{1}{n-2} \frac{1}{n-4} \frac{1}{n-3} \frac{1}{3}$		$\boxed{n}  \boxed{n-2}  \boxed{n-4}  \boxed{4}  \boxed{2}  \boxed{2}$		
		c) $n-1 n-3 n-5 2 \pi$	d)	$\frac{n-1}{2} \frac{n-3}{2} \frac{n-5}{2} \frac{3}{2} \frac{1}{2} \frac{1}{2}$		
		n  n-2  n-4  3  2		n  n-2  n-4  4  2		
	6)	The value of $\int_0^{\frac{\pi}{2}} \cos^7 x  dx$ is				
		a) $16\pi$	b)	<u>8π</u>		
		35 c) 16	d)	35 8		
		35	u)	35		
	7)	If $\bar{f}$ is vector point function th	en $\bar{f}$ is called	l irrotational if		
		a) $\nabla \cdot f = 0$ c) $\nabla \cdot \overline{f} = 1$	b)	$\nabla \cdot f = -1$ $\nabla \times \overline{f} = 0$		
		$v_j - 1$	u)	$v \wedge j = 0$		

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Page **2** of **2** 

8) If  $\phi$  is scalar point function and  $\bar{f}$  is a vector point function then  $div(\phi \cdot \bar{f})$ 

a) 
$$curl(\phi \bar{f})$$

- b)  $\phi \cdot div \, \bar{f} + \bar{f} \cdot div \, \phi$ d)  $grad \phi \times \bar{f} + \phi \cdot curl \, \bar{f}$
- c)  $\phi \cdot div \bar{f} + \bar{f} \cdot grad \phi$

### Q.2 Attempt any four of the following.

- **a)** Evaluate  $\lim_{x \to 0} \sin x \log x$
- **b)** Examine the continuity of  $f(x, y) = \frac{xy}{x^2 + y^2}$ ;  $x^2 + y^2 \neq 0$  and f(x, y) = 0 otherwise.
- **c)** Evaluate  $\int_0^{\pi} \sin^5\left(\frac{x}{2}\right) dx$
- d) Find the directional of  $\phi(x, y, z) = xy^2 + yz^3$  at the point (2, -1, 1) in the direction of the vector  $\overline{i} + \overline{2j} + \overline{2k}$
- e) Find the n<sup>th</sup> derivative of  $y = x^2 e^x$
- f) If  $u = \log x + \log y$  then prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 2$

#### Q.3 Attempt any two of the following.

- a) State Maclaurin's series and find expansion of sin x
- **b)** State and prove the Euler's theorem on Homogenous function.
- **c)** Evaluate  $\int_0^1 x^2 (1-x^2)^{\frac{7}{2}} dx$

#### Q.4 Attempt any two of the following.

- **a)** Prove that  $\nabla^2 f(r) = \frac{\partial^2 f}{\partial r^2} + \frac{2}{r} \frac{\partial f}{\partial r} = f''(r) + \frac{2}{r} f'(r)$
- **b)** Evaluate  $\int_0^{2a} x^3 (2ax x^2)^{\frac{3}{2}} dx$
- c) If  $y = \sin(m\sin^{-1}x)$  then prove that  $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} - (n^2 - m^2)y_n = 0$

#### Q.5 Attempt any one of the following questions.

- a) State and prove the Leibnitz's Theorem.
- b) i) If z is homogenous function of degree n then prove that,

$$x^{2}\frac{\partial^{2}z}{\partial x^{2}} + 2xy\frac{\partial^{2}z}{\partial x\partial y} + y^{2}\frac{\partial^{2}z}{\partial y^{2}} = n(n-1)z$$

ii) If 
$$u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$$
,  $x \neq y$  then show that  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \sin 2u$ 

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		BOTANY (F Fungi and Archego	Pape niate	r–II) ∋ (19201103)	
Day & Time	& Date : 12:0	e: Wednesday, 26-07-2023 0 PM To 02:00 PM			
Instr	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give e</li> <li>3) Figures to the right indicate full</li> </ul>	equati mark	ons wherever neces s.	
Q.1	Choose correct alternative for the following				
	1)	Mucor is a a) Parasitic fungi c) Facultative saprophytic fungi	b) d)	Saprophytic fungi None of the above	
	2)	In Yeast, the sexual reproduction is zygotic nucleus divides meiotically a	by co Ind fo	njugation. After fusio rms haploid spores.	

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# B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023

er necessary.

- fter fusion, the spores. The unicellular structure with haploid spores is b) Zoosporangium a) Gametangium d) Ascus Sporangium c) A mature archegonium of *Riccia* is \_\_\_\_\_ shaped. 3) b) Barrel shaped Cup shaped a) c) Flask shaped d) Ribbon shaped The nurse cells are present in the sporangium of \_\_\_\_\_. 4) Porella b) *Riccia* a) Marchantia d) Anthoceros c) Sellaginella belongs to division \_\_\_\_\_. 5) b) Pteropsida Psilopsida a) Lepidophyta d) Spenopsida c) 6) significance is \_\_\_\_\_. a) Strobilus b) Heterospory d) Seed Ligule c) In Cycas, the fern characteristic is \_\_\_\_ 7) b) circinate venation a) reticulate venation Taproot system d) Coralloid roots c) 8) Sigo b) Psycho a) Sago d) Cycas starch c) Answer any four of the following What are saprophytic fungi? a) What are hyphae and mycelium'? b) How many types of rhizoids found Riccia? C)
- What type of ovule is found in Cycas? d)
- Is Cycas monoecious or dioecious? e)
- Selaginella belongs to which class? **f**)

- The character that Selaginella possesses which is of evolutionary
- The stem of the Cycas is a source of edible starch known as \_\_\_\_\_.
- Q.2



## SLR-QA-42 Set

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Max. Marks: 40

Q.3	Write s         a)       W         b)       D         c)       E	short notes on any two of the following /rite systematic position of Yeast. escribe the antheridium of <i>Riccia.</i> xplain the anatomical features of <i>Cycas</i> leaflet.	08
Q.4	Answe a) Er b) Ex c) De	<b>er any Two of the following</b> nlist the general characters of Gymnosperms. xplain the economic importance of bryophytes. escribe the life cycle of <i>Mucor.</i>	08
Q.5	Answe a) De b) De	e <b>r any one of the following</b> escribe in detail life cycle of <i>Selaginella.</i> escribe in detail life cycle of <i>Cycas.</i>	08

ay 8 me	& Date : 09:0	e: Thu 0 AM	ırsday, 27-07-2023 To 11:00 AM		Max. Marks	;: 4C
str	uctio	n <b>s</b> : 1) 2) 3) 4)	All questions are compulsory. Draw neat labeled diagram wher Figures to right indicate full mark Use of log table and calculator is	evei s. allo	necessary. wed.	
.1	Sele 1)	<b>ct the</b> Serie a) c)	<b>e correct alternative from the fo</b> s resonance circuit is also known Acceptor high pas filter	llow as b) d)	<b>ing.</b> circuit. Rejector low pass filter	08
	2)	The r a) c)	esidential mains supply has 230Hz 50Hz	_ fre b) d)	equency. 440Hz 100Hz	
	3)	In cas a) c)	se of pure inductor current lags in phase with	the b) d)	voltage. leads None of these	
	4)	The s	series and shunt arms of T networ  inductive reactance only capacitive reactance only	к fo b) d)	r impedance matching are having inverse reactance of each other None of these	
	5)	After a) b) c) d)	applying Thevenin's theorem, equivalent of the series with residure the series with residurent source in series with residurent source in parallel with residurent source in parallel with residured source source in parallel with residured source sourc	uival stan stan sista sista	ent circuit will have a new ce nce nce	
	6)	In pai a) c)	rallel resonance circuit impedance minimum remains same	e at b) d)	resonance frequency is maximum changing	
	7)	The u a) c)	unit of resistance is Ohm Henry	b) d)	Mhos Farad	
	8)	A sin a) c)	usoidal signal has period of 5 ms, 200 20	its f b) d)	requency is Hz. 2 0.2 k	

# B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 ELECTRONICS (Paper – I)

Basic Circuit Theory and Network Analysis (19201118)

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- SLR-QA-43
  - Set Ρ

<ul> <li>a) Define quality factor and selectivity of resonance circuit.</li> <li>b) What is two port networks?</li> <li>c) Define Kirchhoff's voltage and current law.</li> <li>d) What is frequency of direct current source?</li> <li>e) Give the classification of Inductor.</li> <li>Q.3 Write short note on any two of the following.</li> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources. Define</li> <li>i) Time period</li> </ul>	Q.2	2 Answer any four of the following.			
<ul> <li>b) What is two port networks?</li> <li>c) Define Kirchhoff's voltage and current law.</li> <li>d) What is frequency of direct current source?</li> <li>e) Give the classification of Inductor.</li> <li>Q.3 Write short note on any two of the following.</li> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert Π to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources. Define <ul> <li>i) Time period</li> </ul> </li> </ul>		a)	Define quality factor and selectivity of resonance circuit.		
<ul> <li>c) Define Kirchhoff's voltage and current law.</li> <li>d) What is frequency of direct current source?</li> <li>e) Give the classification of Inductor.</li> <li>Q.3 Write short note on any two of the following.</li> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		b)	What is two port networks?		
<ul> <li>d) What is frequency of direct current source?</li> <li>e) Give the classification of Inductor.</li> <li>Q.3 Write short note on any two of the following.</li> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		c)	Define Kirchhoff's voltage and current law.		
<ul> <li>e) Give the classification of Inductor.</li> <li>Q.3 Write short note on any two of the following.</li> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		d)	What is frequency of direct current source?		
<ul> <li>Q.3 Write short note on any two of the following.</li> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert Π to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		e)	Give the classification of Inductor.		
<ul> <li>a) Active and passive network.</li> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert Π to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>	Q.3	Wri	te short note on any two of the following.	08	
<ul> <li>b) Milliman's theorem.</li> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert Π to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		a)	Active and passive network.		
<ul> <li>c) Impedance parameter.</li> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		b)	Milliman's theorem.		
<ul> <li>Q.4 Answer any Two of the following.</li> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define</li> <li>i) Time period</li> </ul>		c)	Impedance parameter.		
<ul> <li>Q.4 Answer any Two of the following.         <ul> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> </ul> </li> <li>Q.5 Answer any one of the following.         <ul> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources. Define             <ul></ul></li></ul></li></ul>		-,			
<ul> <li>a) Explain superposition theorem with suitable network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert ∏ to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources. Define <ul> <li>i) Time period</li> </ul> </li> </ul>	Q.4	Ans	swer any Two of the following.	08	
<ul> <li>b) Explain superposition theorem with outdole network.</li> <li>b) Explain mesh analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define         <ul> <li>i) Time period</li> </ul> </li> </ul>	<b>~</b>	a)	Explain superposition theorem with suitable network	•••	
<ul> <li>c) Explain mean analysis for de resistive circuit.</li> <li>c) derive conversion formulae to convert II to T network.</li> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define         <ul> <li>i) Time period</li> </ul> </li> </ul>		h)	Explain mesh analysis for de resistive circuit		
<ul> <li>Q.5 Answer any one of the following.</li> <li>(a) Explain types of sinusoidal and non-sinusoidal current and voltage sources. Define         <ul> <li>i) Time period</li> </ul> </li> </ul>		0) 0)	derive conversion formulae to convert $\Pi$ to $T$ network		
<ul> <li>Q.5 Answer any one of the following.</li> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define         <ul> <li>i) Time period</li> </ul> </li> </ul>		C)			
<ul> <li>a) Explain types of sinusoidal and non-sinusoidal current and voltage sources.</li> <li>Define         <ol> <li>Time period</li> </ol> </li> </ul>	Q.5	Ans	swer any one of the following.	08	
Define i) Time period		a)	Explain types of sinusoidal and non-sinusoidal current and voltage sources.		
i) Time period		,	Define		
			i) Time period		

- ii) RMS value
- Derive short circuit parameters for two port network and draw its equivalent b) circuit by using them.

Max. Marks: 40

Seat	
No.	

## B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 **GEOGRAPHY** (Paper - I) Geomorphology - I (19201124)

Day & Date: Thursday, 27-07-2023 Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labeled diagram wherever necessary.
- 3) Figures to right indicate full marks.
- 4) Use of stencil is allowed.

#### Q.1 Rewrite the sentences by choosing the correct alternatives.

- is the branch of science that dealt the evolution of landforms and 1) their distribution on the earth surface.
  - a) Climatology

- b) Geomorphology
- Biogeography d) Oceanography c) 2) Whenever the two compressive forces applies equal and regularly with
- same magnitude and intensity, then both limbs of folds equally inclined to each other with constant slope and it is known is folds.
  - asymmetrical b) symmetrical a) d) isoclinal
  - monoclinal c)
- Etna & Stromboli volcanoes near the Mediterranean Sea are the examples 3) of volcanoes.
  - active a)
  - extinct c)
- Folded mountain and sea trenches have had been formed at the 4) boundary of plates.
  - a) divergent
  - convergent d) none of them c)
- discontinuity is found in between SIAL and SIMA. 5) The
  - Mohovisic a)
  - c) Guttenberg d) None of them
- A fault is one in which the hanging wall moves downward in 6) comparison with the adjoining footwall along the fault line.
  - a) normal b) reverse c) lateral d) step
- 7) It is believed that all tectonic movements like earthquakes and volcanoes and earth movements originates from
  - b) outer mantle inner mantle a)
  - c) inner core d) outer core
- The rock which is formed by cooling and solidifying of the molten material is 8) known as rocks.
  - a) igneous
  - stratified c)
- b) metamorphic
- d) none of them

- b) dormant
- d) none of them
- - b) transform
  - - b) Conrad

Q.2	Ans a) b) c) d) e) f)	wer of the following any four. Characteristics of metamorphic rocks. Give the names of sedimentary rock types. Characteristics of secondary waves. Interior temperature. Examples of metamorphic rocks. Types of Earth Movement.	80
Q.3	Wri	te a short note on any two of the following.	08
	a)	Describe the types of fold.	
	b)	Describe the world distribution of volcanoes.	
	C)	Importance of geomorphology.	
Q.4	Ans	wer any two of the following.	08
	a)	State the causes of earthquakes.	
	b)	State the various of plate boundaries.	
	C)	Process of sedimentary rock formation.	
Q.5	Ans	wer any one of the following.	08
	a)	Describe the scientific classification of interior earth.	
	b)	Describe the igneous rocks.	

Seat No.		Set	Ρ				
	B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 GEOLOGY (Paper - I)						
		Physical Geology (19201110)					
Day & Time:	a Dat 12:0	e: Thursday, 27-07-2023 Max. Marks: 4 00 PM To 02:00 PM	40				
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat labeled diagram wherever necessary.</li> <li>3) Figures to right indicate full marks.</li> </ul>					
Q.1	Fill i	in the blanks by choosing correct alternatives.	80				
	1)	Majority of earthquake occur ata) Oceanb) Plate boundaryc) Mountaind) Island					
	2)	Formation of soil depends upon factor.a) parent materialb) Timec) climate and land formsd) all of these					
	3)	The Planetesimal hypothesis put forward bya) Chamberlinb) Kantc) Kant and Laplasd) Chamberlin and Moulton					
	4)	discontinuity separate outer core from Inner core.          a)       Movorovisic       b)       Lehman         c)       Moho       d)       Gutenberg					
	5)	Earthquake wave is also called as wave.a) Seismicb) Soundc) Lightd) None of these					
	6)	Most poisonous gas relies from volcano isa) CO2b) Chlorinec) Sulfurd) None of these					
	7)	The highest density of atmosphere occurs ata) Troposphereb) Thermospherec) Stratosphered) Mesosphere					
	8)	Average density of the earth is $gm/cm^3$ .a) 5.5b) 8.5c) 7.5d) 6.5					
Q.2	Ans a) b)	<b>wer any four of the following.</b> What is Shape and size of earth. Name the discontinuities of earths layer.	80				

- Define focus and epicenter. Define weathering. Define Volcano. C)
- d)
- e)
- Define Earthquake. f)

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Earthquake waves.</li> <li>b) Products of volcano.</li> <li>c) Seismograph.</li> </ul>	08
Q.4	<ul> <li>Attempt any two of the following.</li> <li>a) Explain the nebular hypothesis.</li> <li>b) Describe central type of volcanoes.</li> <li>c) Intensity and magnitude of Earthquake.</li> </ul>	08
Q.5	<ul><li>Answer any one of the following.</li><li>a) Describe types of weathering.</li></ul>	08

**b)** Describe the earth interior.

08

Ime	: 09:0	JU AM TO 11:00 AM	
Instr	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat labelled diagrams and give equations wherever necessar</li> <li>3) Figures to right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>	у.
Q.1	Mul 1)	tiple choice questions.The decimal equivalent of Octal 136 isa) 94b) 310c) 136d) 88	
	2)	The Hexadecimal equivalent of binary 101011101 is         a) AE1       b) 15D         c) 349       d) 54	
	3)	The gray code for binary 111011 is         a) 3B       b) E2         c) 100110       d) 101101	
	4)	The Excess-3 code for decimal 174 isa) 00111001b) 10101110c) 000101110100d) 010010100111	
	5)	The Boolean expression for Exclusive NOR gate is a) $\overline{A \cdot B} + A \cdot B$ b) $A \cdot B + \overline{A} \cdot \overline{B}$ c) $(A + \overline{B}) \cdot (\overline{A} + B)$ d) $\overline{A} \cdot B + A \cdot \overline{B}$	
	6)	The Boolean relation $A \cdot (B + C) = A \cdot B + A \cdot C$ representa) Commutative lawb) Associative lawc) Distributive lawd) Identity	
	7)	As per the rules of Boolean algebra, $A \cdot \overline{A} = $ a) $\overline{A}$ b) 1 c) A d) 0	
	8)	The number of minterms in 3-variable Karnaugh map area)8b)4c)16d)12	
Q.2	Ans a)	wer any four of the following. Draw the symbol for NAND gate and show its truth-table.	

Day & Date: Friday, 28-07-2023

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Seat

No.

## B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023 **ELECTRONICS (Paper - II) Digital Fundamentals (19201119)**

SLR-QA-47

Set

Ρ

Max. Marks: 40

08

## Q.

- Explain the role of XOR gate as controlled inverter b)
- Write any four rules of Boolean algebra. C)
- Prove the Boolean expression  $A + \overline{AB} = A + B$ d)
- Convert the binary number 111101 to its Gray code. e)
- Subtract binary 1011 from 1110. f)

Q.3	Writ a) b) c)	te short notes on any two of the following. Write a note on 8421 code. Write a note on IC 7402. Write a note on 4-bit binary adder.	08
Q.4	Ans	wer any two of the following.	08
	a)	Use Karnaugh map to minimize the following Boolean expression- $A\overline{B}C + \overline{A}BC + \overline{A}\overline{B}C + \overline{A}\overline{B}\overline{C}$	
	b)	Simplify the following Boolean expression to obtain	
	,	$\overline{AB + AC} + \overline{ABC} = \overline{A} + \overline{BC}$	
	C)	Prove the universality of NOR gate.	
Q.5	Ans	wer any one of the following.	80
	a)	Explain the logic gates AND, OR, NOT and XOR.	
	b)	Explain in detail a full adder circuit.	

							SLR-QA-	49
Seat No.							Set	Ρ
	B.S	ic. (S	emester - G	l) (Old) (CB GEOGRAI eomorphol	CS) Exar PHY (Paµ ogy - II (′	nination: March per - II) 19201125)	n/April-2023	
Day & Time:	& Dat : 09:0	te: Fric 00 AM	lay, 28-07-20 To 11:00 AN	)23 1			Max. Marks	: 40
Instru	uctio	o <b>ns:</b> 1) 2) 3)	All question Draw neat r Use of map	s are compulse naps and diag s stencil is allo	ory. ram where owed.	ver necessary.		
Q.1	Mul 1)	tiple c a) c)	t <b>hoice ques</b> _ weathering Physical Biological	t <b>ions.</b> J is more domin	nant in hot b) d)	desert region. Chemical Erosional		08
	2)	Land a) c)	scape is a fu Deposition Weathering	nction of struc	ture, proce b) d)	ess and Erosion Time		
	3)	Frost a) c)	weathering Cold Temperatur	is more comm e	on in b) d)	_ areas. Hot Equatorial		
	4)	Beac a) c)	hes are the Glaciers Oceanic wa	depositional la ves	ndforms m b) d)	ade by Winds none of these		
	5)	a) c)	_ is formed b V shape va Barkhans	by the deposition ley	onal work ( b) d)	of wind. Mashroom rock None of these		
	6)	a) c)	_ is erosiona Mashroom Ox-Bow-La	ll landform of ( rock <e< th=""><th>Glaciers. b) d)</th><th>U shaped Valley Flood plains</th><th></th><th></th></e<>	Glaciers. b) d)	U shaped Valley Flood plains		
	7)	a) c)	_ is erosiona Yardang Sand Dune	ll landform of r s	iver. b) d)	Kettles Waterfall		
	8)	a) c)	_ has postul R.A. Ray W.M. Davis	ated the conce	ept of 'cycle b) d)	e of erosion'. Charles Darwin A. Wegener		
Q.2	Ans a) b) c) d) e)	wer a What What What What What	ny four of th is weathering is waterfall? is Geomorp is Fluvial? is Barkhan?	ne following. ng? hic process?				08

f) What is Glacier?

Q.3	<ul> <li>Write a short note on any two of the following.</li> <li>a) V shaped Valley.</li> <li>b) Slow Movement.</li> <li>c) Doline.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain the agents of weathering?</li> <li>b) Causes of Mass Wasting?</li> <li>c) Explain the Circqe and U-Shaped Valley?</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain the erosional landform of Rivers?</li> <li>b) Explain the depositional landforms of Sea Coast?</li> </ul>	08

	c)	Columnar	d)	Bedding			
2)	Hima a) c)	alaya is best example of Fold Joints	b) d)	Fault Outcrop			
3)	Crac	ks in the rocks along which no dis	splac	ement takes place are called as			
	a) c)	 Faults Folds	b) d)	Joints Unconformity			
4)	Joint a) c)	s are formed in rocks. Igneous Metamorphic	b) d)	Sedimentary all types			
5)	Whic a) c)	ch of the following is not type of Fa Graben Horstd	ault? b) d)	Overturned Reverse			
5)	Sync a) c)	cline fold is upward. Convex Inclined	b) d)	Concave None of the above			
7)	Whic a) c)	ch of the following is TRUE for Rea horizontal axial plane reversed limbs	cuml b) d)	bent fold? presence of hard core All the above			
3)	Whic a) c)	ch of the following represents max Aperant dip Strike	imur b) d)	n inclination? True dip All the above			
Ans	wer a	iny four of the following.			08		
a) 5) 5) 3)	swer any four of the following.08Define Fold.Draw labelled diagram of Diagonal/Oblique Joints.What is strike?Define Outcrop.						
71							

# B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023

Seat

No.

Structural Geology (19201111) Day & Date: Friday, 28-07-2023 Time: 12:00 PM To 02:00 PM

2) Figures to the right indicates full marks. 3) Draw neat & well labeled diagram wherever necessary.

Instructions: 1) All questions are compulsory.

#### Q.1 Multiple choice questions.

- Basalt commonly shows presence of \_\_\_\_\_ Joints. 1)
- 2

## 3

**GEOLOGY** (Paper - II)

- 4
- 5
- 6

## 7

## Q.2 A

- а
- b
- С
- d
- e)
- Define Dip angle. f)

## SLR-QA-50

Set

Max. Marks: 40

Ρ

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Outlier and Inlier.</li> <li>b) Columnar Joints.</li> <li>c) Elements of Faults.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Describe Symmetrical and Asymmetrical folds.</li> <li>b) Explain Strike and Dip Joints.</li> <li>c) Describe Axial plane and Limbs of fold.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Define Fault. Describe any three types of Faults.</li> <li>b) Define Unconformity. Describe Angular and Non-conformity.</li> </ul>	08

	B.Sc	. (Semester - II) (New) (CBCS) ENGLISH ( Communication S	Exa Con	mination: March/April-2 1p.) (22221201)	2023
Day Fime	& Date : 12:00	: Monday, 19-06-2023 ) PM To 02:00 PM		Max.	Marks: 40
nstr	uctior	<ul><li><b>is:</b> 1) All questions are compulsory.</li><li>2) Figures to the right indicate full</li></ul>	mark	S.	
Q.1	Choo 1)	bese the correct alternative from the Who according to the author has only a) John Rockefeller c) B. Russell	<b>give</b> y one b) d)	<b>n options.</b> e year of schooling? Jay Gould Sir Henry	08
	2)	Rabindranath Tagore won the Nobel Gitanjali in a) 1911 c) 1913	Priz b) d)	e for Literature for his book 1912 1914	
	3)	In the age of Monarchy, who gets ma personal interests? a) The People c) The Countries	anipu b) d)	lated to achieve their own The Ministers The King	
	4)	Who has lynched the lakes? a) The poet c) Vehicles	b) d)	Factories Humans	
	5)	How old is Pope believed to be when a) 11 c) 12	he b) d)	wrote 'Ode on Solitude'? 13 14	
	6)	What does the poet wish to hear from a) Marriage plans c) His family	n the b) d)	lover in the poem – 'Remerr His work Future plans	ıber'?
	7)	Choose the correct synonyms for the a) Dirty c) Gloomy	wor b) d)	d - Dark. Light Thought	
	8)	Use past tense form in the following we (go) to Mumbai last year.	sente	ence.	

Seat No. . IIX /NI Р ....

## SLR-QA-51

Set P

- a) gone
- b) was god) was going c) went

## Q.2 Write the answers in short. (Any Four)

- a) What opinion does the author have of the education system of his time?
- **b)** What is the true sense of freedom?
- c) Discuss the theme of the poem 'Our Earth Will Not Die' in your words.
- **d)** Why is the poet giving so much emphasis on solitude in the poem and what does it mean to him?
- e) Discuss the tone of compassion used by the poet in the poem Remember?
- f) What kind of people can achieve the true essence of freedom?

## Q.3 Answer the following questions. (Any One)

- a) Write a letter to your father requesting him to send 5000/- as your class trip is going on to visit South India. Mention the details of four tour and places to visit.
- b) Write a formal letter to your college librarian as you lost your library card. Request him also to issue a duplicate library card to you. Mention all details of yourself like Name, Class, Roll No and how you lost the card.
- **Q.4** What is interpersonal intelligence? Write a detailed note on interpersonal intelligence and how to improve them.

12

10

		Org	anic Cł	nemistry	
Day & Date Time: 12:00	e: Tu 0 PM	esday, 20-06-2023 To 02:00 PM			Max. Marks: 40
Instructior	<b>15:</b> 1 2 3 4	) All questions are comp ) Draw neat diagrams a ) Figures to the right ind ) Use of logarithmic tab (At. Wt. : H=1, C=12, 0	oulsory. Ind give e dicate full le and ca O=16, N=	equations wherever nec marks. Ilculator is allowed. =14, Na=23, Cl=35.5)	essary.
Q.1 Multi 1)	i <b>ple (</b> Whi a) c)	choice questions. ch is not a nucleophile? AICl <sub>3</sub> NH <sub>3</sub>	b) d)	ROH H2O	80
2)	The a) c)	compound having sp h propane butadiene	ybridized b) d)	l carbon atom is propene propyne	
3)	The a) c)	movement of single ele curved double headed	ectron is b) d)	shown by an arro fish hook all of these	DW.
4)	Whi a) c)	ch of the following gene CnH2n+2 CnH2n	eral formu b) d)	ula of cycloalkane? CnH2n-2 CnH2n+4	
5)	The a) c)	optically active compo 1-Bromobutane 2-Bromobutane	und from b) d)	the following is 2-Butene Butanoic acid	
6)	Anti a) c)	-Markownikoff's additio 1-butene 2-butene	n of HBr b) d)	is not observed in 2-pentene propene	·
7)	Cyc a) c)	lobutadiene is an exam aromatic anti-aromatic	ple of b) d)	compounds. non-aromatic pseudo-aromatic	
8)	The a) c)	nature of pyridine is basic amphoteric	b) d)	acidic neutral	

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 CHEMISTRY (Paper - III) (22221208)

Seat No.

## SLR-QH-52

Set P

			SLR-QH-	52		
Q.2	Ansv a) b) c) d) e) f)	wer an How What a) Draw a) b) What a) Defin a) What	ny four of the following.will you prepare cycloalkane by internal Wurtz reaction?happens when cyclopropane is treated with:HBrb)Con. $H_2SO_4$ the orbital diagram of ethylene molecule and indicate:the type of hybridization involved andnumber of $\sigma$ and $\pi$ -bond in itis the action of the following on 1-butene?HOCIbH_2O/H^+e the terms:Enantiomersb)Distereoisomersare the conditions for aromaticity?	08		
Q.3	Writ a) b) c)	<b>e sho</b> Reso Addit Optic	<b>rt notes on any Two of the following.</b> nance effect with respect to nitrobenzene ion reaction al isomerism exhibited by Lactic acid	08		
Q.4	Ansv a) b) c)	swer any two of the following. Discuss in detail the optical isomerism of Tartaric acid. What is hybridization? Explain formation of methane molecule on the basis of sp <sup>3</sup> hybridization. Discuss the different types of reagents with suitable examples				
Q.5	Ansv a)	<b>wer a</b> ı Discu i) ii)	n <b>y one of the following.</b> uss the mechanism involved in - Friedel-Crafts alkylation Nitration of benzene	08		
	b)	<ul> <li>b) i) What are alkadienes? Discuss their classifications with suitable example.</li> <li>ii) Complete the following reactions.</li> <li>a) CH<sub>3</sub>-CH=CH<sub>2</sub> + HBr -&gt;&gt;?</li> </ul>				
			b) $CH_3$ -C= $CH_2$ + HCl $\longrightarrow$ ? CH <sub>3</sub>			

c) CH<sub>3</sub>-CH<sub>2</sub>-CH=CH<sub>2</sub> + HOBr → ?

d) CH<sub>3</sub>-CH=CH<sub>2</sub> + H<sub>2</sub>SO<sub>4</sub> 
$$\longrightarrow$$
 ?

Seat No.	t					Set	Ρ		
	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 COMPUTER SCIENCE (Paper-III) Introduction to Web Designing (22221229)								
Day & Time	& Da : 12:	te: Wednesday, 21-0 00 PM To 02:00 PM	6-2023			Max. Marks	: 40		
Instr	uctio	ons: 1) All questions 2) Figures to the 3) Draw neat dia	are compulsory. e right indicate full agrams and give e	mark equati	s. ons wherever necessa	ry.			
Q.1	Cho 1)	oose the correct alt All HTML tags are	ernatives from th enclosed in what?	ie opt	tions.		08		
		a) # and # c) { and }		b) d)	? and ? < and >				
	2)	The tag for the tabl a) c) <tablerow></tablerow>	e row is	b) d)	<trows></trows>				
	3)	Which of the follow a) c) <b></b>	ing is a singular ta	ag? b) d)	<i> <u></u></i>				
	4)	Class attribute is fo a) @ c) #	llowed bys	sign. b) d)	&				
	5)	Which one of the fo a) text box c) submit button	ollowing is a form e	eleme b) d)	ent? radio button All of these				
	6)	What does CSS sta a) Creative Style c) Colorful Style	and for? Sheets Sheets	b) d)	Cascading Style Shee Computer Style Shee	ets ts			
	7)	The default charact a) UTF-16 c) UTF-8	ter encoding in HT	TML5 b) d)	is UTF-32 ISO-8859-1				
	8)	The declaration in ( a) selector c) values	CSS consists	 b) d)	property all of these				
Q.2	Ans a) b) c) d) e)	wers any four of th What is floating? Write any four paire Define selector. Explain date function What is HTML?	e following. ed tag? on in JavaScript.				08		

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Types of CSS selectors</li> <li>b) image Tag</li> <li>c) Frameset tag in HTML</li> </ul>	08
Q.4	<ul> <li>Answers any two of the following.</li> <li>a) Explain box model with example.</li> <li>b) Explain for loop and while loop with example in JavaScript.</li> <li>c) Explain border properties with example.</li> </ul>	08
Q.5	<ul> <li>Answers any one of the following.</li> <li>a) Write the advantages of CSS.</li> <li>b) Explain table tag and its attributes with example in HTML.</li> </ul>	80

				SLR-QA-54			
Seat No.				Set P			
	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 CHEMISTRY (Paper - IV) Analytical Chemistry (22221209)						
Day & Time	& Date : 12:0	e: Thursday, 22-06-2023 D PM To 02:00 PM		Max. Marks: 40			
Instru	uctior	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate ful</li> <li>3) Use of log table or calculator is</li> </ul>	l marks s allow	s. ed.			
Q.1	Choo	ose the correct alternative from the	e optic	on. 08			
	1)	<ul><li>a) red brick powder</li><li>c) dung</li></ul>	b) d)	saw dust all of these			
	2)	For determination of Sulphur by soc presence of Sulphur.	dium fu	sion test colour indicates			
		a) green c) purple	b) d)	blue red			
	3)	The Abbe's refractometer works on a) refraction c) angle	b) d)	principle. critical angle all			
	4)	gas is used for preservation a) Nitrogen c) Hydrogen	of chip b) d)	s. Oxygen Ammonia			
	5)	NaOH is acid base. a) di c) mono	b) d)	tri tetra			
	6)	The application of paper chromatog a) the process is rapid c) require less sample	lraphy b) d)	are it requires less time all of these			
	7)	The compound containing 42% C, 7 a) 46 c) 12	12% H, b) d)	, the % of oxygen is%. 42 100			
	8)	Molecular volume of liquid when its a) molal volume c) viscosity	surfac b) d)	e tension is unity is called parachor density			
Q.2	Ansv	ver any four of following.		08			
	a) b) c) d)	Write classification of chromatograph Draw neat labelled diagram of Kjelda Define standard solution & indicator. Write equation to calculate specific r	hy. ahl's m efractio	ethod for estimation of nitrogen.			

- e) Write too molecules whose dipole moment is zero.f) Name the adulterants in pulses.

#### Q.3 Write short notes on any Two.

- a) Determination of viscosity by Ostwald viscometer
- **b)** Mole fraction & weight fraction
- c) Four chemical methods for food preservation

#### Q.4 Answer the any two of following.

- a) Define equivalent weight what weight of Na<sub>2</sub>CO<sub>3</sub> is required for preparing 250 cm<sup>3</sup> of its  $\frac{N}{10}$  solution.
- **b)** Write experimental procedure for paper chromatography.
- c) How will you identify starch & urea as adulterants in milk? How will you identify yellow colour saw dust & metanil yellow as adulterants in turmeric powder?

#### Q.5 Answer any one of following.

- a) Explain the process for detection & calculation of percentage of carbon & hydrogen by Liebig's combustion method.
- **b)** How will you determine surface tension of liquid by Drop weight method? Give its advantages.

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Seat No.							Set	Ρ
	B.S	ic. (Ser	nester - CC	II) (New) (CBC MPUTER SCI Operating Sys	S) Exar ENCE ( stem (22	nination: March/April-2 Paper – IV) 2221230)	2023	
Day & Time:	& Dat 12:(	te: Frida 00 PM T	y, 23-06-2 o 02:00 PN	023 M	,	, Max.	Marks	: 40
Instru	uctio	o <b>ns:</b> 1) A 2) F	Il question	s are compulsory he right indicate f	ull marks			
Q.1	Mul 1)	tiple cho For no a) m c) m	<b>oice ques</b> on-sharable nust exist nay exist	<b>tions:</b> e resources like a	printer, n b) d)	nutual exclusion must not exist none of the mentioned		08
	2)	PCB s a) T	tands for F rue	Process Central E	Box. b)	False		
	3)	a) M c) T	_ O.S. is la lulti-Progra ïme Sharir	argely used in De amming ng	fense app b) d)	olications. Real Time Parallel		
	4)	RAG s a) R c) R	stands for Resource A Required A	Ilocation Graph	b) d)	Resource Acquisition Grap Required Acquisition Grap	h า	
	5)	a) P c) S	_ is a prob aging starvation	lem in priority scl	neduling a b) d)	algorithm. Aging None of these		
	6)	A Proc a) C c) B	cess Contr Code Sootstrap p	ol Block (PCB) do rogram	bes not co b) d)	ontain which of the following Stack Data		
	7)	Which a) b c) b	of the follo locked to r locked to r	owing state transi running ready	itions is n b) d)	ot possible? ready to running running to blocked		
	8)	Switch Ioadin a) P c) T	ning the CF g new proc Process blo Time sharir	PU to another pro cess state is calle ock g	cess savi d as b) d)	ng state of old process and  Context Switch None		
Q.2	Sol <sup>v</sup> 1) 2) 3) 4) 5)	ve any fo Define F Define F Define 7 What is State th	<b>our quest</b> Page Fault Process ar Fransfer Ti Request E e term Pro	i <b>ons.</b> d Program. me. Edge in RAG? cess Creation.				08

Q.3	<ul> <li>Solve any Two.</li> <li>a) Define Scheduler with its 3 types.</li> <li>b) Write a note on Overlays.</li> <li>c) Write note on Critical Section Problem.</li> </ul>	08
Q.4	<ul> <li>Solve any Two.</li> <li>a) Explain Process States Diagram.</li> <li>b) Explain Segmentation.</li> <li>c) State Four necessary conditions to occur Deadlock.</li> </ul>	08
Q.5	<ul> <li>Solve any One.</li> <li>a) Define Operating System? Explain any four types of Operating System.</li> <li>b) Define Threads and Explain types of Threads in detail.</li> </ul>	08

y 8 1e:	& Date : 12:00	: Sa ) PM	turday, 01-07-2023 I To 02:00 PM		Max. Marks:	40
tru	uction	1 2 2 3 4	) All questions are compulsory. ) Draw neat diagrams and give ec ) Figures to the right indicate full r ) Use of logarithmic table and calc	quation marks culato	ns wherever necessary. r is allowed.	
I	Choc 1)	<b>ose c</b> Dies	correct alternative. sel cycle is also known as	÷		08
		a) c)	constant volume cycle constant temperature cycle	b) d)	constant pressure cycle none of the above	
	2)	Coe	efficient of thermal conductivity de	pends	on temperature as	
		a) c)	$k \propto \sqrt{T}$ $k \propto T^2$	d)	$k \propto \frac{1}{T}$ $k \propto \frac{1}{T}$	
	3)	In L	inde's air liquefier, the air is passe from air.	ed thro	ough the KOH solution to remove	
		a) c)	dust minerals	b) d)	smell CO <sub>2</sub> gas and water vapour	
	4)	lf th a)	e systems A and B are in thermal $\frac{T_A}{T_B} = 1$	equili <i>b)</i>	brium with each other then $\frac{T_A}{T_B} = 0$	
		c)	$T_A \times T_B > 1$	d)	$T_A \times T_B < 1$	
	5)	As t a) c)	the temperature of a gas increase decreases increases	s, me b) d)	an free path of gas molecules remains constant none of these	
	6)	The is a)	efficiency of Carnot's engine wor  1 	king b b)	oetween steam point and ice point	
	7)	Enti a) c)	ropy of reversible process is increases remains constant	b) d)	decreases zero	
	8)	In re a)	efrigerator, heat is extracted from sink and source	b)	and delivered to source and sink	

d)

## PHYSICS (Paper - III) Heat and Thermodynamics (22221205)

B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023

Day & Date: Saturday. 01-07-2023 Tim

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atmosphere and sink

c)

## Q.1

## SLR-QA-56

atmosphere and source

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### Q.2 Solve Any Four

- 1) The diameter of nitrogen molecule is  $3.2 \times 10^{-10}$  m. The number of molecules at 0°C and 1 atmospheric pressure is  $2.69 \times 10^{25}$  per m<sup>3</sup>. Calculate mean free path for nitrogen molecules.
- 2) What is Joule-Thomson effect?
- 3) What is fountain effect of liquid He II?
- 4) Give principle of air conditioning system.
- 5) Name different parts of Carnot's ideal heat engine.

#### Q.3 Write short notes on Two of the following.

- 1) Transport phenomena
- 2) With a neat labelled diagram explain construction of vapour compression refrigeration system.
- 3) Experimental set up for adiabatic demagnetisation of paramagnetic substance.

#### Q.4 Answer any Two of the following.

- 1) Obtain an expression for coefficient of viscosity of gas.
- 2) Derive an expression for the work done in isothermal process.
- A Carnot's refrigerator takes heat from water at 0°C and discard it to a room temperature at 27°C. 1 kg of water at 0°C is to be changed into ice at 0°C. Calculate:
  - a) How many calories of heat are discarded to the room?
  - b) What is the work done by the refrigerator in this process?
  - c) What is the coefficient of performance of the machine? (Given: latent heat of ice = 80 cal/gm)

#### Q.5 Answer any One of the following.

- 1) What is Otto cycle? Explain its operation and derive an expression for efficiency of Otto engine.
- 2) Define adiabatic process. Show that  $PV^{\gamma} = \text{constant}$  for adiabatic process.

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6	,	
nd between amino acids in pro	btein	s is called as
ic bond	b)	Acidic bond
ptide bond	d)	Hydrogen bond
_ Protein is present in the mill sein ratin	k. b) d)	gelatin Hemoglobin
are present in stru	ictur	e of protein.
mary	b)	Secondary
rtiary	d)	Quaternary
acteria which uses CO <sub>2</sub> as a of energy for growth.	sole	source of carbon and light as
ganotrophs	b)	Heterotrophs
otoautotrophs	d)	Lithotrophs
ite of the enzyme is chemicall	y co	mposed of
nino acids	b)	Nucleotides
rbohydrates	d)	None of the above

## Seat No.

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 MICRÓBIOLOGY (Paper–III) Microbial Metabolism and Cultivation (22221220)

Day & Date: Sunday, 02-07-2023 Time: 12:00 PM To 02:00 PM

Instr	uctior	<b>15:</b> 1 2 3 4	) All questions are compulsory. ) Figures to the right indicate full ) Draw neat diagram and give eq ) Use of logarithmic table and cal (At. Wts.: H=1, C=12, O=16, N=	mark uatic culat :14, I	ks. ons wherever necessary. tor is allowed. Na=23, CI=35.5)
Q.1	Multi 1)	a) c)	<b>choice questions.</b> is the general formula of Carb (C4H2O)n (CH2O)n	ohyc b) d)	Irates. (C <sub>6</sub> H <sub>2</sub> O)n (C <sub>2</sub> H <sub>2</sub> O)n COOH
	2)	Suc a) c)	rose is a disaccharide of compos Glucose- Glucose Glucose galactose	ed fr b) d)	om Glucose-fructose none of the above
	3)	a) c)	is the major storage form of Starch Glycogen	carbo b) d)	ohydrates in animals. Chitin Cellulose
	4)	The a) c)	bond between amino acids in pr Ionic bond Peptide bond	otein b) d)	s is called as Acidic bond Hydrogen bond
	5)	a) c)	Protein is present in the mil Casein keratin	k. b) d)	gelatin Hemoglobin
	6)	α-he a) c)	elix are present in str Primary Tertiary	uctur b) d)	e of protein. Secondary Quaternary
	7)	sou a) c)	bacteria which uses CO₂ as a rce of energy for growth. Organotrophs Photoautotrophs	sole b) d)	e source of carbon and lig Heterotrophs Lithotrophs
	8)	Acti a) c)	ve site of the enzyme is chemica Amino acids Carbohydrates	lly co b) d)	omposed of Nucleotides None of the above

Max. Marks: 40

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Q.2	Ans 1) 2) 3) 4) 5)	wer any Four of following. Define Apo-enzyme and co-enzyme. Give 4 examples of polysaccharides. What is the Second law of thermodynamics? Write a note on inducible enzymes. Give two examples of synthetic media.	08
Q.3	Wri 1) 2) 3)	<b>te short note on any Two of the following.</b> Explain what is induced fit hypothesis for enzyme action. Discuss in brief structural level of classification of protein. What is the fate of pyruvate in anaerobic condition?	08
Q.4	Ans 1) 2) 3)	wer any Two of following. Write a note on structure of ATP. Structure of DNA. Write a note on Nutritional requirements of Micro-organisms with special emphasis on Carbon source.	08
Q.5	Ans 1) 2)	w <b>er any One of following.</b> Write a detailed account on methods of pure culture. Write detailed account of EMP pathway.	80

<ul> <li>Instructions: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of logarithmic table or nonprogrammable calculator is allo</li> <li>4) Draw neat labelled diagrams must be drawn wherever necess</li> </ul>						
Q.1	Mult 1)	Decision Choice questions.         The time constant of the circuit containing resistance R and capacit         connected to a source of steady e.m.f. is         a)       RC         b)       R/C         c)       1/RC				
	2)	The time constant of LR circuit containing inductor of 10H connecte series with the resister of $20\Omega$ is a) 2 sec. b) 0.5 sec. c) 200 sec. d) 5 sec.				
	3)	The expression for discharging of the condenser through resistance given by a) $q = qo e t/RC$ b) $q = qo e - t/RC$ c) $q = qo(1 - e t/RC)$ d) $q = qo(1 - e - t/RC)$				
	4)	The susceptance of a purely inductive circuita) wLb) 1/wLc) L/wd) XL				
	5)	If Z is the impedance and Y is the admittance of an a.c. circuit a) $Y = 1/Z$ b) $Y = Z$ c) $Y = \sqrt{Z}$ d) $Y = \sqrt{R2} + \left(Lw - \frac{1}{wc}\right)2$				
	6)	At series resonance power factor of LCR series circuit is a) Infinite b) One c) $\cos\theta = XL - XC/R$ d) Zero				
	7)	Magnetic induction along axis of an infinitely long solenoid is				

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 PHÝŠICS (Paper - IV)

## Electricity, Magnetism and Basic Electronics (22221206)

Day & Date: Monday, 03-07-2023 Time: 12:00 PM To 02:00 PM

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- a)  $B = \mu oni$ b)  $B = \mu o / 4\pi ni$ 
  - d)  $B = \mu o/4 ni$ c)  $B = \mu o/2\pi ni$
- In Bridge rectifier is layer solid state semiconductor device. 8)
  - one a) b) two c) three
    - d) four

# SLR-QA-58

Max. Marks: 40

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#### 2) State Biot-Savarts law. 3) Define Figure of merit. Define ripple factor. 4) Find the value of current amplification factor $\alpha$ if $\beta = 95$ 5) Write short notes on any Two of the following. 1) Owens Bridge. Damping in B.G. and its correction. 2) 3) Series L - C - R circuit is connected to a variable frequency 230 V ac. L = 5 H, $C = 80 \mu f, R = 40 \Omega$ Find: a) Resonant frequency b) Quality factor Answer any Two of the following.

- 1) Derive an expression for growth of current containing a inductance, a resistor and source of constant e.m.f. E in series.
- 2) Explain working of CE transistor amplifier.
- 3) Explain the working of positive and negative clampers.

## Q.5 Answer any One of the following.

Q.3

Q.4

- 1) Draw neat labeled diagram of Bridge rectifier and explain its operation with ripple factor and rectification efficiency.
- 2) Explain construction, theory and working of Ballistic Galvanometer.

1) Define time constant of RC circuit.
# B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 **MICROBIOLOGY** (Paper – IV) Applied Microbiology (22221221)

Day & Date: Tuesday, 04-07-2023 Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams must be drawn wherever necessary.

#### Rewrite the sentences by choosing correct alternative. Q.1 Indole production is detected by \_\_\_\_\_ reagent. 1) a) $\alpha$ Naphthol b) Kovac's Methyl red d) 40% KOH c) 2) An individual carrying a pathogen without showing symptoms is known as . Vector b) Fomite a) c) Carrier d) Vehicle 3) Solid material settled at bottom during sewage treatment is called \_\_\_\_\_. a) Sediment b) Flocs c) Sludge d) Precipitate 4) determines strength of sewage. a) MPN b) MBRT SPC c) d) BOD 5) organism produces dark centered green metallic sheen producing colonies. a) E. coli b) Clostridium Enterobacter aerogenes d) Bacillus cereus c) 6) The infection transmitted from mother to baby via placenta is called as \_\_\_\_\_. b) cross infection a) latrogenic d) Mixed infection Congenital C) Differentiation of E. coli from Enterobacter is carried out by \_\_\_\_\_ test. 7) b) IMVIC a) MPN Phosphatase d) SPC c) 8) Disease causing ability of organism is called b) Etiology a) Virulence Mortality d) Pathogenicity c) Q.2 Answer any four of the following. 08 Define B.O.D. a) Define Opportunistic pathogen. b) Composition of sewage. Types of sewage. C) Define Incubation period. d)

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**SLR-QA-59** 

Max. Marks: 40

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Define coliforms with two examples. e)

Q.3	Wri a) b) c)	<b>te short notes on any two of the following.</b> Define carrier and explain different carriers. IMViC test Presumptive and confirmed test	08
Q.4	Ans a) b) c)	wer any Two of the following. Municipal water purification process. Define faecal pollution and enlist and explain indicators of faecal pollution. Explain different types of infections.	08
Q.5	Ans a) b)	wer any one of the following. Describe various modes of transmission of diseases in detail. Write on secondary and tertiary treatment of sewage.	08

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Seat No.						Set	Ρ	
I	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 STATISTICS (Paper – III) Descriptive Statistics - II (22221211)							
Day 8 Time:	Date 12:00	: We ) PM	dnesday, 05 To 02:00 PN	-07-2023 M		Max. Marks: 4	40	
Instru	iction	i <b>s:</b> 1) 2) 3)	All question Figures to t Use of Calo	is are compulsory. he right indicate full culator is allowed.	mark	S.		
Q.1	Choc 1)	lf the coef a)	<b>ne correct a</b> e variables X ficient is Zero Positive	I <b>lternative.</b> ( and Y are changes 	s in sa b) d)	me direction then the corr. One Negative	08	
	2)	c) lf ∑2 a) c)	$Y = 1242, \bar{X}$ 67.4 58.5	$\bar{y} = 5.1, \bar{y} = 10, n = 2$	10 the b) d)	n cov $(x, y)$ is 83.9 73.2		
	3)	For Math rank a) c)	a group pf 8 nematics and correlation 1 0.40	students, the sum o d Statistics marks w coefficient?	of squ vas fou b) d)	ares of differences in ranks for and to be 50. What is the value of 0.80 0.75		
	4)	The corre of re a) c)	standard de elation coeff gression for $\frac{7}{13}$	viation of two variab icient between them these variables the	bles ai n is <u>1</u> . I en the b) d)	The $\sigma_1 = 2$ and $\sigma_2 = 3$ and the f $\theta$ is the angle between the lines value of tan $\theta$ will the. $\frac{9}{19}$ $\frac{6}{19}$		
	5)	Let X on Y a) c)	X = X + 1 a respectively $\frac{1}{2}$	and $X = \frac{1}{2}Y + 1$ be y. Then the mean of	the lir f <u>Y</u> is _ b) d)	nes of regression of <i>Y</i> on <i>X</i> and <i>X</i>		
	6)	Sup whe two a) c)	pose <i>r</i> is the re standard egression lin $\tan \theta = \frac{1 - 2\pi}{2\pi}$ $\cos \theta = \frac{2\pi}{1 + 2\pi}$	e correlation coefficience deviations of <i>X</i> and the then $\frac{r^2}{r}$	ent be Y are b) d)	tween two variables <i>X</i> and <i>Y</i> equal. If $\theta$ is the angle between $\sec \theta = \frac{1+r^2}{2r}$ $\sin \theta = \frac{1+r^2}{1-r^2}$		
	7)	Inde a) c)	x number is Economic t Constant	also called as parometer	 b) d)	Parameter None of the above		

# Seat No.

- 8) Which index number is called as ideal index number?
  - Lasperys b) Paasches
    - d) None of the above
- Q.2 Answer any four of the following.
  - a) Define Spearman's rank correlation coefficient and state the limits of R.
  - **b)** Prove that Corr(X, X) = 1.

Fisher

a) c)

- c) Define the two regression coefficients.
- d) Given Cov(X, Y) = -15 S.D. of X and Y are 11 and 7 respectively. Find  $b_{yx}$ .
- e) Define Paasche's quantity index numbers.

## Q.3 Write short note on any two of the following.

- a) What is the effect of change of origin and scale on correlation?
- b) State any two properties of regression coefficient. Prove any one of them.
- c) Write a note on Cost of living index number.

## Q.4 Answer any two of the following

- a) Prove that correlation coefficient lies between -1 and +1.
- **b)** The equations of two regression lines are
  - 8X 10Y + 66 = 0 and 40X 18Y 214 = 0 Find
    - i) Means of X and Y
  - ii) Coefficient of correlation between *X* and *Y*.
- c) Write a short note on index number.

## Q.5 Answer any One of the following.

- a) What is time reversal test of consistency? Verify the same for Laspeyre's index number.
- b) Obtain the expression for the acute angle  $\theta$  between the two regression lines. Interpret the results  $\theta = 0, \theta = \frac{\pi}{2}$ .

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	B.Sc	:. (Se	mester - I Comparat	I) (New) (CB ZOOLOG ive Anatomy	CS) Exar Y (Paper of Verte	nination: Mar ′ - III) brates (2222′	ch/April-2023	
Day 8 Time:	a Date 12:00	e: Thur D PM 1	sday, 06-07 Го 02:00 РМ	7-2023 1			Max. Marks	: 40
Instru	Instructions:1) All questions are compulsory. 2) Draw neat labelled diagram whenever necessary. 3) Figures to the right indicate full marks.							
Q.1	<b>Multi</b> 1)	p <b>le ch</b> The s a) c)	<b>noice Ques</b> skin of scolli epidermis both a & b	<b>tions.</b> odon consist of	b) d)	dermis none of these		08
	2)	Whic a) c)	h of the follo Scapula Glenoid Cav	wing is NOT a	part of pec b) d)	toral girdle? Coracoids Pubis		
	3)	Bile is a) c)	s secreted b liver small intesti	y ne	b) d)	stomach pancreas		
	4)	In wh a) c)	ich part of r trachea pharynx	espiratory syste	m, gaseou b) d)	is exchange take alveoli larynx	es place.	
	5)	Deox a) c)	ygenated bl left auricle left ventricle	ood collecting ir	nc b) d)	chamber. right auricle right ventricle		
	6)	Struc a) c)	tural and fu neuron nephron	nctional unit of l	kidney b) d)	nerve cell neuston		
	7)	Cerel a) c)	bellum is us balance memory	eful for	b) d)	intelligence decision		
	8)	Scrol a) c)	l valves pres frog rate	sent in alimenta	ry canal of b) d)	calotes scoliodon		
Q.2	<b>Ansv</b> 1) 2) 3) 4) 5)	<b>ver an</b> Functi Stoma Gill of Air sao Sketcl	<b>by FOUR of</b> ons of skin ach of frog fish cs h and label l	<b>the following.</b> prain of scolliod	on			08

6) Archinephorns

SLR-QA-61 Set P

# Q.3 Write short notes on any two of the following. Explain heart of scolidon and compare it with heart of frog. Describe pronephros. Describe brain of frog and compare it brain of rat. Q.4 Answer any two of the following. Explain metanephros.

- 2) Describe pelvic girdle of frog and compare it with pelvic girdle of calotes.
- 3) Explain digestive system of rat.

# Q.5 Attempt any One of the following.

- 1) Describe skin of frog.
- 2) Explain heart of rat.

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# B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 **STATISTICS** (Paper – IV) **Discrete Probability Distribution (22221212)**

Day & Date: Friday, 07-07-2023 Time: 12:00 PM To 02:00 PM

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Instructions: 1) All Questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

#### **Q.1** Choose the correct alternative.

- The probability distribution of a r.v. X is given as below, then the  $P(X \ge 4)$ 1)
  - IS х: -1 0 1 2 3 4 P(X): 1/6 1/6 1/6 1/6 1/6 1/6 a) 1/6 b) 2/6 d) Cannot be determined c) 0

#### If X is a discrete random variable with p. m. f. p(x) then $E\left(\frac{1}{x}\right)$ is given 2)

- by \_ a)  $\Sigma \overline{p(x)}$ b)  $\Sigma \frac{p(x)}{x}$ d)  $\sum xp(x)$ C)
- 3) If X follows Bernoulli distribution with variance = 0.25 and mean = 0.5, then value of second order moment about origin is .
  - a) 0.25 b) 1
  - d) 0.75 0.05 c)
- Suppose a box contain 4 white and 6 black balls. Three balls are drawn 4) randomly without replacement. Ar.v. X is defined as number of white balls obtained. Then probability distribution of r.v. *X* is identical to distribution.
  - a) Bernoulli
  - Hyper-geometric c)
- For binomial distribution \_\_\_\_\_. 5)
  - a) Mean = Variance
  - c) Mean *<* Variance
- If X is a Poisson variate with P[X = 3] = P[X = 4], then the mean of a 6) Poisson variate is \_\_\_\_\_.
  - a) 3 b) 4 c) 7 d) 1
- If X is a geometric r.v. then  $P\begin{bmatrix} X \ge 6 \\ X \ge 2 \end{bmatrix}$  is equal to \_\_\_\_\_. a)  $P[X \ge 2]$  b)  $P[X \ge 6]$ 7)
  - d)  $P[X \ge 4]$
  - c)  $P[X \ge 6]/P[X \ge 2]$

- d) None of these
- b) Mean > Variance
- d) None of these





Max. Marks: 40

SLR-QA-62

b) Binomial

8) If  $X \sim NB(k, p)$  such that E(X) = 15 and V(X) = 60, then \_\_\_\_\_.

a) 
$$k = 5, p = \frac{3}{4}$$
  
b)  $k = 5, p = \frac{1}{4}$   
c)  $k = 15, p = \frac{1}{2}$   
d)  $k = 3, p = \frac{1}{5}$ 

## Q.2 Answer any four of the following.

- a) Define probability mass function (p.m.f.) of discrete random variable X.
- **b)** Show that  $V(aX + b) = a^2 V(X)$
- c) Define two point distribution and state its mean.
- **d)** Define uniform distribution.
- e) Define negative binomial distribution.

## Q.3 Write short note on any two of the following.

a) A.r.V. X has p.m.f.

 X: 1
 2
 3
 4

 P(x): k 2k 2k 3k 

 Find:
 1)
 k 2)
 P[X - 2 < 0] 

**b)** The mean and variance of random variable *X* are 60 and 25 respectively. Find mean and variance of \_\_\_\_\_.

1) 
$$Y = \frac{x - 60}{5}$$
  
2)  $Z = \frac{x - 50}{10}$ 

c) Find mean and variance of Bernoulli distribution.

## Q.4 Answer any two of the following.

- a) Find mean and variance of Hyper-geometric distribution.
- b) State and prove lack of memory property of geometric distribution.
- c) State and prove recurrence relation for probability of Poisson distribution.

## Q.5 Answer any one of the following questions.

a) The probability mass function of a r. v. X is given by

 $P(x) = \frac{x+1}{10}$  x = 0,1,2,3Find

i) 
$$P(X \le 2)$$

ii) 
$$P(X > 1)$$

- iii) distribution function of *X*
- **b)** Find probability generating function of binomial distribution. State and prove additive property of binomial distribution

08

	B.Sc	. (Semester - II) (New) (CBC ZOOLOGY	S) Exa (Paper	mination: March/April-2023 r – IV)
		Developmental Biology	of Vert	ebrates (22221233)
Day & Time	& Date : 12:00	e: Saturday, 08-07-2023 O PM To 02:00 PM		Max. Marks: 40
Instr	uctior	<ul> <li><b>is:</b> 1) All questions are compulsor</li> <li>2) Figures to the right indicate</li> <li>3) Draw neat labelled diagram</li> </ul>	ry. full mark whereve	s. r necessary.
Q.1	Multi 1)	<b>ple choice Questions.</b> Fertilization in human takes plac a) fallopian tube c) vagina	e in b) d)	 ovary uterus
	2)	Formation of male gamete is kno a) oogenesis c) gastrulation	own as b) d)	fertilization spermatogenesis
	3)	Species-specific reaction of sper In which receptor. a) ZP-1 c) ZP-3	m & egg b) d)	is takes place in zona pellucida. ZP-2 ZP-4
	4)	Egg of Hen is of a) Alecithal c) Mesolecithal	b) d)	Polylecithal Microlecithal
	5)	Overgrowth of micromeres on m a) Emboly c) Invagination	egamers b) d)	is known as Epiboly Involution
	6)	<ul><li>Structural changes take place du</li><li>a) Spermatomorphosis</li><li>c) Metamorphosis</li></ul>	uring deve b) d)	elopment is called as Oomorphosis Zygomorphosis
	7)	ldentical twins are a) tetrazygotic c) monozygotic	b) d)	dizygotic trizygotic
	8)	Programmed cell death is a) homeoptosis c) guanoptosis	 b) d)	hetroptosis apoptosis
Q.2	Ansv 1) 2) 3) 4) 5) 6)	ver any FOUR of the following. External and internal fertilization Structure of ovum of Human Blastulation in chick Causes of miscarriages Juvenile frog Phases of spermatogenesis		08

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Q.3	Writ 1) 2) 3)	<b>e short notes on any TWO of the following.</b> Give significance of apoptosis Oogenesis Structure of Hen egg	08
Q.4	Ansv 1) 2) 3)	<b>wer any TWO of the following.</b> Principles of ultrasound Cleavage in chick Describe hormonal regulation of metamorphosis in tadpole.	08
Q.5	Ans <sup>.</sup> 1) 2)	<b>wer any ONE of the following.</b> Define placenta. Describe types of placenta on the basis of Histology. Explain types of twins in human.	08

Seat No.					Set	Ρ	
I	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Paper–III)						
Day 8 Time:	& Date: I 12:00 F	Monday, 10-07 PM To 02:00 Pl	-2023 M	(2222122、	Max. Marks	: 40	
Instru	uctions	: 1) All questior 2) Figures to f	is are compulsory. the right indicate fu	ull marks			
Q.1	Choos 1) T	<b>e correct alter</b> The polar point ( a) X-axis c) Initial line	natives (r, 0) lies on b) d)	Y-axis	these	08	
	2) T	The cartesian ed a) $x - y = 0$ c) $\frac{x}{y}$	quation of <i>cos θ</i> = b) d)	<i>sinθ is</i> )	0 these		
	3) T	The polar coord a) $\left(\sqrt{3}, \frac{5}{2}\right)$ c) $\left(\frac{1}{2}, \frac{5}{2}\right)$	inate (5, 30°) then b) d)	its cartesian $ \begin{pmatrix} \frac{5\sqrt{3}}{2}, \frac{5}{2} \\ \frac{5}{2}, \frac{1}{2} \end{pmatrix} $	n coordinates is		
	4) T p	The plane $a_1x + a_1x + b_1$ erpendicular if a) $\frac{a_1}{a_2} + \frac{b_1}{b_2} + b_2$ c) $a_1b_1 + a_2b$	$\frac{b_1 y + c_1 z + d_1}{c_2} = 0$ $\frac{b_1}{c_2} = 0$ $\frac{b_1}{c_2} = 0$ $\frac{b_1}{c_2} = 0$ $\frac{b_1}{c_2} = 0$	0 and $a_2 x + \frac{a_1}{a_2} = \frac{b_1}{b_2}$ ) $a_1 a_2 + \frac{b_2}{a_1}$	$b_2 y + c_2 z + d_2 = 0$ are $\frac{1}{c_2} = \frac{c_1}{c_2}$ $b_1 b_2 + c_1 c_2 = 0$		
	5) T	The direction co a) $\left(\frac{2}{7}, \frac{-3}{7}, \frac{6}{7}\right)$ c) $(2, -3, 6)$	sine of the normal b) d)	to the plane $\left(\frac{2}{5}, \frac{-3}{5}, \frac{-3}{5}\right)$ none of	$e^{2x} - 3y + 6z = 7$ is $\frac{6}{5}$ ) f these		
	6) T	The equation of a) $ax + by +$ c) $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} =$	plane in normal fo cz + d = 0 by 1 d	rm is ) $lx + my$ ) None of	y + nz = p f these		
	7) T	The centre of th	e sphere $x^2 + y^2 + b^2$	$-z^2 - 4x - (-2, -3)$ (2,3,4)	6y + 8z + 4 = 0 is , - 4)		
	8) T	the radius of sp a) $r = 4$ c) $r = 2$	here $x^2 + y^2 + z^2$ b) d)	-4x - 6y + r = 3 ) $r = 5$	-8z + 4 = 0 is		

Page **1** of **2** 

# Q.2 Solve any four of the following:

- a) Find the polar coordinates whose cartesian coordinates is (-1, 1)
- **b)** Find the cartesian coordinates whose polar coordinates is  $(-3, 45^{\circ})$
- c) Write the formula for relation between direction cosine and direction ratio.
- d) Write the equation of the plane passing through three points.
- e) Find the equation of sphere whose centre (2, 3, 5) and radius r = 2

# Q.3 Answer any two of the following.

- 1) Transform the equation  $x^2 + 4xy + y^2 = a^2$  when axis are rotated through an angle  $\theta = \frac{\pi}{4}$
- 2) Find the equation of plane in intercept form with figure.
- 3) Find the equation of tangent plane to the sphere  $x^2 + y^2 + z^2 6x 4y + 10z + 12 = 0$  at point (2, -1, -1)

# Q.4 Answer any two of the following.

- **1)** Explain two types of family of spheres,  $s + \lambda p = 0$ ,  $s + \lambda s = 0$
- 2) Find the angle between two planes 2x y + z = 6 and x + y + 2z = 3
- 3) Identify the conic  $16x^2 24xy + 9y^2 104x 172y + 44 = 0$

# Q.5 Answer any one of the following.

- 1) If the axis are rotated through an angle  $\theta$  the equation  $ax^2 + 2hxy + by^2$ transform into  $a(x)^2 + b(y)^2$  then  $\theta = \frac{1}{2} \tan^{-1} \left(\frac{2h}{a-b}\right)$
- **2)** Define tangent plane and find the equation of tangent plane to the given sphere.

### 08

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Day & Date: Tuesday, 11-07-2023 Time: 12:00 PM To 02:00 PM Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 4) Use of logarithm table and calculator is allowed. Q.1 **Multiple Choice Questions.** 1) Ecology b) Zoology a) b) Geology d) Algology major ecological levels of organizations. 2) Eight b) Seven a) Three d) Nine c) The term\_\_\_\_\_ is used for the gaseous envelope. 3) weather climate a) b) temperature c) atmosphere d) 4) The study of soil science is called as Virology b) Biology a) Bacteriology d) Pedology c) 5) The plants which grow in dry condition are called as Hydrophytes Xerophytes a) b) Epiphytes Mesophytes c) d) The study of plant community is called 6) phytosociology phytomycology a) b) phytohistology b) Phytogeography d)

Q.2 Answer any four of the following.

Forest

Shrub

- Define plant ecology. a)
- What is climate? b)

a)

c)

8)

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- Define the hydrophyte. C)
- What is edaphic factor? d)
- Define humidity. e)
- What is hydrosere? **f**)

**08** 

# SLR-QA-65

Set

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# B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 **BOTANY** (Paper - III) **Plant Ecology (22221202)** Max. Marks: 40

- 3) Draw neat labelled diagrams must be drawn wherever necessary.
- is the science of relations between organisms and their environment.

- 7) is the structural and functional unit of ecology.
  - Communities b) Ecosystem a)
    - All of above Succession d) c)

In xerosere, stage is replaced by the herb stage.

b)

d)

Moss

Crustose lichen

80

80

Q.3	Write short notes on any two of the following.	
-----	--	--

- a) Wind
- b) Qualitative character of community
- c) Autotrophy

## Q.4 Answer any Two of the following.

- a) Describe the stages of xerosere studied by you.
- **b**) Explain the sciophytes and heliophytes.
- c) Write on interaction between the living world.

## Q.5 Answer any one of the following.

- a) Explain the origin and soil formation studied by you.
- **b)** Describe the rainfall in details.

I	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Paper-IV) Differential Equations (22221224)						
Day & Time:	& Date : 12:0	e: W 0 PN	ednesday, 12-07-2023 I To 02:00 PM			Max. Marks: 40	
Instru	uctio	ns: 1 2	) All questions are compulsory. 2) Figures to the right indicate full n	nark	S.		
Q.1	Cho	oset	the correct alternatives from the	opt	ions.	08	
	1)	The	solution of the differential equation	1 √1	$\overline{-x^2}dy + \sqrt{1-y^2}dx =$	= 0 is	
		a) c)	$\sin^{-1} x + \cos^{-1} x = c$ $\cos^{-1} x + \sin^{-1} y = c$	b) d)	$\sin^{-1} x + \sin^{-1} y = c$ (1 - x <sup>2</sup> )(1 - y <sup>2</sup> ) = c		
	2)	A di	fferential equation $\frac{dy}{dx} = \frac{f(x,y)}{a(x,y)}$ is said	d to	be homogeneous if de	gree of	
		evei	ry term in $f(x, y)$ and $g(x, y)$ is				
		a)	Different	b)	One		
		c)	Same	d)	Finite		
	3)	The	differential equation $Mdx + Ndy =$	: 0 is	exact if		
		a)	$\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$	D)	$\frac{\partial^2 M}{\partial x^2} = \frac{\partial^2 N}{\partial y^2}$		
		c)	$\partial M  \partial N$	d)	$\partial^2 M  \partial^2 N$		
			$\frac{\partial y}{\partial y} = \frac{\partial x}{\partial x}$		$\frac{\partial y^2}{\partial y^2} = \frac{\partial x^2}{\partial x^2}$		
	4)	The	I.F. of the equation $\frac{dx}{dy} + py = Q$ is				
		a)	$e^{\int Pdy}$	b)	$e^{\int Pdx}$		
		c)	$e^{-\int Pdx}$	d)	$e^{-\int Pdy}$		
	5)	The	solution of $\frac{d^2y}{dx^2} + 4y = 0$ is				
		a)	$y = c_1 e^{-2x} + c_2 e^{2x}$	b)	$y = (c_1 + c_2 x)e^{2x}$		
	<b>C</b> )	() 1 (D	$y = c_1 \cos 2x + c_2 \sin 2x$	u)	$y = (c_1 + c_2 x)e^{-2x}$		
	0)	1/U 2)	$-(\sin 2x) = \underline{\qquad}$	b)	cos 2r		
		aj	4	5)	$\frac{\cos 2\pi}{4}$		
		c)	$\frac{\sin 2x}{4}$	d)	$\frac{-\cos 2x}{4}$		
	7)	The	value of $\frac{1}{f(D)}(e^{ax}v)$ =				
		a)	$e^{ax} \frac{1}{f(D)}V$	b)	$e^{ax} \frac{1}{f(D+a)}V$		
		c)	$e^{ax} \frac{1}{f(D-a)}V$	d)	None of these		

# Seat No.

# SLR-QA-66 Set P

Page 1 of 2

8) The value of  $\frac{1}{D^2+1}\cos x$  is \_\_\_\_\_. b)  $\frac{x}{2} = \sin x$ d)  $-\frac{x}{2} = \sin x$ a)  $\frac{x}{2} = \cos x$ c)  $-\frac{x}{2} = \cos x$ 

## Q.2 Attempt any four of the following.

- Solve  $\log\left(\frac{dy}{dx}\right) = 2x + 3y$ a)
- Solve  $\frac{dy}{dx} = (4x + 3y 1)^2$ b)
- Solve  $(x^2 4xy 2y^2)dx + (y^2 4xy 2x^2)dy = 0$ C)
- $d) \quad \text{Solve } \frac{d^3y}{dx^3} y = 0$
- e) Evaluate  $\frac{1}{D^3}(e^{2x})$

#### Q.3 Attempt any two of the following.

Explain the method of solving the Bernoulli's equation. a)  $\frac{dy}{dx} + Py = Qy^n$ 

**b)** Solve 
$$\frac{d^2y}{d^2y} + 4y = xe^{2x}$$

Solve (2x + 3y + 4)dx - (4x + 6y + 5)dy = 0C)

#### Q.4 Attempt any two of the following.

- Prove the necessary and sufficient condition for the equation a) Mdx + Ndy = 0 to be exact if  $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$
- Explain the method of finding P. I. of  $f(D)y = e^{ax}$  when  $f(a) \neq 0$  also b) explain the method of finding P. I. when f(a) = 0
- Solve  $(y^2 + 2xy)dx + (2x^2 + 3xy)dy = 0$ C)

#### Attempt any one of the following. Q.5

- a)
- Solve  $(D^3 3D^2 + 4D 2)y = e^x + \cos x$ i) Solve  $\frac{dy}{dx} + \frac{4x}{1+x^2}y = \frac{1}{(1+x^2)^3}$ ii) Solve  $x^2ydx (x^3 + y^3)dy = 0$ b)

08

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Seat No.							Set	Ρ
	B.S	c. (S	emester -	II) (New) (CB BOTAN	CS) Exar Y (PAPEF	nination: March/Apr R IV)	i <b>l-2023</b>	
Day & Time:	& Date : 12:0	e: Thu 0 PM	<b>I axc</b> Irsday, 13-0 <sup>°</sup> To 02:00 PN	nomy of Ang 7-2023 A	giosperm	i <b>s (22221203)</b> M	ax. Marks	: 40
Instru	Instructions: 1) All questions are compulsory. 3) Figures to the right indicate full marks. 4) Use of logarithmic tables and calculator is allowed.							
Q.1	Mult 1)	ti <b>ple c</b> Taxe a) c)	<b>:hoice ques</b> onomy is Arrangeme Botany	tions.  nt	b) d)	Lawful arrangement Science		08
	2)	Bota a) c)	anical names Arrangeme Botany	are always wri nt	tten in b) d)	 Lawful arrangement Science		
	3)	a) c)	is the first s Drying Collection	step of herbariu	m preparat b) d)	ion. Labelling Pressing		
	4)	a) c)	_ among the Unisexual f numerous a	following is prir lower anthers	nitive chara b) d)	acter. cymose inflorescence herb habit		
	5)	a) c)	_ is aim of ta make inven both a & b	xonomy. tory of plants	b) d)	give classification plant trees		
	6)	a) c)	among th Dhatura me Aspragous	e following is e> etal racemosa	ample of fa b) d)	amily Solanaceae. <i>Allim cepa</i> Caesalpinia		
	7)	Inflo as _ a) c)	rescence in  Spiklet Racemose	which older flov	vers at bas b) d)	e and younger at apex ca Panicle Cymose	lled	
	8)	Arra a) c)	ngement of Arrangeme Placentatio	leaves on stem nt n	is called as b) d)	S Phyllotaxy none		
Q.2	Ans a) b) c) d) e)	wer a Defir Defir Defir Write Enlis	ny four of the herbarium be artificial syne taxonomy any four ve t any four ac	ne following. vstem of classifi getative characte vance characte	cation. ters of fami rs of angio	ly Solanaceae. sperms.		08

SLR-QA-67 Set P

## Q.3 Write short notes on any Two of the following.

- a) What is taxonomy? Describe indirect method of identification.
- **b)** Write principles of ICBN.
- c) What are aims of Taxonomy?

## Q.4 Answer the any two of following.

- a) Write a note on Sir J.C, Bose botanical garden.
- **b**) Write a note on vegetative & reproductive characters of family Liliaceae.
- c) Write a note on types of inflorescences.

## Q.5 Answer any one of following.

- a) Write a note on Bentham & Hookers system of classification & add a note on merits & demerits.
- b) What are steps for preparation of herbarium.

80

Seat No.		Set P	)		
E	3.Sc	. (Semester - II) (New) (CBCS) Examination: March/April-2023 ELECTRONICS (Paper – III) Semiconductor Devices (22221226)			
Day & Time:	Date 12:0	e: Friday, 14-07-2023 Max. Marks: 40 D PM To 02:00 PM	)		
Instru	<ul> <li>Instructions: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>				
Q.1	Mult 1)	ple choice questions.08At 0°K, pure semiconducting material acts asa) insulatorb) conductorc) semiconductord) resistor	3		
	2)	The $\beta$ of a transistor is 199, then the value of $\alpha$ is a) 0.905 b) 0.95 c) 0.99 d) 0.995			
	3)	Field effect transistor is a a) High input resistance device b) Unipolar device c) Voltage controlled device d) All of these			
	4)	A Zener diode is normally used as a) an oscillator b) voltage regulator c) an amplifier d) Rectifier			
	5)	Capacitance of Varactor diode with increase in reverse voltage.a) Increasesb) Decreasesc) remains constantd) Unpredictable			
	6)	The Emitter of a transistor is doped. a) lightly b) moderately c) heavily d) all of these			
	7)	UJT is a terminal semiconductor device. a) 1 b) 2 c) 3 d) 4			
	8)	An SCR is a semiconductor device which consists of a) one PN junction b) three PN junctions c) two PN junctions d) four PN junctions			
Q.2	Ansv a) b) c)	<b>ver any four of the following.</b> 08 What is SCR? Draw its I-V characteristics. State any four applications of MOSFET. compare BJT and UJT.	3		

- d)
- Draw symbols of Zener diode and photo diode. In a transistor circuit  $I_E = 1$  mA,  $I_C = 0.94$  mA. What is the value of  $I_B$ ? e)

#### Write short notes on any two of the following. Q.3 Write a note on Varactor diode. a) Write a note on intrinsic and extrinsic semiconductor. b) Write a note on tunnel diode with the help of I-V characteristics. C) Q.4 Answer any Two of the following. 08 Explain construction of TRIAC. a) Define $\alpha$ and $\beta$ of a transistor. Obtain the relation between them. b) C) With the help of suitable circuit diagram, explain IV characteristics of PN junction diode. Answer any one of the following. 80 Q.5

- Explain input and output characteristics of a transistor in CE configuration. a)
- Explain construction & I-V characteristics of D-MOSFET. b)

B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 PHYSICAL GEOGRAPHY (Paper – III) Human Geography I (22221235) Day & Date: Friday, 14-07-2023 Time: 12:00 PM To 02:00 PM Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Draw neat diagrams & amp: give equations wherever necessary. 4) Use of maps stencil is allowed. Q.1 Fill in the blanks by choosing correct alternatives given below. is the Father of Human Geography. 1) Carl Ritter b) Blache a)

- The term comes from Anthropogeography, the title of a two-volume work 2) published in 1882 and 1891 by the German geographer .
  - Carl Ritter b) Humbolt a)
  - c) Strabo d) Friedrich Ratzel
- is the largest group according to percentage of population in the 3) world.
  - Christianity a)
  - Judaism c)
- The language families with the most speakers are the family. 4)
  - a) Afro-Asiatic c)

Strabo

c)

8)

- Sino-Tibetan
- 5) Bodh Gaya is a religious site and place of pilgrimage associated with the Mahabodhi Temple Complex in Gaya district in the Indian state of b) Maharashtra
  - a) Bihar
  - c) Uttar Pradesh
- Mecca and Madina are the important holy places of religion. 6)
  - a) Christianity b) Hinduism
  - Judaism d) Islam c)
- is the a group of people of common ancestry, distinguished from 7) others by physical characteristics, such as hair type, colour of eyes and skin, stature, etc.
  - b) Religion a) Race d) Tradition c) Culture
  - There are main blood groups in India.
  - a) 6 b) 3
    - c) 4 d) 5

Seat No.

# SLR-QA-70

Max. Marks: 40

08

- d) Islam
- b) Indo-European
- b) Hinduism

d) Hartshorne

d) West Bengal

- d) Austronesia

Q.2	Ans a) b) c) d) e)	wer any four of the following. What is mean by Anthropogeography? Where do the Naga live? What are the branches of human geography? What are the holy places of Islam? What are the physical characteristics (Any two) of Naga Tribe?	08
Q.3	Wri a) b) c)	<b>te short notes on any two of the following.</b> Eskimo Tribe. Explain the scope of Human geography. Characteristics of Christianity.	08
Q.4	Ans a) b) c)	<b>Explain the Mongoloid human race?</b> Describe the concept of religion & explain it's various groups in the world? Explain the language groups in the world?	08
Q.5	Ans a) b)	<b>wer any one of the following.</b> Define the human geography & explain it's importance? Explain the racial classification by Griffith Taylor?	08

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	B.Sc	. (Semester -	II) (New) (CBC GEOLOGY Structural Goo	S) Exan ( (Paper	nination: March/April-202 – III) 2221214)	3
Day & Time:	& Date 12:00	: Saturday, 15-07 ) PM To 02:00 PI	7-2023 M	biogy (2	Max. Ma	arks: 40
Instru	uction	s:1) All question: 2) Draw neat a 3) Figures to th	s are compulsory and well labeled d ne right indicate fu	liagrams g ull marks.	jive wherever necessary.	
Q.1	Multi 1)	ple choice ques In young a) Outlier c) Columnar	<b>tions:</b> ger rocks are surr	ounded by b) d)	y older formations. Inlier Strike	08
	2)	Himalaya is best a) Fold c) Fault	t example of	 b) d)	Unconformity Strike	
	3)	Which of the foll a) Faults c) Folds	owing structure re	epresents b) d)	Geological time gap? Joints Unconformity	
	4)	Joints are forme a) Igneous c) Metamorph	d in rocks ic	s. b) d)	Sedimentary all types	
	5)	Which of the foll a) strike- slip c) graben	owing is not type	of fault? b) d)	step columnar	
	6)	In isoclinal fold, a) convex c) inclined	limbs and axial pl	anes are b) d)	concave parallel	
	7)	Which of the foll a) Clinometer c) a & b both	owing instrument	is used to b) d)	o study attitude of rocks in field? Brunton compass contact Goniometer	>
	8)	True dip represe a) minimum c) moderate	ents inclin	ation of b b) d)	ed. maximum All the above	
Q.2	Answ 1) 2) 3) 4) 5)	<b>ver any four of t</b> Define Joints. Draw labelled dia What is outcrop? Define Structural Draw labelled dia	<b>he following.</b> Igram of Strike Jo Geology. Igram of clinomet	oints. er compa	SS.	08

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SLR-QA-71

# Seat

Q.3	Wr 1) 2) 3)	<b>ite short notes on any two of the following.</b> Strike & Dip Columnar Joints Recumbent fold	08
Q.4	An 1) 2) 3)	<b>swer any two of the following.</b> Describe Horst and Graben faults. Explain Bedding and Diagonal Joints. Distinguish between Normal and Reverse faults.	08
Q.5	An 1) 2)	<b>swer any one of the following</b> Define Folds. Describe Symmetrical and Asymmetrical Folds. Define Unconformity. Describe Non-conformity and Angular unconformity.	08

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	B.S	c. (Semester - II) (New) (CBCS) ELECTRONICS	Exa (Pa	mination: March/ per–IV)	April-2023
		Digital Electronic	s (2	2221227)	
Day Time	& Da : 12:0	te: Sunday, 16-07-2023 00 PM To 02:00 PM	,	,	Max. Marks: 40
Instr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full i</li> <li>3) Draw neat labelled diagrams wh</li> <li>4) Use of log table and calculator is</li> </ul>	mark nerev s allo	s. ver necessary. owed.	
Q.1	Cho 1)	oose the correct alternatives from the In TTL has input transistor. a) multi collector	<b>ə op</b> i b)	t <b>ions.</b> multi emitter	08
		c) multi base	d)	normal	
	2)	Race around condition is observed in a) R-S c) D	b) d)	flip flop. J-K T	
	3)	IC 7495 is a a) decade counter c) up-dn counter	b) d)	ripple counter shift register	
	4)	In TTL NAND gate sourcing current is a) 40μA c) 1.6mA	b) d)	 16mA 80μA	
	5)	J-K flip flop will toggle when J= a)   J=0, K=1 c)   J=0, K=0	and b) d)	K= J=1, K=0 J=1, K=1	
	6)	8:1 multiplexer has control line a) 8 c) 3	s b) d)	1 2	
	7)	Maximum counts for three-bit counter a) 3 c) 8	is _ b) d)	6 9	
	8)	common anode seen segment a) IC 7447 c) IC 7445	deco b) d)	oder driver IC 7448 IC 7440	
Q.2	Ans a) b)	<b>swers any four of the following.</b> Draw the diagram of master slave J-K Define propagation delay time in case	flip of T	flop and give its truth TL NAND gate.	08 table.

- How data is loaded parallelly in shift register? C)
- Give any two differentiating points between multiplexer and demultiplexer. d)
- Draw the timing diagram of MOD 2 counter. e)
- List the types of shift register? f)

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Q.3	Writ a) b) c)	<b>e Short notes on any two of the following</b> MOD 5 counter Edge triggered D flip flop Noise margin and power dissipation	80
Q.4	Ans a) b) c)	<b>wers any two of the following.</b> Explain 3 to 8 decoder. Explain ring counter with truth table and timing diagram. Explain R-S flip flop using NOR gate.	08
Q.5	Ans a) b)	wers any one of the following. Explain 4-bit binary asynchronous counter with its truth table and timing diagram. Explain construction and working of TTL NAND gate along with its necessary truth table.	80

Seat No.						Set	Ρ	
l	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 PHYSICAL GEOGRAPHY (Paper – IV)							
Day & Time:	& Dat : 12:0	e: Sunday, 16-07-2 0 PM To 02:00 PM	023	(		Max. Marks	: 40	
Instru	uctio	ns: 1) All questions 2) Figures to th 3) Draw neat d 4) Use of Stend	are compulsory. e right indicate full m liagrams wherever n cils is allowed.	hark ece	s. ssary.			
Q.1	Cho 1)	ose the correct alt The world populati a) 10 July c) 11 June	ternatives from the ion day celebrated or	<b>opt</b> n b) d)	ions.  11 July 10 June		08	
	2)	High density of pop a) Agriculture c) Lumbering	pulation in Europe is	ma b) d)	inly due to . Industrializ Mining	zation		
	3)	The age group of 1 a) Workers c) Child	15-59 year is known	as b) d)	Dependen Old	_group. icy		
	4)	a) Transport c) Industry	occupation of rural s	ettle b) d)	ement. Trade Agriculture	<u>,</u>		
	5)	is main cau a) Transport c) Poverty	se of slums growth.	b) d)	Trade Richness			
	6)	The houses arrang a) Radial c) Circular	ged in a straight line	kno b) d)	wn as Linear Triangular			
	7)	The term Agricultu a) Latin c) Roman	re is derived from the	e b) d)	langua Greek Spain	age.		
	8)	In the first stage of are a) High c) Medium	f demographic transi	tion b) d)	theory the Low Very low	birth and death rates		
Q.2	Ans a) b) c) d) e)	wers any four of the What is population What is Sex-ratio? What is human Se What is mining tow What is shifting cul	h <b>e following.</b> density? ttlement? /n? ltivation?				08	

f) What is dairy farming?

Q.3	Writ a) b) c)	<b>e a Short notes on any two of the following</b> High density population region of the world Age and Sex Ratio Characteristics of Plantation Agriculture	08
Q.4	Ans a) b) c)	<b>wers any two of the following.</b> Explain any four functions of rural settlement. Demerits of demographic transition theory Explain the economic problems of Indian Agriculture.	08
Q.5	Ans a) b)	<b>wers any one of the following.</b> Explain the population distribution of the world. Explain the physical factors affecting on agriculture.	08

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No.			Set	Ρ				
	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023 GEOLOGY (Paper – IV) Crystallography (22221215)							
Day Time	& Dat : 12:0	ite: Monday, 17-07-2023 00 PM To 02:00 PM	Max. Marks	: 40				
Instr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat diagrams wherever necessary.</li> </ul>						
Q.1	Cho	oose the correct alternatives from the options.		08				
	1)	a) Triclinic b) Hexagonal c) Orthorhombic d) Monoclinic						
	2)	Which of the following form belongs to Cubic system? a) Prism b) Pyramid c) Quarter Pyramid d) Octahedron						
	3)	In Monoclinic system, planes of symmetry present a) 7 b) 5 c) 1 d) 3						
	4)	The general formula of Cube is a) (100)    b) (011) c) (110)    d) (111)						
	5)	Type mineral of Triclinic system is a) Gypsum                                    b) Beryl c) Axinite						
	6)	Which of the following form cuts all three axes? a) Pyramid b) Prism c) Dodecahedron d) Basal Pinacoid						
	7)	Smooth, flat surface of crystal is called as a) edge b) solid angle c) face d) interfacial angle						
	8)	In Quarter Pyramid faces present a) 6 b) 8 c) 2 d) 4						

# Q.2 Answers any four of the following.

- a) What is a Crystal?
- b) Give Elements of Symmetry of Tetragonal System
- c) Draw labeled diagram of crystallographic axes of Cubic system
- d) Define combined forms of Crystal
- e) What is interfacial angle?
- f) Define Dome

80

Q.3	Wri a) b) c)	<b>te a Short notes on any two of the following</b> Crystallographic axes of Monoclinic and Triclinic system Contact Goniometer Pinacoids and types	08
Q.4	Ans	swers any two of the following.	08
	a)	Describe Faces, Solid angle and interfacial angle of crystal with labeled	
		diagram	
	b)	Explain Plane and Axes of Symmetry	
	c)	Describe Cube & Octahedron	
Q.5	Ans	swers any one of the following.	08
	a)	Define crystal. Describe Crystallographic axes, Elements of Symmetry and	
		any two forms of Hexagonal System.	
	b)	Describe Crystallographic axes. Elements of Symmetry and any two forms	

# Describe Crystallographic axes, Elements of Symmetry and any two forms of Orthorhombic System. D)

# Q.3 Write a Short notes on any two of the following

Seat	
No.	

# B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 **ENGLISH** (Comp.) Literary Voyage (19201201) (20201201)

Rewrite the following sentences choosing correct alternative given below

Day & Date: Monday, 19-06-2023 Time: 12:00 PM To 02:00 PM

Q.1

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

- them. 1) According to Francis Bacon, a good continued speech show . a) slowness b) fastness c) fumbling d) vagueness Whatever we may think about education in our speculative moments, as a 2) practical men we regard value of education as \_\_\_\_\_. a) unquestionable b) questionable c) speculative d) useless The West is continually producing \_\_\_\_\_ power. 3) b) moral a) spiritual c) military d) mechanical The poem *Our Earth Will Not Die* is written by 4) b) Christina Rossetti a) Alexander Pope c) Niyi Osundare d) Robert Browning 5) The mood of the poem Ode on Solitude is a) Sad and gloomy b) reflective and hopeful c) pensive and melancholic d) Celebratory and joyful 6) The poem *Remember* is a . a) Ballad b) Ode c) Sonnet d) Song 7) The correct synonym, of the word 'calm' is a) sound b) conflict c) tranquil d) noisy Priyanka \_\_\_\_\_ for a walk every morning. 8) a) goes b) going c) went d) gone Q.2 Answer the following questions in short (Any Four) 12 What has been done to the lakes, the seas and mountains? a) How does poet want to live and die? b) Explain the theme of the poem Remember. C) What does author say about teachers? d) What are the people in the West flattered to believe in? e)
  - What should be included in good discourse? **f**)

Max. Marks: 40

**08** 

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# Q.3 Answer any one of the following questions.

- a) Describe the process of making a cup of coffee. Use appropriate linking words wherever necessary.
- **b)** Prepare a presentation on your favourite author. Use following points Birth and childhood—education and influences—important books and themes- important events—prizes and recognition death.

# Q.4 Read the following advertisement and write a letter of application for it

10

Moderna Hotel Requires Receptionist Educational qualification: Graduation, diploma in hotel management Fluency in Marathi, Hindi and English Proficiency in MS- Office Experience: 1 year in a three star hotel Write to: The manager Moderna Hotel 65, Main road Solapur-2

Seat No.							Set	Ρ
	B.So	c. (S	emester - OF	II) (OId) (CBC CHEMISTR RGANIC CHEM	S) Exa Y (Pap ISTRY	mination: March/A er – III) ′ (19201208)	pril-2023	
Day 8 Time:	Date 12:00	: Tue ) PM	esday, 20-06 To 02:00 PM	-2023 M			Max. Marks	: 40
Instru	iction	is:1) 2) 3) 4)	All question: Draw neat c Figures to th Use of logai At. Wts.: H=	s are compulsory liagrams and give ne right indicate f rithmic table and r1, C=12, O=16, I	r. e equatic ull marks calculato N=14, Na	ons wherever necessary 5. or is allowed. a=23, CI=35.5)	/.	
Q.1	Choc 1)	o <b>se tl</b> Whie a) c)	the correct a ch of the foll $C_nH_{2n} + 2$ $C_nH_{2n} - 2$	I <b>ternative from</b> to owing is the gene	<b>the optic</b> eral form b) d)	<b>on.</b> ula of cycloalkanes? C <sub>n</sub> H <sub>2n</sub> none of the above		08
	2)	Hete a) c)	erolytic fissio Free radica Only anions	n of an organic c I S	ovalent l b) d)	oond gives Only cations Both cations and ani	ons	
	3)	SP <sup>3</sup> a) c)	hybridizatio Linear Trigonal	n leads to which s	shape of b) d)	the molecule Pyramidal Tetrahedral		
	4)	Tota a) c)	Il number of $5\sigma$ and $1\pi$ $4\sigma$ and $4\pi$	bonds present in	CH <sub>2</sub> =CH b) d)	H₂ are 3σ and 3π 2σ and 4π		
	5)	Con a) c)	jugated doul 1,3 butadie Isobutylene	ble bond compou ne	ind is b) d)	Butyne Butylenes		
	6)	Anti∙ a) c)	-Markowniko Propene but-2-ene	offs addition of HE	Br is not b) d)	observed in but-1-ene pent-2-ene		
	7)	The a) c)	C-C-C bonc 120° 45°	l angle in Benzen	ne is b) d)	 180° 60°		
	8)	All c a) c)	arbon atoms SP <sup>3</sup> hybridi SP hybridiz	s in benzene are zed ed	 b) d)	SP <sup>2</sup> hybridized none of the above		

## Q.2 Answer any four of the following.

- 1) What are dienes? Explain isolated, conjugated and cumulated dienes.
- 2) Define and explain following terms.
  - i) Aromatic compound
  - ii) non aromatic compounds
- 3) What are carbanions? Give any two methods of formation of carbanions.
- 4) What are cycloalkanes? Give the method of preparation of cyclopropane.
- 5) Write the IUPAC names of the following.



6) What are Geometrical isomers? Explain with example.

## Q.3 Write short notes on any two of the following.

- 1) What are rearrangement reactions? Explain different types of rearrangement reactions.
- 2) What is resonance effect? Illustrate resonance effect in phenol.
- 3) Give an account of isomerism exhibited by tartaric acid.

## Q.4 Answer any two of the following.

- 1) What are carbocations? Give any two methods of formation of carbocations.
- 2) What is optical activity? Explain conditions for optical activity.
- 3) Explain and illustrate SP<sup>3</sup>, SP<sup>2</sup> and SP hybridization.

## Q.5 Answer any one of the following

- 1) What is Friedel-Crafts acylation? Give its mechanism.
- 2) Explain the addition of hydrogen bromide to propene in accordance with
  - i) Markownikoffs rule
  - ii) Anti-Markownikoffs rule

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Seat No.	t			Set	Ρ				
	B.S	c. (Semester - II) (Old) (CBCS) E	Exa	mination: March/April-2023					
	COMPUTER SCIENCE (Paper-III) Introduction to Web Designing (19201229)								
Day &	& Da	te: Wednesday, 21-06-2023	- 3	Max. Marks	: 40				
Instr	. IZ. Uctiv	ou Fini TO 02.00 Fini							
msu	uoin	2) Figures to the right indicate full i	mark	(S.					
Q.1	Cho 1)	<b>Dose the correct alternatives from the</b> is the father of HTML.	e opi	tions.	08				
		a) Tim Berners-Lee c) Tim Thompson	b) d)	Hack on lee none of these					
	2)	JavaScript is case sensitive language	•						
	•	a) True	b)	False					
	3)	<ul> <li>a) <h6></h6></li> <li>c) <h4></h4></li> </ul>	st ne b) d)	ading. <h9> <h1></h1></h9>					
	4)	HTML tags are surrounded by which t a) Angle c) Square	ype b) d)	of brackets. Round Curly					
	5)	Which of the following is not a pair tag a)	l? b)	<u></u>					
		c) <i></i>	d)	br>					
	6)	What does CSS stand for?							
		c) Colorful Style Sheets	d)	Cascading Style Sheets					
	7)	HTML stands for a) Hyper Tech Markup Language c) Hyper Text Makeup Language	b) d)	Hyper Text Markup Language None of these					
	8)	The declaration in CSS consists a) selector c) values	 b) d)	property all of these					
Q.2	Ans a) b) c) d) e) f)	Swers any four of the following. What is internet? What is singular and paired tag? Different heading tags. Explain star topology with diagram. What is image floating? Define opacity.			08				

Q.3	Writ a) b) c)	<b>e short notes on any two of the following.</b> Frameset tag Anchor Tag Media tags in HTML5	08
Q.4	Ans a) b) c)	<b>wers any two of the following.</b> Explain different types of list in HTML with example. Explain for loop and while loop with example in JavaScript. Explain different types of computer networking.	08
Q.5	Ans a) b)	<b>wers any one of the following.</b> Explain different types of CSS. Explain table tag and its attributes with example in HTML.	08
		Analytical Chemis	stry (19201209)
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Day a Time	& Date : 12:00	e: Thursday, 22-06-2023 0 PM To 02:00 PM	Max. Mar
Instr	uctior	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full</li> <li>3) Use of log table and calculator i</li> <li>4) Draw neat labelled diagrams matrix</li> </ul>	marks. is allowed nust be drawn wherever necessary.
Q.1	Multi 1)	iple choice questions. Abbes' refractometer is based on a) critical angle c) angle	principle. b) refraction d) none of these
	2)	The molecular mass of compound is a) constitutive c) subtractive	an example of property. b) additive & constitutive d) additive
	3)	Haemoglobin is an complex. a) Cobalt c) Zinc	b) Iron d) lead
	4)	Hardness of water is measured in a) PPm c) g/cm <sup>3</sup>	 b) amu d) N/m²
	5)	In Kjeldah's method is used a a) CuO c) CuSO4	as catalyst. b) K2SO4 d) AgNO3
	6)	The fusion of sodium with aniline give a) NaCN c) NaX	/e b) Na₂S d) NaCNS
	7)	Natural gas mainly contains highest a) Ethane c) Pentane	percentage of b) Propane d) Butane
	8)	Paracetamol having activity. a) analgesic c) a & b	b) antipyretic d) antimaterial
~ ~	<b>A</b>		

## B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 CHEMISTRY (Paper-IV)

Seat No.

# SLR-QA-80

08

## Q.2 Answer any four of following.

- Write two advantages of Abbe's refractometer. a)
- Define COD & BOD. b)
- What are type of water pollution? C)
- Draw neat labelled diagram of activated sludge process. d)
- Define molecular formula & empirical formula. e)
- f) Define knocking. Give one example of compound having ant knocking property.

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- ks: 40

Q.3	Writ a) b) c)	<b>e short note on any two.</b> Drop weight method to determine surface tension Types of water pollution Classification of air pollutants	08
Q.4	Ans a) b) c)	<b>wer any two of following.</b> Explain the dipole moment in the study of molecular structure. Explain in detail ion exchange process. Explain the process of refning of petroleum.	08
Q.5	, a) b)	wer any one of following. What is meant by viscosity & fluidity? Describe the method to determine coefficient of viscosity by Ostwald viscometer. Explain Liebig's combustion method to determine percentage of carbon & hydrogen.	80

	B.Sc	c. (S	emester - II) (Old) (CBCS) I COMPUTER SCIEN Programming Using	Exan ICE ( C – ∣	nination: March/April-2023 Paper - IV) II (19201230)	
Day & Time:	& Date 12:00	: Fric ) PM	lay, 23-06-2023 To 02:00 PM		Max. Marks:	: 40
Instru	uction	i <b>s:</b> 1) 2)	All questions are compulsory. Figures to the right indicate full m	narks.		
Q.1	Choo 1)	ose c In ca on a a) c)	orrect alternative for the follow ase of call by, operation pe ctual parameter. Value Address	r <b>ing.</b> erform b) d)	ed on formal parameter affects Pointer Both b and c	08
	2)	Asse a) c)	essing structure members using _ Both a and b	b) d)	_ operators. -> None of these	
	3)	For ( a) c)	dynamic memory allocation dma.h alloc.h	b) d)	eader file is used. dynamic.h runtime.h	
	4)	All tł a) c)	ne members of shared co structure Array	ommo b) d)	n memory location. union Both b & c	
	5)	Pass a) c)	sing parameters to function main() clrscr()	n is ca b) d)	alled as "command line" arguments. getch() getchar()	
	6)	a) c)	keyword is useful to give alte sizeof char	rnativ b) d)	e name for exiting data type. int typedef	
	7)	a) c)	is used as a dynamic memor release() fprintf()	y alloo b) d)	cation function. realloc() None of these	
	8)	a) c)	function is used to write sing putc() putw()	gle int b) d)	eger value into file. get() getw()	
Q.2	Answ 1) 2) 3) 4) 5) 6)	ver a What Defin What Defin How What	ny four of the following. is typedef? e macro. are the use of getpixel()? e local and global variables. to declare array? is pointer?			08

Set P

### 80 Chain of Pointer 1) Command line argument 2) 3) Nested structure Q.4 Answer any Two of the following. 80 1) Write a program to show concept of recursion. 2) Explain call by value and call by reference in detail. 3) Explain random access of file. Answer any one of the following. 08 Q.5 1) What is dynamic memory allocation? Explain any two functions used in it with program. 2) Write a program to check given number is prime or not using function.

## Q.3 Write short notes on any two of the following.

			Heat and Thermodyn	aper	- iii) cs (19201205)					
Day a Time	& Date : 12:00	e: Sat D PM	turday, 01-07-2023 To 02:00 PM		Max. Marks: 40					
Instr	uctior	1 <b>s</b> :1) 2) 3) 4)	All questions are compulsory. Draw neat diagrams and give ec Figures to the right indicate full r Use of logarithmic table and calc	luatior narks. culatoi	ns wherever necessary. r is allowed.					
Q.1	Choose correct alternative.									
	1)	Dies a) c)	sel cycle is also known as constant volume cycle constant temperature cycle	 b) d)	constant pressure cycle none of the above					
	2)	Viso a) c)	cosity of a gas is directly proportion $T = \sqrt{T}$	onal to b) d)	Р Р Т <sup>2</sup>					
	3)	In L from a) c)	inde's air liquefier, the air is pass n air dust minerals	ed thr b) d)	ough the KOH solution to remove Smell CO2 gas and water vapour					
	4)	Firs a) c)	t law of thermodynamics introduc temperature pressure	es the b) d)	e concept of internal energy entropy					
	5)	As a) c)	the temperature of a gas increase decreases increases	es, me b) d)	ean free path of gas molecules remains constant none of these					
	6)	The a) c)	gas which cannot be liquified by hydrogen oxygen	Linde b) d)	's method is nitrogen carbon dioxide					
	7)	Enti a) c)	ropy of reversible process increases remains constant	 b) d)	decreases zero					
	8)	ln re a) c)	efrigerator, heat is extracted from sink and source atmosphere and sink	b) d)	and delivered to source and sink atmosphere and source					

# B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 PHYSICS (Paper - III)

Seat

No.

Page 1 of 2

SLR-QA-82

## Set P

### Q.2 Solve any Four of the following.

- 1) Define isothermal process.
- Calculate the coefficient of viscosity of a gas having average velocity of 900m/s. (Density of gas = 1.5 kg/m<sup>3</sup> and mean free path = 8 x 10<sup>-6</sup>m)
- 3) What is Joule-Thomson effect?
- 4) Define coefficient of performance.
- 5) Find the efficiency of Carnot's engine working between steam point and ice point.
- 6) A certain mass of gas at NTP is expanded to three times its volume under adiabatic conditions. Calculate the resulting pressure,  $\gamma$  for the gas is 1.40.

## Q.3 Write short notes on Two of the following.

- 1) Reversible and irreversible process with examples.
- 2) Properties of liquid He II.
- 3) Experimental set up for adiabatic demagnetisation of paramagnetic substance.

## Q.4 Answer any Two of the following.

- 1) Obtain an expression for coefficient of thermal conductivity of gas.
- 2) Derive an expression for the work done in adiabatic process.
- 3) What is mean free path? Obtain Clausius expression for mean free path by collision cross section method.

## Q.5 Answer any One of the following.

- 1) What is Otto cycle? Explain its operation and derive an expression for efficiency of Otto engine.
- 2) With a neat labelled diagram explain construction and working of vapour compression refrigeration system?

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	B.Sc	. (Se	mester - I Mi	I) (Old) (C MICROBIC crobial Ph	BCS) E DLOGY ysiolog	xar (Pa gy (	nination: March/April-20 aper–III) (19201220)	23	
Day 8 Time:	Date 12:00	: Sun ) PM <sup>-</sup>	day, 02-07-2 To 02:00 PN	2023 /			Max. M	arks	: 40
Instru	uction	i <b>s:</b> 1) 2) 3)	All question Figures to t Draw neat o	s are compu he right indic diagram and	lsory. ate full n give equ	nark atio	s. n wherever necessary.		
Q.1	<b>Multi</b> 1)	ple cl a) c)	hoice ques is the ex Starch Cellulose	<b>tions.</b> ample of hor	nopolysa	icch b) d)	aride carbohydrate. Glycogen All of the above		08
	2)	In B t a) c)	type DNA, tl 30A° 34A°	ne distance c	of one co	mpl b) d)	ete turn is 20A° 35A°		
	3)	The ı a) c)	nitrogen bas Purine Both a and	se having sing b	gle ring s	struc b) d)	cture is called as Pyrimidine DNA		
	4)	<ul> <li>4) Nucleosides are nothing but</li> <li>a) Nitrogen base and sugar molecule</li> <li>b) Nitrogen base and Phosphate molecule</li> <li>c) Phosphate and sugar molecule</li> <li>d) Nitrogen base sugar and Phosphate molecule</li> </ul>							
	5)	All er a) c)	nzymes are Apoenzyme Amylase	protein but a	ll protein	s ar b) d)	e not enzymes except Ribozyme RNA polymerase		
	6)	Enzy a) c)	mes used fo Constitutive Isoenzyme	or lactose util	lization a	re _ b) d)	type of enzyme. Inducible Apoenzyme		
	7)	To ac cultu a) c)	djust or maiı re media. Agar – Aga NaCl	ntain osmotic r	; pressur	e b) d)	component is added in Vitamin Yeast extract		
	8)	On h Kcal a) c)	ydrolysis of / mol of ene -5.7 7.3	one ATP mo rgy is releas	lecule ur ed.	nder b) d)	-7.5 -7.3		

Page **1** of **2** 

Page 2 of 2

#### 1) Draw the structure of DNA and neat label it. 2) Define coenzyme and give their example. Define Chemoheterotrophs and give two examples of chemoheterotrophic 3) bacteria. Write the importance of peptone in bacteriological media. 4) Define induced enzyme and give their example. 5) Write the importance of Neutral red in bacteriological media. 6) Q.3 Write short note on any Two of the following. 08 Write note on structure and energy content of ATP. 1) Describe in brief the types and function of lipids. 2) 3) Write in short about importance of Agar - Agar and sodium taurocholate in bacteriological media. 80 Q.4 Answer any Two of following. Define enzymes and write in short about basic or simple structure of 1) enzyme. 2) Describe in short about nutritional requirements of microorganisms. Write in short about EMP pathway of glucose catabolism. 3) Answer any One of following. 08 Q.5 Describe in detail about nutritional types of microorganisms based on 1) carbon and energy source. 2) Describe in detail the structure and function of proteins.

#### Answer any Four of the following. Q.2

-

Set

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No.	

B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 PHYSICS (Paper-IV)

## Electricity, Magnetism and Basic Electronics (19201206)

Day & Date: Monday, 03-07-2023 Time: 12:00 PM To 02:00 PM Max. Marks: 40

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of logarithmic table or nonprogrammable calculator is allowed.
- 4) Draw neat labelled diagrams must be drawn wherever necessary.

## Q.1 Select and write the most appropriate answer from the given alternatives 08 for each sub-question:

- With an increase of frequency of a.c. voltage source applied across capacitor, the value of susceptance of capacitor \_\_\_\_\_.
  - a) increases

remain constant

c)

- b) decreases
- d) increases exponentially
- 2) Magnetic induction at point along the axis of an infinitely long solenoid consisting 'n' number of turns per unit length and carrying current 'i' is
  - a)  $(\mu_0 n i)/2$  b)  $2\mu_0 n i$
  - c)  $3\mu_0 n i$  d)  $\mu_0 n i$
- 3) In the circuit of zener diode voltage regulator, zener diode is connected in
  - a) forward bias mode
- b) revere bias mode
- c) active mode d) saturation region
- 4) Gate, Drain and Source are the names of three terminals of a \_\_\_\_\_.
  - a) BJT b) UJT
  - c) FET d) SCR
- 5) For a transistor connected in common emitter configuration, the ratio of change of base-emitter voltage 'Δ VBE' to change of base current 'Δ IB' is called \_\_\_\_\_.
  - a) output resistance k
    - b) current gain
  - c) voltage gain d) input resistance
- The current amplification factor 'β' for a transistor connected in CE configuration is \_\_\_\_\_.
  - a) ratio of ' $\Delta$  I<sub>B</sub>' and ' $\Delta$  I<sub>C</sub>'
- b) ratio of ' $\Delta$  I<sub>c</sub>' and ' $\Delta$  I<sub>B</sub>'
- c) ratio of ' $\Delta$  I<sub>E</sub>' and ' $\Delta$  I<sub>C</sub>'
- d) ratio of  $\Delta I_{c}$  and  $\Delta I_{E}$
- 7) For 1000 radian/sec angular frequency of applied a. c. voltage source across pure inductor having susceptance 0.01 mho, the value of inductance of pure inductor is \_\_\_\_\_.
  - a) 0.1 henry b) 1 henry
  - c) 0.2 henry d) 2 henry
- 8) When figure of merit is  $2 \times 10^{-7} \,\mu\text{A/mm}$  and voltage sensitivity is  $1.25 \times 10^{4} \,\text{mm/}\mu\text{V}$  then resistance of a coil of ballistic galvanometer is \_\_\_\_\_.
  - a) 100 Ω b) 300 Ω
  - c)  $400 \Omega$  d)  $500 \Omega$

### Q.2 Attempt any FOUR of the following

- 1) Draw the frequency response curve for series LCR Circuit.
- 2) Define charge sensitivity and voltage sensitivity for ballistic galvanometer.
- 3) Draw input and output waveforms for positive clamper.
- 4) What is filter circuit?
- 5) Calculate the magnetic induction at a centre of a single turn circular coil having radius 3.14 cm and carrying current 2 ampere.
- 6) Calculate the resonance frequency for series LCR circuit, when circuit consist 100 mH inductor and 10  $\mu$ F capacitor.

### Q.3 Attempt any TWO of the following.

- 1) Write a short note on: Parallel Resonant Circuit.
- 2) Describe the circuit of common emitter transistor amplifier.
- 3) Calculate current flowing through a coil having resistance  $1\Omega$  and inductance 1 henry at time instant 1 second after applying potential difference of 2 V.

### Q.4 Attempt any TWO of the following.

- 1) What is clipper? Explain the working of Negative Clipper circuit?
- 2) Derive the relationships between current amplification factors for a transistor connected in CB and CE configurations.
- 3) In a series LCR circuit L = 20 mH,  $C = 10 \mu\text{F}$  and  $R = 2\Omega$ . Calculate: a) Bandwidth
  - b) Quality factor at resonance

### Q.5 Attempt any ONE of the following.

- 1) Describe charging and discharging modes of a capacitor through an inductor.
- 2) State Biot-Savart's law and derive an expression for magnetic induction at one end point on the axis of a solenoid carrying current having finite length.

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Seat		Set
No.		50
E	B.Sc. (Semester -	II) (Old) (CBCS) Examination: March/April-2023
		MICROBIOLOGY (Paper–IV)
	A	oplied Microbiology (19201221)

Day & Date: Tuesday, 04-07-2023 Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.

3) Figures to the right indicate full marks. 4) Use of logarithmic table and calculator is allowed. (At. Wts.: H=1, C=12, O=16, N=14, Na=23, CI=35.5) Q.1 Multiple choice questions. The UHT method of milk Pasteurization, exposes milk to a temperature of 1) 200° C for a) 30 minutes 5 minutes c) d) 1 second 2) is the only source of carbon in Koser's Citrate medium. Lactose b) Glucose a) c) Na Citrate d) Peptone 3) is a protein component of milk. a) Casein b) Gelatin Gluten c) d) Globulin temperature is used for incubation for Eijkman's test. 4) 40°C b) 45.5°C a) 35°C d) 37°C c) is an indicator of fecal pollution. 5) Bacillus b) S. aureas a) c) E. coli d) Shigella 6) Enteric diseases are mainly transmitted by

- b) Contact a) Blood Air d) Water c)
- EMB agar is used for \_\_\_\_\_ test. 7)
  - Confirmed b) Presumptive a) c) Completed d) MPN
  - is an example of air borne disease.
    - Cholera Typhoid a) b)
    - Tuberculosis Rabies c) d)

#### Q.2 Answer any FOUR of the following.

Define coliforms. a)

8)

- What is an incubation period? b)
- Define pathogen. C)
- Define Virulence. d)
- DMC of Milk. e)
- Etiology and etiological agents. **f**)

Max. Marks: 40

08

08

- b) 15 to 30 seconds

2) Draw neat diagrams and give equations wherever necessary.

Q.3	Writ a) b) c)	<b>e short notes on any TWO of the following.</b> IMViC Test. Modes of transmission of diseases. Explain the Biological methods for sewage treatment.	80
Q.4	Ans <sup>r</sup> a) b) c)	<b>wer any TWO of the following.</b> MPN test. Describe the types of infection. Pasteurization methods of Milk.	08
Q.5	Ans <sup>.</sup> a) b)	<b>wer any ONE of the following.</b> Describe municipal water purification. Give an account of composition of milk and sources of contamination of milk.	08

Seat No.		Set	Ρ						
B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 STATISTICS (Paper – III) Descriptive Statistics – II (19201211)									
Day & Time:	Descriptive Statistics - II (19201211)Day & Date: Wednesday, 05-07-2023Max. Marks: 40Time: 12:00 PM To 02:00 PMMax. Marks: 40								
Instru	uction	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat labelled diagrams must be drawn wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>							
Q.1	Choo 1)	ose the correct alternative.If $r(X,Y) = 0.9$ , then $r(2X + 1, Y + 3)$ isa) 0.9b) $-0.9$ c) 1.8d) $-1.8$	08						
	2)	Absolute correlation coefficient is independent of change ofa) Originb) Scalec) Both origin and scaled) None of these							
	3)	The limits of rank correlation isa) 0 to 1b) 0 to $\infty$ c) $-1$ to $+1$ d) None of these							
	4)	If $r = \pm 1$ , then two regression lines are a) Coincident b) Parallel c) Perpendicular to each other d) None of these							
	5)	If one regression coefficient is greater than one, then other must be a) More than one b) Equal to one c) Less than one d) Equal to 0.5							
	6)	The two regression lines of regression intersect at a) $(-\bar{X}, \bar{Y})$ b) $(\bar{X}, -\bar{Y})$ c) $(-\bar{X}, -\bar{Y})$ d) $(\bar{X}, \bar{Y})$							
	7)	In a regression line of <i>Y</i> on <i>X</i> , the variable <i>X</i> is known as a) Independent variable b) Dependent variable c) Both a and b d) None of these							
	8)	The total number of class frequencies of all order for three attributes isa) 3b) 9c) 27d) 12							
Q.2	Ansv a) b) c) d) e)	wer any four of the following. Define positive correlation and negative correlation. Define Paasche's price index number. Define covariance between <i>X</i> and <i>Y</i> . Show that G.M. of regression coefficients is equal to the correlation coefficient. Define Fisher's quantity index number.	08						

## Q.3 Write short note on any two of the following

- a) Uses of index number.
- **b)** Effect of change of origin and scale on correlation coefficient.
- c) Yules coefficient of association.

## Q.4 Answer any two of the following

- **a)** With usual notation, prove that  $R = 1 \frac{6\sum di^2}{n(n^2-1)}$
- **b)** What is time reversal test of consistency? Verify the same for Laspeyre's quantify index number.
- c) Prove that the correlation coefficient is the geometric mean between the regression coefficients.

## Q.5 Answer any One of the following.

- a) Derive acute angle between the two regression lines.
- **b)** State the conditions of consistency in case of three attributes A, B and C.

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Seat No.									Set	Ρ
	B.S	c. (S	emester -	II) (O Z	Id) (CE OOLO	BCS) E GY (Pa	Exan aper	nination: March/A · – III)	pril-2023	
Day 8 Time:	Date 12:00	e: Thu ) PM	ursday, 06-0 To 02:00 Pl	7-2023 M	3	iy or v	rente	DIALES (19201232	) Max. Marks	: 40
Instru	ictior	<b>is:</b> 1) 2) 3)	All question Draw neat o Figures to th	s are o liagran ne righ	ompulsons where t indicate	ory. ever ne e full m	ecessa arks.	ary.		
Q.1	Multi 1)	ple c Thre a) c)	boice Ques chambere fish rabbit	stions. ed hear	rt is pres	ent in <sub>-</sub>	b) d)	 frog man		08
	2)	n fro a) c)	og, process skin both a and	of resp b	piration is	s throu	gh b) d)	lung head		
	3)	The a) c)	heart is pumping excretion	or	gan.		b) d)	sucking digestion		
	4)	True a) c)	e horn is mae keratin myosin	de up o	of		b) d)	actin bone		
	5)	a) c)	is the la Pancreas Salivary	rgest g	land of (	digestiv	/e sys b) d)	stem. Liver Adrenal		
	6)	The a) c)	function of o smell vision	cerebe	llum is _		 b) d)	digestion equilibrium		
	7)	The a) c)	secretion of saliva acid	the se	baceou	s gland	l is ca b) d)	illed as sebum water		
	8)	ln m a) c)	ammals metanephro pronephros	ki os	dney is	presen	t. b) d)	mesonephros nephros		
Q.2	Ansv 1) 2) 3) 4) 5) 6)	<b>ver a</b> Air bl Optic Meta Aortic Func Horn	ny four of t adder lobes of bir nephric kidn c arches in li tions of hear	h <b>e foll</b> d ey ung fis t	<b>owing</b> . h					08

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>1) Define soft glands of vertebrates.</li> <li>2) Explain endoskeletons.</li> <li>3) Define wolffian duct.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>1) Compare the structure of heart of scoliodon with that of <i>Rana</i> species.</li> <li>2) Compare the structure of brain of aves with mammal.</li> <li>3) Compare the structure of aortic arches of amphibians with reptiles.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>1) Give a comparative account of stomach in different vertebrates.</li> <li>2) Give a comparative account of respiratory organs of vertebrates.</li> </ul>	08

	B.S	c. (Semester - II) (Old) STAT	(CBCS) Exai ISTICS (Pape	mination: March/April-2023 er – IV)
		Probability and Proba	ability Distrik	outions – II (19201212)
Day Tim	/ & Da ne: 12:0	te Friday, 07-07-2023 00 PM To 02:00 PM		Max. Mar
Ins	tructio	ons: 1) All Questions are cor 2) Figures to the right ir 3) Use of Calculator is a	npulsory. Idicate full mark allowed.	S.
Q.1	Cho	oose the correct alternative	es from the op	tions.
	1)	If random variable X is a r	umber appeare	ed on throw of a fair die then $E(X)$
		= a) 3 c) 1/6	b) d)	7/2 Does not exist
	2)	In usual notations probabi random variable X is defined	lity generating f ied as	unction (p.g.f.) of a discrete

Seat

No.

## March/April-2023 I (19201212)

xist f.) of a discrete c)  $\sum sp(x)$ d)  $\sum s^{x}p(x)$ 3) The joint p. m. f. of a bivariate r. v. (X, Y) is P(X,Y) = K(x + y) X = 1,2Y = 1,2 then the value of k is \_\_\_\_\_. a) 1/6 b) 1/9 d) 1/12 c) 1/4 4) If X and Y are independent r. v.s then a) E(X + Y) = E(X) + E(Y)b)  $E(X,Y) = E(X) \cdot E(Y)$ c)  $P(x, y) = P(x) \cdot P(y)$ d) all of these The variance of one point distribution is always 5) zero b) One a) Constant K d) none of these c) The sex of a new born child is recorded as male or female in a hospital is 6) an real life situation where Binomial distribution is used a) Discrete uniform distribution is used b) Bernoulli distribution is used c) None of these d) 7) For a Binomial distribution, probability of success (p) is always for each trial. a) 1 b) Increasing  $\frac{1}{2}$ d) c) Constant 8) The number of parameters of hypergeometric distribution is . One a) b) Two d) None of these c) Three

## SLR-QA-88

Set

Max. Marks: 40

- Attempt any four of the following. 08 Q.2 Define expectation of X. a) Define joint probability mass function b) Define conditional variance of X given Y = y. C) d) Define one point distribution. e) Define Binomial distribution. Define Hyper-geometric distribution. **f**) Q.3 Write short note on any two of the following. 08 The p.m.f. of a r.v. *X* is given by  $P(x) = \frac{x}{15}$  for x = 1,2,3,4,5a) Find E(X) and E(2X + 3)State and prove multiplication theorem on expectation. b) Find mean and variance of Bernoulli distribution. C) **Q.4** Answer any two of the following. **08** With usual notation prove that  $V(aX + b) = a^2 V(X)$ a) The joint pmf of r. v. (X, Y) is b)
  - $P(x, y) = \frac{1}{4}x = 1, 2, ; y = 1, 2$ = 0 otherwise

Discuss the independence of *X* and *Y*.

If the p.g.f. of discrete r. v. is  $0.5 + 0.3S + 0.2S^2$  then find E(X) and V(X)C)

#### Answer any one of the following questions. Q.5

The joint probability distribution of r. v. (X, Y) is a)

X Y	1	2	3
1	0	$\frac{1}{3}$	0
2	$\frac{1}{3}$	0	$\frac{1}{3}$

Find

Marginal probability distribution of X and Y. 1)

2) E(X+Y)

b) Find mean and variance of Hypergeometric distribution.

SLR-QA-88

## Seat No.

### B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 **ZOOLOGY** (Paper IV) **Developmental Biology of Vertebrates (19201233)**

Day & Date: Saturday, 08-07-2023 Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat diagrams and give equations wherever necessary.

#### **Q.1** Fill in the blanks by choosing correct alternatives:

The process of production and accumulation of yolk in a developing oocyte 1) is called as

b)

d)

- Oogenesis a)
- Spermiogenesis d) Fertilization c)
- The fusion of sperm and egg nucleus is called as 2)
  - a) Conjugation
  - Recombination c)
- The cleavage in frog is \_\_\_\_\_ type. 3)
  - Holoblastic & unequal a)
  - Meroblastic & unequal c)
- Physiological connection between mother and fetus is called as 4)
  - Amnion Endometrium a) b)
  - Placenta d) Uterus c)
- 5) The process of becoming a specialized cell with unique structure and function is called as
  - Maturation b) Specialization a)
  - Organization Differentiation c) d)
- 6) Dizygotic twins originate from \_\_\_\_
  - One egg b) Two eggs a)
  - Multiple eggs c) One sperm d)

#### The process of conversion of spermatid to spermatozoa is known as \_\_\_\_\_. 7)

- Spermiospecialization Spermiodifferentiation a) b) Spermiogenesis Spermatidogenesis c) d)
- 8) of the following show external fertilization.
  - Rat b) Frog a)
  - d) Rabbit c) Pigeon

#### Q.2 Answer the following questions briefly (any Four):

- Define oogenesis and its significance. 1)
- 2) Define external fertilization with example.
- 3) Define fate map and its significance.
- Define implantation of blastocyst in humans. 4)
- Differentiate between epiboly and emboly. 5)
- Define miscarriage and mention two causes. 6)

Holoblastic & equal

b)

Meroblastic & equal d)

b) Copulation

Fertilization

Vitellogenesis



Set

Max. Marks: 40

Q.3	Writ 1) 2) 3)	e notes on any Two of the following. Give an account on structure of hen's egg. Give a brief account on the principle and applications of ultrasound in human embryology. Define placenta and give explanation on hemochorial placenta.	08
Q.4	Atte 1) 2)	<b>mpt the following.</b> Explain the process of spermatogenesis. Define apoptosis and give an outline of its mechanism.	08
Q.5	Ans 1) 2)	<b>wer any One of the following.</b> Discuss the process of cleavage, blastulation and gastrulation in human. Give a detailed account on from tadpole metamorphosis and its hormonal regulation.	08

Seat No.					Set	Ρ	
	B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 MATHEMATICS (Paper–III)						
Day & Time:	& Date: Mo : 12:00 PN	onday, 10-07- / To 02:00 PI	-2023 M	<b>y</b> ( 1	Max. Marks	: 40	
Instru	u <b>ctions</b> : 1 2	) All question ) Figures to t	s are compulsor he right indicate	ry. full	marks		
Q.1	Choose 1) Ide a) c)	<b>correct alter</b> ntify the conic Circle Parabola	<b>natives</b> c given by $x^2 + 2$	2 <i>xy</i> b) d)	+ $y^2 - 2x - 1 = 0$ Ellipse Hyperbola	08	
	2) r = a) c)	<i>a</i> represent Straight Lin Circle	e	b) d)	Parabola Ellipse		
	3) The a) c)	e cartesian ec $x^2 + y^2 = 1$ xy = 2	quation of $r = a$	cos <i>t</i> b) d)	$\begin{array}{l} y \text{ is } \underline{\qquad} \\ x = y \\ x^2 + y^2 - ax = 0 \end{array}$		
	4) The a) c)	e centre of sp (u, v, w) (-u, v, -w)	here $x^2 + y^2 + z$	z <sup>2</sup> + b) d)	2ux + 2vy + 2wz + d = 0 is (-u, -v, -w) (-u, -v, w)		
	5) The a) c)	e equation of $x^2 + y^2 - z$ $x^2 - y^2 - z$	standard sphere $z^2 = r^2$ $z^2 = r^2$	e is _ b) d)			
	6) The ext a) b) c) d)	e equation of remities of a $x^2 + y^2 + z$ $x^2 + y^2 + z$ $x^2 + y^2 + z$ $x^2 + y^2 + z$ $x^2 + y^2 + z$	the sphere desc diameter is $x^{2} + 5x - 4y - 3z^{2}$ $x^{2} + 5x - 4y + 3z^{2}$ $x^{2} - 5x + 4y - 3z^{2}$ $x^{2} + 5x + 4y + 3z^{2}$	ribe 	d on $(2, -3, 1)$ and $(3, -1, 2)$ as 11 = 0 11 = 0 11 = 0 11 = 0		
	7) The 122 a) c)	e length of the $x + 4y + 3z + 12$ 26	e perpendicular f 26 = 0 is	from b) d)	origin to the plane 2 4		
	8) The per a) c)	e planes $a_1x$ pendicular if $a_1a_2 + b_1b_2$ $a_1b_1 + a_2b_2$	$+ b_1 y + c_2 z + d_1$ $\overline{f_1 + c_1 c_2} = 0$ $f_2 + c_1 c_2 = 0$	= 0 b) d)	and $a_2 x + b_2 y + c_2 z + d_2 = 0$ are $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ $\frac{a_1}{a_2} + \frac{b_1}{b_2} + \frac{c_1}{c_2} = 0$		

Page 1 of 2

## Solve any four of the following:

- a) Find the polar co-ordinates whose cartesian co-ordinates is (-1, 1)
- **b)** Find the cartesian equivalents of polar equation  $r = a \cos \theta$
- c) Find centre and radius of  $x^2 + y^2 + z^2 2x + 4y 6z = 11$
- **d)** Find the equation of sphere with centre at (a, b, c) and radius 'r'
- e) Show that the three points (-2,3,5)(1,2,3)(7,0,-1) are collinear.
- f) Find the equation of plane whose x, y, z intercept are 3,4 and 7 respectively

### Q.3 Answer any two of the following.

Q.2

- 1) Transform the equation  $x^2 4xy + 3y^2 10x + 16y + 21 = 0$  to parallel axes through the points (1, -2)
- 2) Prove that the plane Ax + By + Cz = D touches the sphere  $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$  if and only if  $(Au + Bv + Cw + D)^2 = (A^2 + B^2 + C^2)(u^2 + v^2 + w^2 - d)$
- 3) Find equation of plane through the points P(2,2,-1), Q(3,4,2) and R(7,0,6)

### Q.4 Answer any two of the following.

- 1) If by rotation of axes, the expression  $\propto x + \beta y$  changes to  $\propto' x' + \beta' y'$  then show that  $\alpha^2 + \beta^2$  is invariant
- 2) Find the equation of a tangent plane to the sphere  $x^2 + y^2 + z^2 6x 4y + 10z + 12 = 0$  at (2, -1, -1)
- **3)** Derive equation of plane in normal form.

### Q.5 Answer any one of the following.

- 1) If by rotation of axes the expression  $ax^2 + 2hxy + by^2$  becomes  $a'x'^2 + 2h'x'y' + b'y'^2$  then prove that a + b = a' + b' and  $ab h^2 = a'b' h'^2$
- 2) a) Find k if (2, -1, 1) lies on the sphere  $x^2 + y^2 + z^2 + 4x + 2y - 2z - k = 0$ 
  - b) Find the equation of the plane through the point (1, -3, 2) and perpendicular to the planes x + 2y + 2z = 5 and 3x + 3y + 2z = 8

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	B.Sc	c. (Se	emester - II) (OI I Plai	d) (CBCS) BOTANY (F nt Ecology	Exar Paper (192	nination: March/A <sup>r</sup> III) 01202)	pril-2023
Day & Time	& Date : 12:0	e: Tue 0 PM	esday, 11-07-2023 To 02:00 PM				Max. Marks: 40
Instr	uctior	n <b>s:</b> 1) 2) 3) 4)	All questions are of Figures to the righ Draw neat labelled All questions carry	compulsory. It indicate full d diagrams m / equal marks	mark iust be s.	s. e drawn wherever nece	essary.
Q.1	Rew 1)	rite th a) c)	<b>ne following sent</b> is the space betw Bulky density Soil structure	ences by cho een the soil p	b <b>osing</b> barticle b) d)	<b>g correct alternative.</b> es. Soil permeability Soil porosity	08
	2)	The a) c)	plant grows in extra Hydrophytes Mesophytes	emely dry hal	oit are b) d)	known as Xerophytes Oxalophytes	
	3)	The a) c)	poorly developed r Mesophyte Xerophytes	oot system is	show b) d)	n in Hydrophyte Epiph	
	4)	a) c)	succession takes Hydrosere Lithosere	place on rocl	k. b) d)	Xerosere None of these	
	5)	The a) c)	plants are called _ Consumer Producers	of ecosys	stem. b) d)	Decomposer Rotifer	
	6)	Ecol a) c)	ogical pyramids are Triangular Quadrangular	e in na	ture. b) d)	Circular Pentangular	
	7)	The a) c)	term ecosystem wa Lawlor - 1931 E.P. Odum - 1963	as first propos	sed by b) d)	/ Ecologist. A.G. Tansley - 1935 Madhavan - 1974	
	8)	Vitali a) c)	ity of plant commu V1 V5	nity is ty	vpes. b) d)	V2 V3	
Q.2	Ansv a) b) c) d)	wer a Defin Defin What Give	ny four of the foll e the pediology. e Food Chain. is mean by primar the components of	owing. ry succession f grassland ec	? cosyst	em.	08

- Give the chemical properties of soil.
- e) f) Define hydro sere.

Seat

No.

SLR-QA-91

Set P

Q.3	Write short notes following questions (any two).	08
	1) What is mean by soil profile?	
	2) What are the qualitative characters of plant community?	
	3) Consumers.	
Q.4	Answer the following questions (any two).	08
	a) Describe the components of an ecosystem.	
	b) Explain Xerosere.	
	c) Describe the grassland ecosystem.	
Q.5	Answer the following (any one ).	08

- What is ecological pyramid? Describe pyramid of number in ecosystem. What is succession? Describe the various stages of Hydrosere. a)
- b)

Set

## B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 MATHEMATICS (Paper-IV) Differential Equations (19201224)

Day & Date: Wednesday, 12-07-2023 Time: 12:00 PM To 02:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Draw neat labelled diagram and give equations wherever necessary.

### Q.1 Choose the correct alternatives from the options.

The meaning of  $\frac{1}{D+a}X =$  \_\_\_\_\_. 1) b)  $e^x \int e^{-x} \times dx$ a)  $e^{-x} \int e^x \times dx$ d)  $e^{ax} \int e^{-ax} \times dx$ c)  $e^{-ax} \int e^{ax} \times dx$  $\text{If} \frac{1}{D+2} \sin x = \underline{\qquad}.$ 2) a)  $\frac{\cos x + 2\sin x}{5}$ c)  $\frac{\sin x + 2\cos x}{5}$ b)  $\frac{\cos x - 2\sin x}{-5}$ d)  $\frac{\sin x - 2\cos x}{5}$ The solution of differential equation  $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = 0$  is \_\_\_\_\_. 3) a)  $y = (c_1 + c_2 x)e^{2x}$ c)  $y = (c + c_2 x^2)e^{-2x}$ b)  $y = c_1 e^{2x} + c_2 e^{-2x}$ d)  $y = (c_1 + c_2 x) e^{-2x}$ The solution of  $(D^2 - 2D + 5)y = 0$  is \_\_\_\_\_. a)  $y = c_1 \cos 2x + c_2 \sin 2x$  b)  $y = c_1 e^x + c_2 e^{2x}$ c)  $y = e^x (c_1 \cos 2x + c_2 \sin 2x)$  d)  $y = e^{-x} (c_1 \cos 2x + c_2 \sin 2x)$ 4) c)  $y = e^{-1}(c_1 \cos 2 - c_1)^{-1}$ The solution of  $\log \left(\frac{dy}{dx}\right) = 2x + 3y$  is \_\_\_\_\_. a)  $\frac{e^{2x}}{2} + \frac{e^{-3y}}{3} = c$ b)  $\frac{e^{2x}}{2} - \frac{e^{-3y}}{3} = c$ c)  $e^{2x} + \frac{e^{3y}}{3} = c$ d)  $-\frac{e^{2x}}{2} + \frac{e^{3y}}{3} = c$ 5) The equation  $\frac{dy}{dx} = \frac{1-3x-3y}{2y+2x}$  is solved by using substitution \_\_\_\_\_. 6) b) x + y = ud) 2x + 2y = ua) x - y = uc) y = uxThe Bernalli's equation  $x \frac{dy}{dx} + y \log y = xye^x$  by using substitution \_\_\_\_\_. 7) a)  $\frac{1}{u} = u$ b)  $\frac{1}{u} = u$ d)  $e^x = u$ c)  $\log v = u$ 

Set P

SLR-QA-92

Max. Marks: 40

8) If the equation Mdx + Ndy = 0 is homogeneous and  $Mx + Ny \neq 0$  then

I.F. = \_\_\_\_\_. a)  $\frac{1}{\frac{Mx + Ny}{My - Nx}}$ b)  $\frac{1}{My + Nx}$ d)  $\frac{1}{Mx - Ny}$ 

## Q.2 Attempt any four of the following.

- a) Solve  $(x^4 2xy^2 + y^4)dx (2x^2y 4xy^3 + \sin y)dy = 0$ b) Solve  $(x^2 yx^2)dy + (y^2 + x^2y^2)dx = 0$ c) Solve  $\frac{dy}{dx} \frac{2x}{1 x^2}y = \frac{1}{(1 x^2)^{3/2}}$

- **d)** Solve  $\frac{dy}{dx} = \frac{x^2 + y^2}{2xy}$  by using substitution y = vx
- e) Solve  $\frac{d^4y}{dx^4} 81y = 0$ f) Solve  $(D^3 + 3D + 2)y = 2e^{2x}$

## Q.3 Attempt any two of the following.

- a) Prove that the necessary and sufficient condition that Mdx + Ndy = 0 to be exact is  $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$
- **b)** Show that  $(D \alpha)(D \beta)y = (D \beta)(D \alpha)y$
- **c)** Solve  $\frac{d^2y}{dx^2} 3\frac{dy}{dx} + y = 2\sin 3x$

## Attempt any two of the following. a) Solve $\frac{dy}{dx} = \frac{y-x+1}{y+x+5}$ Q.4

- Solve  $(D^4 2D^3 + D^2)y = x^3$ b)
- The differential equation  $(D m_1)^2 y = 0$ , then show that  $y = (c_1 x + c_2)e^{m_1 x}$ C)

#### Q.5 Attempt any one of the following.

- Explain the method of solving  $\frac{dy}{dx} + py = Qy^n$ , and hence solve a)  $\frac{dy}{dx} - \frac{\tan y}{1+x} = (1+x)e^x \sec y$
- **b)** If f(D)y = x, where  $x = \sin ax$ , a is constant. Prove that  $\frac{1}{f(D^2)}\sin ax = \frac{1}{f(-a^2)}\sin ax$ , where  $f(-a^2) \neq 0$ . Solve that differential equation  $\frac{d^4y}{dx^4} + 10\frac{d^2y}{dx^2} + 9y = \cos x$

08

08

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ay & Da me: 12:	ite: Thursday, 13-07-2023 Max. Marks 00 PM To 02:00 PM	s: 40
structio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Draw neat diagrams and give equations wherever necessary.</li> </ul>	
.1 Mu 1)	Itiple Choice Questions are commonly known as group of flowering plants.a) Angiospermsb) Gymnospermsc) Fungid) Pteridophytes	08
2)	The aim of taxonomy includes three aspectsof plants. a) Identification b) nomenclature c) classification d) all the above	
3)	is concerned with the laws governing the classification of plants. a) Taxonomy b) Anatomy c) Both a and b d) None of these	
4)	are the two English taxonomists who were closely associated with the Royal Botanical Garden at Kew, England. a) Angler and Hooker b) Bentham and Hooker c) Bentham and Alexopolous d) Mims and Hooker	
5)	A binomial name is comprised of two parts that isname. a) generic b) specific c) both a and b d) none of these	
6)	A herbarium is a collection of plant specimens mounted on sheets.a) pressedb) driedc) both a and bd) none of these	
7)	Sir J. C. Bose Botanical Garden in is one of the largest government botany gardens in India. a) Mumbai b) Calcutta c) Lucknow d) Chennai	
8)	Casia auriculata is the scientific name of family a) Nyctaginaceae b) Solanaceae c) Liliaceae d) Caesalpinaceae	
.2 Ans a) b) c) d)	swer any four of the following. Define taxonomy. Give the long form of ICBN. What is Bionomial Nomenclature? Define herbarium	08

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## Q.

B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 BOTANY (PAPER IV) Taxonomy of Angiosperms (19201203)

Seat No.

SLR-QA-93

Set P

- Q.
  - Define herbarium. d)
  - Write two names of botanical garden of India. e)
  - What is systematic? f)

Q.3	Write a) b) c)	<b>e short notes on any Two of the following.</b> Economic importance of family Liliaceae Importance of Botanical Garden Aims of Taxonomy	08
Q.4	Ansv a) b) c)	<b>wer the any two of the following.</b> Explain the Artificial Classification studied by you. Describe the Nomenclature. Write on Mounting and Labelling of herbarium preparation.	08
Q.5	Ansv a) b)	<b>wer any one of the following.</b> Describe the vegetative and reproductive character of family Solanaceae. Describe the significance of herbarium.	08

Saat				
Seat			Set	Ρ
	B.So	:. (Semester - II) (OId) (CBCS) Examination: March/Apri ELECTRONICS (Paper – III) Semiconductor Devices (19201226)	1-2023	
Day 8 Time:	& Date 12:0	e: Friday, 14-07-2023 Ma D PM To 02:00 PM	ax. Marks	: 40
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>		
Q.1	Sele 1)	ct the correct alternative from the following.In good conductor, the valance banda) is partially filledb) overlap with conduction Ic) both a and bd) neither a nor b	band	80
	2)	In transistor structure, lightly doped having thin area is a) Base b) Emitter c) Collector d) Gate		
	3)	transistor has double base structure.a)FETb)SCRc)UJTd)NPN		
	4)	is voltage-controlled device.a) BJTb) rectifierc) amplifierd) FET		
	5)	The diode whose junction capacitance varies with reverse bias is diode. a) Varactor b) Tunnel c) Zener d) Photo		
	6)	The conduction angle of SCR is given by equationa) $(100-\alpha)$ b) $(360-\alpha)$ c) $(180-\alpha)$ d) $(270-\alpha)$		
	7)	If $lb = 400\mu A$ and Ic = 1.2mA then $\beta$ = a) 0.3 b) 30 c) 3 d) 0.06		
	8)	Zener diode is always operated in for voltage regulation.a) forwardb) reversedc) both biasd) strait		
Q.2	Ansv a) b)	<b>ver any four of the following.</b> What are majority and minority carriers in P type semiconductor? List any four applications of LED.		08

- List the modes of biasing of BJT. Give the classification of FET. C)
- d)
- List the unidirectional and bidirectional power devices. e)

#### 80 Q.3 Write short notes on any two of the following. construction of UJT. a) Working of Photo diode. b) Intrinsic semiconductor. C) Q.4 Answer any Two of the following. Explain IV characteristics of SCR. a) Explain construction of MOSFET. b) Explain graphical representation of H parameters of BJT in C.E. configuration. C) Q.5 Answer any one of the following. Explain I-V characteristics BJT in Common Base configuration with neat a) circuit diagram of. Explain construction and working of P-N junction diode. b)

08

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Seat No.							Set	Ρ
	B.Sc	. (Se	emester - I PHY H	ll) (Old) (CBCS SICAL GEOGI uman Geogra	S) Exar RAPHY phy I (*	nination: March// ′ (Paper – III) 19201235)	April-2023	
Day 8 Time:	Date 12:00	: Frid ) PM	ay, 14-07-20 To 02:00 PN	023 M		,	Max. Marks	s: 40
Instru	iction	i <b>s:</b> 1) 2) 3)	All question Draw neat of Figures to t	s are compulsory diagrams and give he right indicate f	/. e equati full mark	ons wherever necess s.	ary.	
Q.1	Multi <sub>l</sub> 1)	<b>ple c</b> The b a) c)	<b>hoice ques</b> book 'Princip Humboldt Ratzel	<b>tions.</b> al of human geo <u>c</u>	graphy' i b) d)	s written by Miss. Semple Blache		08
	2) _	a) c)	is the sub Settlement Population	branch of econon geography geography	nic geog b) d)	raphy. Agriculture geograph Medical geography	ıy	
	3) _	a) c)	_ has discov Charles Da Willum Dev	vered blood group rwin is	os in the b) d)	world. Jems Hutton Landstiner		
	<b>4)</b>	Religi a) c)	ion, Race, la Cultural Political	anguage etc are tl	he b) d)	_ factors. Historical Economic		
	5) (	Siddh a) c)	artha Gauta Lumbhini Shravasti	ama was born at <sub>-</sub>	in b) d)	i Kapilvastu. Sarnath Gaya		
	<b>6)</b> [	Mecc a) c)	a and Madir Buddha Hindu	na are the importa	ant holy b) d)	places of religi Islam Christian	on.	
	7) _	a) c)	_ is worlds n Islam Hindu	nost populated ar	nd most b) d)	widely distributed relig Christian Buddha	gion.	
	8) 🤅	Seco a) c)	ndary activit Blue White	ies are called as <sub>.</sub>	c b) d)	ollar workers. Red Golden		
Q.2	Answ a) [ b) [ c) [	<b>ver a</b> l Expla Defin Expla	<b>ny four of th</b> in the impor e of Human in the branc	<b>he following.</b> tance of human g Geography. thes of social Geo	geograpl ography.	hy in the view of Cultu	ire factors.	08

- Define race. d)
- e)
- State the regions of the Negrito. State the characteristics of Christianity f)

# Seat No.

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Physical characteristics of eskimo.</li> <li>b) State the types of economic activities.</li> <li>c) Scientific nature of human geography.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) State the importance of human geography.</li> <li>b) State the characteristics of Hinduism.</li> <li>c) State the nagas.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Describe the scope of human geography.</li> <li>b) Explain the various language families in the world.</li> </ul>	08

Seat			0.4							
No.			Set	Ρ						
B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 GEOLOGY (Paper – III) Crystallography (19201214)										
Day 8 Time:	Date 12:00	e: Saturday, 15-07-2023 M 0 PM To 02:00 PM	ax. Marks	: 40						
Instru	ctions	<ul> <li>s: 1) All questions are compulsory.</li> <li>2) Draw neat and well labeled diagrams give wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>								
Q.1	Multi 1)	iple choice questions:In System, three equal and interchangeable axes present.a) Cubicb) Hexagonalc) Orthorhombicd) Monoclinic		08						
	2)	Which of the following form belongs to Triclinic system? a) Cube b) Trapezohedron c) Quarter Pyramid d) Octahedron								
	3)	In Hexagonal system, planes of symmetry present. a) 7 b) 5 c) 1 d) 3								
	4)	The general formula of Pyramid is         a) (100)       b) (001)         c) (110)       d) (111)								
	5)	Type mineral of Monoclinic system is a) Gypsum								
	6)	Which of the following form cuts all three axes?a)Octahedronb)Prismc)Dodecahedrond)Basal Pinacoid								
	7)	Intersection of adjacent faces of crystal forms a) edge b) solid angle c) fossil d) interfacial angle								
	8)	Di-hexagonal prism has faces. a) 6    b) 8 c) 12    d) 4								
Q.2	Answ 1) 2)	wer any four of the following. Define Crystal. Describe Planes and Axes of Symmetry of Triclinic System.		08						

- Draw labeled diagram of crystallographic axes of Orthorhombic system. Define Crystallography. What is Form? 3)
- 4)
- 5)
- 6) Define Dome.

Q.3	Wr 1) 2) 3)	ite short notes on any two of the following. Crystallographic axes of Monoclinic and Triclinic system. Contact Goniometer Orthorhombic Pinacoid and their types	08
Q.4	An 1)	<b>swer any two of the following.</b> Describe Faces, Solid angle and interfacial angle of crystal with labeled diagram.	08
	2) 3)	What is Plane and Axes of Symmetry? Draw and Describe Pyramid crystal.	
Q.5	Answer any one of the following		
	1)	Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Cubic System.	
	2)	Define crystal. Describe Crystallographic axes, Elements of Symmetry and any two forms of Tetragonal System.	

NO.						_
	B.So	c. (Semester - II) E	(Old) (CBCS) E LECTRONICS (	xar Pa	mination: March/April-2023 per - IV)	
Day 8 Time:	k Date 12:0	<b>טע</b> e: Sunday, 16-07-20 0 PM To 02:00 PM	23	5 (1	9201227) Max. Marks	s: 40
Instru	uctio	ns: 1) All questions a 2) Figures to the 3) Draw neat dia 4) Use of logarit	are compulsory. right indicate full m grams wherever ne hmic table and calc	nark eces ulat	s. ssary. or is allowed.	
Q.1	Choose the correct alternatives from the options.					
	1)	a) Normal c) Multi base	it transistor.	b) d)	Multi collector Multi emitter	
	2)	IC 7447 is a) Encoder c) Multiplexor		b) d)	Decoder Counter	
	3)	number of A a) Four c) Two	ND gates used in d	emu b) d)	ıltiplexer 4:1. Three One	
	4)	RS flipflop is set wh a) R = S = 0 c) R = 0, S = 1	en	b) d)	R = S = 1 R = 1, S = 0	
	5)	Mod 5 counter requ a) Five c) Two	ires minimum	_ fli b) d)	pflops. Three One	
	6)	In case of shift regis a) Serial input pa c) Serial input pre	ster SIPO is rallel output esent output	b) d)	Standard input present output Standard input parallel output	
	7)	number of co a) Four c) Two	ontrol lines required	in 8 b) d)	3 : 1 multiplexer. Three One	
	8)	IC is univers a) 7400 c) 7490	al 4 bit shift register	r. b) d)	7447 7495	
Q.2	Ans	wers any four of th	e following.			08
	a) b) c) d)	What is meant by p What is Decoder? Draw 4 bit PIPO shi What is Counter?	ropagation delay in ft register diagram.	ΤTI	_?	

- Draw truth table of JK flipflop. What is current sourcing? e)
- f)

Set P

# SLR-QA-98

Seat

## **SLR-QA-98** Q.3 Write a Short notes on any two of the following 80

- a) Write a note on Priority encoder IC 74147. **b)** Write a note on D flip flop.
- c) Write a note on IC 74153.

## Q.4 Answers any two of the following.

- Explain 4 bit synchronous counter. a)
- Explain 8 to 1 multiplexer and write truth table. b)
- Explain Right Shift Register & draw timing diagram. C)

## Q.5 Answer any one of the following.

- Draw diagram and explain TTL NAND gate. a)
- Explain IC 7490 as a divided by 2, 5 & 10 counter & draw timing diagram. b)

### 80
08

#### Human Geography - II (19201236) Max. Marks: 40 **Instructions**: 1) All guestions are compulsory. 2) Figures to the right indicate full marks. 3) Draw neat diagrams wherever necessary. 4) Use of logarithmic table and calculator is allowed. Choose the correct alternatives from the options. According to Malthus the growth of population as per \_\_\_\_\_ progression. a) Geometric b) Statistics c) Arithmetic d) None of these The \_\_\_\_\_ theory was put forward by Notestein. a) Industrial location b) demographic transition d) None of these c) Continental Drift Slums and pollution are \_\_\_\_\_ problem. a) Rural-Urban Fringe b) Rural c) Urban d) None of these The \_\_\_\_\_ is Low populated continent in the world. a) Asia b) Africa c) Europe d) Australia Oxford is the \_\_\_\_\_ city. b) Mining a) Education c) Fishing d) Industrial Mining is the function of \_\_\_\_\_ settlement.

- 6) a) Urban b) Rural
  - d) Suburban c) Urban-Rural fringe
- 7) Terrestrial agriculture is found in \_\_\_\_\_ area.
  - b) Plain a) Plateau c) Mountain d) Wet land
- is known as father of green revolution in India. 8)
  - a) Sing b) Deshpande
    - c) Symons d) Swaminathan
- Q.2 Answers any four of the following question.
  - State any two factors affecting on the Mortality. a)
  - What is an Optimum population? b)
  - What is Urbanization? C)
  - State any two functions of Rural Settlement. d)
  - State any two types of Agriculture. e)
  - Define Urban Settlement. f)

Ρ Set

# B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 PHYSICAL GEOGRAPHY (Paper – IV)

Day & Date: Sunday, 16-07-2023 Time: 12:00 PM To 02:00 PM

Seat

No.

Q.1

1)

2)

3)

4)

5)

08

Q.3	<b>Write</b> a) Ag b) W c) Tr	<b>a Short notes on any two of the following question.</b> ge and Sex Composition /orld Urbanization rends and Patterns of World Population	80
Q.4	Answ a) E b) E c) E	<b>ers any two of the following question.</b> Explain the factors affecting on the Agriculture. Discuss the Demographic Transition Theory. Explain the Problems of urban settlement.	08
Q.5	Answ a) [ b) E	<b>ers any one of the following questions.</b> Describe the Urban Settlements classification. Explain the origin and history of Agriculture.	80

No.								Set	Ρ
	B.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2023 GEOLOGY (Paper – IV) Mineralogy (19201215)								
Day & Time:	Day & Date: Monday, 17-07-2023         Max. Marks: 40           Time: 12:00 PM To 02:00 PM         Max. Marks: 40								
Instru	Instructions:1) All questions are compulsory. 2) Draw neat and well labeled diagrams wherever necessary. 3) Figures to the right indicate full marks.								
Q.1	Mult 1)	<b>iple cho</b> Twinkl a) C c) G	<b>bice ques</b> ing is pres calcite Garnet	tions: sent in		b) d)	Microcline Biotite		08
	2)	Which a) C c) G	of the foll calcite Garnet	owing is carbor	nate mi	neral b) d)	? Microcline Biotite		
	3)	Lower a) A c) P	nicol prisr nalyzer olarizer	n is called as _		b) d)	Condenser Mirror		
	4)	Hornbl a) P c) P	lende shov ale brown ale green	ws pleochroism to dark brown to dark green	in	b) d)	Pale pink to dark pink None of the above		
	5)	Broker a) L c) F	n surface o uster orm	of mineral is cal	lled	b) d)	Streak Fracture		
	6)	Streak a) in c) ro	t is used to idustrial ock formin	o identify	_ mine	erals. b) d)	Ore Gangue		
	7)	Repea a) G c) B	ated twinni Sarnet Seryl	ng is shown by		 b) d)	Plagioclase Orthoclase		
	8)	A ray o a) m c) p	of light trav nonochrom olarized	veling in one dir natic	rection	and i b) d)	n one plane is called _ Ordinary Refracted		
Q.2	Ansv 1) 2) 3) 4) 5)	wer any Define Describ Draw d Give th What is	<b>four of tl</b> Anisotropi be any two iagram of e names of Chemica	he following. sm. names of mine Crystallized and of any two mine I composition o	erals fro d Fibro rals sh f Olivin	om Q ous fo lowing le?	uartz/Silica Group. rms of Mineral. g Pleochroism.		08

6) Define Cleavage in Minerals.

SLR-QA-101 

Soat

#### Write short notes on any two of the following. 80 Q.3 Lower assembly of Polarized microscope. 1) Twinning and their types 2) 3) Hardness of Mineral and Scale Q.4 Answer any two of the following. 80 1) Describe Isotropism with example. 2) Describe Calcite Mineral. 3) Explain any two types of Lusters in Minerals with example. 80 Q.5 Answer any one of the following 1) Define Mineral. Describe Physical properties, chemical composition, Optical properties of Muscovite and Biotite. 2) Define Mineral. Describe Physical properties, chemical composition, Optical properties of Orthoclase and Microcline.

		Organic Che	emistry (	19201305)
Day Time	& Dat : 03:0	e: Monday, 10-07-2023 00 PM To 05:00 PM		Μ
Instr	uctio	<ul> <li>ns: 1) All questions are compuls</li> <li>2) Figures to the right indica</li> <li>3) Draw neat diagrams and</li> <li>4) Use of logarithmic table a (At. Wts.: H=1, C=12, O=</li> </ul>	ory. te full marl give equat nd calcula 16, N=14,	ks. ions wherever necessary. tor is allowed. Na=23, Cl=35.5)
Q.1	Mult	tiple choice questions.		
	1)	In Beckmann transformation th a) Oxime c) Aldehyde	ie product b) d)	obtained is Ketone N-substituted amide
	2)	In D and L nomenclature syste	m the star	dard reference molecule
		is a) lactic acid c) glyceraldehyde	b) d)	glycerol acetaldehyde
	3)	Ethylene glycol on oxidation w a) OHC-CHO c) 2HCOOH	ith nitric ac b) d)	id gives HOOC-COOH CO <sub>2</sub>
	4)	The reaction in which benzalde using HCN and HCI is known a a) Kolbe synthesis c) Gattermann synthesis	ehyde and as b) d)	aldehydes are synthesize Friedel Craft's reaction Fries rearrangement
	5)	Aldol condensation will not tak a) CH₃-CHO c) CH₃-CH₂-CHO	e place wit b) d)	h HCHO CH₃COCH₃
	6)	Preparation of an ether by read	cting sodiu	m phenoxide with methyl

Seat No.

## B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 CHEMISTRY (Paper\_V)

Max. Marks: 40

**SLR-QA-102** 

### lecule taken

- hesized by ction
- nethyl halide is known as \_\_\_\_\_.
  - Kolbe's reaction Wurtz reaction a) b)
  - Williamson's synthesis d) Perkin reaction c)
- 7) α-halo acids easily undergo \_\_\_\_ reactions electrophilic substitution a)
  - b) nucleophilic substitution
  - addition d)
- 8) Absorption maxima shifts to longer wavelength due to presence of \_\_\_\_\_. a)
  - conjugation saturated group

elimination

c)

c)

cyclic structure b) none of these d)



Set P

### Q.2 Answer any four of the following.

1) Calculate the  $\lambda_{max}$  for following compound.



- 2) What are geometrical isomers? Explain geometrical isomerism in benzaldoxime.
- 3) Why formaldehyde gives Cannizzaro's reaction whereas acetaldehyde does not?
- 4) Draw the structure of 18 crown -6 ether.
- **5)** Write action of following on phthallic acid.
  - a) Soda lime
  - b) Ammonia
- 6) Write the synthesis of phenyl hydrazine from benzene diazonium chloride.

#### Q.3 Write short notes on any two of the following

- 1) Reimer Tiemann reaction with mechanism
- 2) Perkin reaction with mechanism
- 3) Acid and base catalyzed ring opening reaction of ethylene oxide

#### Q.4 Answer any Two of the following

- 1) Write two methods of formation of ethylene glycol with reaction.
- 2) What is the action of acetic anhydride and hydroiodic acid on citric acid & write uses of citric acid
- 3) What is mean by diazotization reaction? Write synthesis of Congo Red.

#### Q.5 Answer any one of the following

- 1) Write various types of electronic transitions with example.
- 2) Describe conformational analysis of n-butane with the help of energy profile diagram.

08

08

08

Seat	
No.	

### B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 **COMPUTER SCIENCE (Paper-V)** Data Structure (19201307)

Day & Date: Tuesday, 11-07-2023 Time: 03:00 PM To 05:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams must be drawn wherever necessary.
- 4) Use of log table and calculator is allowed.

#### Q.1 Choose the correct alternative.

- Linked List's Node must store 1)
  - The address of the next node if it exists a)
  - b) The value of the current node
  - Both a and b c)
  - None of the above d)

#### 2) Which of the following algorithms are used to find the shortest path from a source node to all other nodes in a weighted graph?

a) BFS **Prims Algorithm** 

c)

- b) Djikstra's Algorithm
- d) Kruskal's Algorithm
- 3) The recursive algorithm is implemented by using following data structure.
  - b) Arrav Queue a)
  - c) List d) Stack
- is very useful in situation when data have to stored and then 4) retrieved in reverse.
  - Stack b) List a)
  - d) Linked list c) Queue
- 5) Linked list is considered as an example of type of memory allocation.
  - Dynamic b) Static a)
  - Compile time Heap c) d)
- Which of the following is not an application of binary search? 6)
  - To find the lower/upper bound in an ordered sequence a)
  - Union of intervals b)
  - Debugging c)
  - To search in unordered list d)
- 7) Which of the following data structure can't store the non-homogeneous data elements?
  - Arrays Records a) b)
  - Pointers None C) d)

#### The complexity of merge sort algorithm is 8)

b) O(log n) a) O(n) c) O(n2) d)  $O(n \log n)$  Max. Marks: 40

08

Set

Q.2	Ans a) b) c) d) e) f)	wer any four of the following. List out the advantages of using linked list. Define abstract data type. State the difference between stack and queue. Define priority queue. Define complete binary tree. What do you mean by breadth first search?	80
Q.3	Writ a) b) c)	<b>te short notes on any two of the following.</b> Explain adjacency matrix with example. Explain Dequeue in detail. Explain singly linked list with create operation.	
Q.4	Ans a) b) c)	<b>wer any Two of the following.</b> Write an algorithm to evaluate postfix expression with example. Write a program to implement bubble sort. Write a program to create binary search tree.	08
Q.5	Ans	wer any one of the following.	80

- a)
- Write a program to implement sequential search. Convert the following Infix Expression to Postfix by using an algorithm. A + B \* (C D) + E / F Gb)

NO.		
	B.Sc. (Semester - III) (CBCS) Exami CHEMISTRY (Pap Inorganic Chemistry (	nation: March/April-2023 per–VI) (19201306)
Day & Time:	Date: Wednesday, 12-07-2023 03:00 PM To 05:00 PM	Max. Mai
Instru	<ul> <li>actions: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full mark</li> <li>3) Draw neat labelled diagram and give</li> <li>4) Use of logarithmic table and calculat</li> <li>(At. Wts: H=1, C=12, O=16, Na=23,</li> </ul>	ks. e equations wherever necessary. tor is allowed. CI=35.5)

Seat

2)

No

#### Choose the correct alternatives from the options. Q.1

- The EAN of Cr in  $[Cr(NH_3)_6]^{3+}$  is 1)
  - a) 36 b) 35 c) 33 d) 37
  - The hybridization of [Co(NH<sub>3</sub>)<sub>6</sub>]<sup>3+</sup>is \_ a) d<sup>2</sup>sp<sup>3</sup> b) dsp<sup>3</sup> c)  $sp^3d^2$ d) sp<sup>3</sup>
- The chelating agent must have at least \_\_\_\_\_ donor groups 3)

- a) One b) Two
  - c) Three d) Four
- [Cu(CN4]<sup>2</sup>- is \_\_\_\_\_ complex. 4)
  - a) tetragonal b) octahedral c) tetrahedral d) square planar
- The observed electronic configuration for Copper is 5)
  - a) [Ar]  $3d^9$ ,  $4s^2$ b) [Ar] $3d^{8}$ ,  $4s^{0}$ c) [Ar] 3d<sup>10</sup>, 4s<sup>1</sup> d) [Ar] 3d<sup>8</sup>, 4s<sup>2</sup>
- 6) M(AB)<sub>2</sub> complex shows \_\_\_\_\_ type isomers.
  - a) optical b) geometrical c) ring d) hydrate
- According to Lewis base is \_\_\_\_\_. 7)
  - a) electron pair acceptor
  - c) proton donor
- Hard acid prefers to bind with \_\_\_\_\_. 8) a) soft base
  - c) soft acid
- b) hard base

b) electron pair donor

d) hydrogen giving substance

d) All of these

**SLR-QA-105** 

Set

Max. Marks: 40

Q.2	An	swers any four of the following.	08
	a) b) c) d)	State the Pearson rule. Why transition elements can form colour? Define the term ligands with suitable example. Show the cis-trans isomerism in:	
	,	i) [PtCl <sub>2</sub> (NH <sub>3</sub> ) <sub>2</sub> (Py) <sub>2</sub>	
	e) f)	Why d-block elements are called transition elements? Draw the structure of [Ni (DMG) <sub>2</sub> ] metal chelate.	
Q.3	Wr a) b)	i <b>te short notes on any two of the following.</b> EDTA as chelating agent. EAN with suitable examples. Magnetic behavior of transition element (spin only formula)	80
	C)	Magnetic behavior of transition element (spin only formula).	
Q.4	An: a) b)	swers any two of the following. How acids & bases can be defined on the basis of Lewis concept? with suitable examples. Give the electronic configuration of 4d transition elements.	08
	c)	Distinguish between metal chelate and metal complex.	
Q.5	An: a)	swers any one of the following. Define isomerism. Discuss optical and geometrical isomerism in coordination compounds with CN=6.	08
	b)	Give the name, atomic symbol and electronic configuration of 3d & 5d	

 Give the name, atomic symbol and electronic configurat transition elements.

Seat No.						Set	Ρ	
	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 COMPUTER SCIENCE (Paper–VI) Design Analysis and Algorithm (19201308)							
Day 8 Time:	Date 03:00	: Thu ) PM	rsday, 13-07 To 05:00 PN	7-2023 /	J	Max. Marks	: 40	
Instru	iction	i <b>s:</b> 1) 2)	All question Figures to t	s are compulsory. he right indicate full	marks	Э.		
Q.1	Multi 1)	<b>ple c</b> Whic a) c)	<b>hoice ques</b> ch of the follo Kruskal's al Prim's algoi	t <b>ions.</b> owing is not a Greed gorithm ithm	dy algo b) d)	orithm? Bellman ford algorithm Dijkstra's algorithm	08	
	2)	Let ii Whic a) c)	n a file the fr ch of the follo 01 00	equency of letters i owing is the Huffma	n,d,e,x, n code b) d)	x are 16,7,17,25,20 respectively. of the letter d? 101 11		
	3)	The a) c)	average cas O(2n) O(n3)	e complexity of Inse	ertion \$ b) d)	Sort is O(n2) 0(2n)		
	4)	Whic algor a) c)	ch of the follo rithm? Dynamic pr Divide and o	owing algorithm des ogramming conquer	ign teo b) d)	chnique is used in the quick sort Backtracking Greedy method		
	5)	The a) c)	approach us Greedy Probabilistic	ed by linear search	is b) d)	 Divide & Conquer Brute-Force		
	6)	Brea a) b) c) d)	dth First Tra Graph using All successors successors A single pat None of the	iversal (BFS) is a m g shortest path ors of a visited node h of the graph as fa se	ethod e befor ir as it	to traverse e any successors of any of those can go		
	7)	Dyna a) c)	amic Prograi 0/1 Knapsa Binomial Co	mming Method is no ck Problem p-efficient	ot suita b) d)	ble to solve Making Change Problem Fractional Knapsack Problem		
	8)	Bina a) c)	ry Search m Unsorted A Sorted Arra	ethod uses as input rray y	b) d)	_ Linear Linked List Hash Table		
Q.2	Answ a) <sup>v</sup> b) <sup>v</sup>	<b>ver a</b> i What What	n <b>y four of tl</b> is algorithm is Hashing?	ne following. ?			08	

- C)
- d)
- e)
- What are the algorithm Design Techniques? What is Graph? What are the advantages of an algorithm? What is Time Complexity and space complexity? f)



#### 80 a) Asymptotic notation Rabin-Karp algorithm b) Prim's Algorithm C) Q.4 Answer the any two of the following. 80 Explain Divide and conquer algorithm with its different Approaches. a) Explain Brute force approach. b) Explain merge sort with suitable example. C) 08 Q.5 Answer any one of the following. What is Backtracking? Explain N-Queens Problem with suitable example. a) Consider the problem having weights and profits are: b) Weights: {3, 4, 6, 5} Profits: {2, 3, 1, 4}

The weight of the knapsack is 8 kg The number of items is 4 The above problem can be solved by using the 0/1 knapsack problem method.

#### Q.3 Write short notes on any Two of the following.

			PH` General Phy	YSICS (Pape sics and Sou	r – V) Ind (19201323)	
Day o Time	& Dat : 03:0	te: Fri 00 PM	day, 14-07-2023 I To 05:00 PM		(,	Max. Marks: 40
Instr	uctio	o <b>ns:</b> 1 2 3 4	) All questions are cor ) Figures to the right i ) Use of logarithmic ta ) Neat diagrams must	npulsory. ndicates full ma ıble is allowed. be drawn wher	rks. ever necessary.	
Q.1	Mul 1)	t <b>iple</b> The a) c)	<b>Choice questions.</b> rise and fall of axis of Nutation Rotation	rotation of a rot b) d)	ating body is called <sub>.</sub> Precession Vibration	<b>08</b>
	2)	Bend a) b) c) d)	ding moment of a bear Directly proportional Inversely proportional Directly proportional Inversely proportional	m is to the modulus al to the modulu to the radius of al to the radius of	of rigidity s of rigidity curvature of curvature	
	3)	Louc a) c)	lspeaker is an Electro-optical Electro-mechanical	transducer. b) d)	Electro-acoustical Thermo-electrical	
	4)	lf <i>À</i> . a) c)	$\left(\vec{B} \ x \ \vec{C}\right) = 0$ then vector Collinear Antiparallel	ors $\overrightarrow{A}$ , $\overrightarrow{B}$ , and $\overrightarrow{C}$ a b) d)	re Parallel Coplanar	
	5)	The a) c)	C. G. S. unit of viscos Poise gm/cm/sec	ity is b) d)	kg/m.sec gm.cm/sec	
	6)	Curl a) c)	of a vector field is Vector Constant	quantity. b) d)	Scalar Real	
	7)	ln pu a) c)	ure processional motic Present very small	on, nutation is _ b) d)	Absent very large	
	8)	The a) c)	coefficient of absorpti Zero Two	on of an open w b) d)	/indow is Infinity One	
Q.2	Ans a)	<b>swer</b> a Wha	any FOUR the follow	ing.		08

B.Sc. (Semester - III) (CBCS) Examination: March/April-2023

- What is a scalar field? Give one example. b)
- Define bending moment. C)
- State Stoke's law of viscosity. d)
- Define vector triple product. e)
- State Lanchester's rule. f)

**SLR-QA-107** 

Set P

## Seat No.

Page 2 of 2

## **SLR-QA-107**

#### Q.3 Write short notes on any TWO of the following.

- a) Carbon microphone
- **b)** Ostwald's viscometer.
- c) Gyroscope.

#### Q.4 Answer any TWO of the following.

- a) Calculate the critical velocity of a rolling disc of radius 30 cm. rolling over a horizontal surface.
- **b)** Obtain an expression for depression produced at the end of a bar forming a cantilever.
- c) Define scalar triple product and obtain its value in determinant form.

#### Q.5 Answer any ONE of the following.

- a) Define gyrostatic pendulum. Obtain an expression for its period.
- **b)** What is acoustics of buildings? Explain various factors affecting the acoustics of buildings.

08

**08** 

	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 BIO-CHEMISTRY (Paper – I) Biomolecules (19201303)							
Day & Time	& Date : 03:00	: Sat ) PM	urday, 15-07-2023 To 05:00 PM			Max. Marks: 40		
Instr	uction	<b>is:</b> 1) 2) 3)	All questions are compulsory. Draw neat diagrams and give ec Figures to the right indicate full r	luatio narks	ns wherever necessary			
Q.1	Multi 1)	<b>ple c</b> Whie a) c)	c <b>hoice questions:</b> ch of the following disease is cau Scurvy Pellagra	ised b b) d)	by deficiency of niacin? Rickets Pernicious anemia	08		
	2)	a) c)	is not a factor responsible fo pH change Heat	r the d b) d)	denaturation of proteins Organic change Charge			
	3)	a) c)	is the purine base of nucleic Cytosine Uracil	acid. b) d)	Thymine Adenine			
	4)	Build a) c)	ding blocks of nucleic acids are _ amino acids nucleotides	b) d)	 nucleosides histones			
	5)	Whie a) c)	ch of the following is a fat soluble Vitamin B Vitamin B12	e vitar b) d)	nin? Vitamin C Vitamin K			
	6)	Whie a) c)	ch is simplest amino acid? Glycine Asparagine	b) d)	Alanine Tyrosine			
	7)	Terp a) c)	penes are lipids derived from isoprene waxes	b) d)	phospholipids sterols			
	8)	Disa mon a) c)	accharide sucrose structure is co losaccharide units. lactose and glucose fructose and glucose	mpos b) d)	ed by two galactose and glucose mannose and glucose	9		
Q.2	<b>Ansv</b> 1) 2) 3) 4) 5)	<b>ver a</b> What Write Defin Write What	ny four of the following. t is the function of cholesterol? the structure of ribose and fruct the simple lipids with one example the properties of amino acids. t is phosphodiester linkage?	ose.		08		

6) Write the sources of thiamine and niacin?

SLR-QA-108

Set P

## Seat No.

#### Write short notes on any two of the following. Q.3

- Write note on phospholipid and spingolipid. 1)
- Write the structure and role of cellulose. 2)
- Explain Watson Crick model of DNA. 3)

#### Q.4 Answer any two of the following.

- 1) Write note on coenzyme and holoenzyme.
- 2) Write the structure and functions of mRNA.
- 3) Write the biochemical role and deficiency disorders of retinol.

#### Q.5 Answer any one of the following

- 1) Write the classification of carbohydrates. Write structure and role of erythrose and erythrulose.
- 2) Write the structures of primary and secondary proteins. What are forces involved in stabilising native structure of protein.

08

80

Seat No.	t	Set P						
	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023							
	Мајо	r crops and methods of integrated plant protection (19201325)						
Day a Time	& Date : 03:0	e: Saturday, 15-07-2023 Max. Marks: 40 0 PM To 05:00 PM						
Instru	uction	<ul> <li>s: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of a logarithmic table and calculator is allowed.</li> </ul>						
Q.1	Mult	iple choice questions: 08						
	1)	Coffee rust came to India from along with coffee powder. a) Shrilanka b) Cuba						
		c) Brazil d) Peru						
	2)	of potato came to India from Ireland.						
		a) Late blight b) Early blight c) both a and b d) None of these						
	3)	Powdery mildew of came to India along with stem cuttings.						
	-,	a) tomato b) grapes						
		c) bean d) mango						
	4)	Activity of pathogen is reduced through the agency of any other living						
		a) animal b) man						
		c) plant d) none of these						
	5)	control of insect pest is based on the exploitation of mutual antagonism.						
		c) Physical d) Mechanical						
	6)	The use of pesticides caused many losses to						
		a) agroecosystem b) air pollution						
	-	c) water pollution d) all of these						
	()	<ul> <li>control has given scientific base since 16 to 19 centuries.</li> <li>a) Chemical</li> <li>b) Mechanical</li> </ul>						
		c) Biological d) all of these						
	8)	eats cottony cushion scale of citrus and destroy them.						
		a) Vedalia beetle b) Medalia beetle c) Sedalia beetle d) Kedalia beetle						
• -	_							
Q.2	Ansv 1)	ver any four of the following. 08 Define plant protection						
	2)	Write two uses of Jowar.						
	3)	What is mean by agriculture?						
	4) 5)	Give the definition of fungicides						
	6)	Define the quarantine.						

**6)** Define the quarantine.

#### Q.3 Write short notes on any two of the following. 80 1) Netting Bactericides 2) 3) Tillage Answer any two of the following. 80 1) Explain the types biofertilizers studied by you. 2) Describe the domestic quarantine. 3) Give the general account of use of resistant varieties. 80 Q.5 Answer any one of the following 1) Explain the cultural practice of brinjal with respect to morphology, soil types, fertilizers and irrigation. 2) Describe the cultural practice of sugarcane with respect to morphology,

irrigation, yield and economic importance.

## Q.4

TIME	. 05.0					
Instr	uctio	o <b>ns</b> : 1 2 3 2	) All questions are 2) Figures to the rig 3) Draw neat diagra 4) Use of logarithm	compulsory. ht indicate full n ams and give eq ic table and calc	nark uati ulat	s. ons wherever necessary. or is allowed.
Q.1	Cho 1)	o <b>ose</b> f The a) c)	<b>the correct altern</b> disadvantage of v high stability facto many resistors	<b>atives from the</b> oltage divider bia or	<b>opt</b> as is b) d)	t <b>ions.</b> s that it has low base current many inductors
	2)	A fe a) c)	edback circuit usu resistive inductive	ally employs	b) d)	feedback. capacitive diode
	3)	Whi a) c)	ch oscillator is cha Phase shift Wein bridge	racterized by a s	split b) d)	capacitor in its tank circuit? Colpitts Hartley
	4)	a) c)	oscillator is fixe Phase shift Crystal	d frequency osc	illato b) d)	or. Colpitts Hartley
	5)	FET a) b) c) d)	has high input imp it is made by sem input is revers bia of impurity atom input is forward b	bedance becaus iconductor mate ised iased	e rial	·
	6)	UJT a) c)	may be better use Amplifier Rectifier	ed as	b) d)	Clamper saw tooth wave generator
	7)	lf a chai a) c)	voltage regulator e nges by 1 V. The li 5 4	xperience 8 mV ne regulation is	cha b) d)	inge in its output when its input mV/V. 6 8
	8)	Liss sign a) c)	ajous pattern obta als are equal zero	ined on a CRO s	b) d)	en is a circle, frequency of two unequal infinity

#### Q.2 Answers any four of the following.

- Draw the symbols of n channel and p channel FET. a)
- What is differential amplifier? Write the modes of operations. b)
- Compare amplifier with oscillator. C)

## B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 PHYSICS (Paper-VI) Electronics (19201324)

Day & Date: Sunday, 16-07-2023 Time: 03:00 PM To 05:00 PM

Seat No.

**SLR-QA-110** 

Max. Marks: 40

Set P

08

- 3)
- 4)

### 5)

- 6)

# Page **2** of **2**

## SLR-QA-110

- d) Derive relation among FET parameters.
- e) When CRO is used to determine unknown frequency, the steady wave pattern on 1 μs knob gives 8 divisions on the horizontal scale as wavelength. What is the unknown frequency?
- f) Define the term Line and load regulation.

### Q.3 Write a Short notes on any two of the following

- a) Digital Multi Meter
- b) Dual power supply using 3 pin IC
- c) Hartley oscillator

#### Q.4 Answers any two of the following.

- a) A transistor phase shift oscillator uses three identical sections in the feedback network, the values of components are  $R = 10 k\Omega$  and C = 470 pF. Calculate the frequency of oscillations.
- **b)** Explain the characteristics of UJT.
- c) Draw and explain Zener voltage regulator.

#### Q.5 Answers any one of the following.

- a) What is biasing? What are types of biasing? Explain voltage divider bias.
- **b)** Explain principle, construction and working of CRO.

80

08

Seat No.		Set I	כ
	В	Sc. (Semester - III) (CBCS) Examination: March/April-2023 BIO CHEMESTRY (Paper – II) Biochemical Techniques (19201304)	
Day 8 Time:	03:00	Monday, 17-07-2023 Max. Marks: 4	0
Instru	uctior	<ul> <li>s:1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>	
Q.1	Multi 1)	ble choice questions:0The technique used for blot transfer of blotting technique.a)a) northernb)westernc) southernd)	8
	2)	<ul> <li>For monitoring the migration of protein in starch gel electrophoresis is used as a marker days.</li> <li>a) phenolphthalein</li> <li>b) bromophenol blue</li> <li>c) oil red</li> <li>d) methyl orange</li> </ul>	
	3)	In Bradford protein assay, dye used in the experiment. a) Benedict's reagent b) Coomassie brilliant blue c) Methylene blue d) Ethidium bromide	
	4)	In spectrophotometer one side aluminium coated prism is used to a) absorb radiations b) provide radiations c) reflect radiations d) split radiations	
	5)	In polymerase chain reaction accurately and rapidly changes the reaction temperature. a) thermal cycle b) electro blotter c) ELISA plate d) petri plate	
	6)	In electrophoresis, DNA will migrate towards a) anode or negative electrode b) anode or positive electrode c) cathode or negative electrode d) cathode or positive electrode	
	7)	The ester value is the number of milligrams of potassium hydroxide requiredto saponify the esters present in of the substance.a) 1 gmb) 1 mgc) 1 kgd) 1 litre	
	8)	In spectrophotometer converts light signals into electrical signals. a) photocell b) mercury lamp c) diagonal mirror d) galvanometer	
Q.2	<b>Ansv</b> 1) 2) 3) 4) 5)	<b>Yer any four of the following.</b> What is immunodiffusion? What is the meaning of transmittance and specific absorbance? Write the advantages of Gel permeation chromatography. What is Lawery's assay? Write the two advantages of colorimeter.	18

6) Write the difference between acid value and saponification value.

### Q.3 Write short notes on any two of the following.

- 1) Explain the Beer-Lamberts law.
- 2) How chromatoplate is prepared in TLC? Explain sample application process in TLC.
- 3) Write principle and technique of agarose gel electrophoresis.

#### Q.4 Answer any two of the following.

- 1) Write the technique of ELISA.
- 2) Explain phenol-H<sub>2</sub>SO<sub>4</sub> method for carbohydrates.
- 3) Write note on western blotting technique.

#### Q.5 Answer any one of the following

- 1) Write the principle, technique and applications of HPLC.
- 2) Write principle, technique and applications of polyacrylamide gel electrophoresis

80

## 80

Seat	
No.	

## B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 PLANT PROTECTION (Paper – II)

Crop Diseases and their management (19201326)

Day & Date: Monday, 17-07-2023 Time: 03:00 PM To 05:00 PM

**Instructions:** 1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary.

3) Figures to the right indicates full marks.

#### **Q.1** Choose the correct alternatives from the options. 08 The establishment of pathogen in the plant tissue after penetration is 1) called a) Infection b) Inoculation c) Isolation d) Incubation The separation of pathogen from its host and its culture on a nutrient 2) medium is called \_\_\_\_\_. a) Inoculation b) Reproduction c) Isolation d) Incubation Plant diseases are classified on the basis of 3) a) Pathogens **Symptoms** b) c) Transmission of pathogen d) All of these 4) The pathogen enters into a plant through a) Lenticels Stomata b) c) Hydathodes All of the these d) Little leaf of Brinjal is disease. 5) a) Bacterial Fungal b) c) Viral phytoplasma d) 6) Yellow vein mosaic of Bhendi is caused by a) Mycoplasma Bacterium b) c) Virus d) Fungus 7) Smut pathogen mainly affects \_\_\_\_\_ of Jowar plant. a) Root b) Stem c) Grains d) Leaf Preventing the entrance and establishment of pathogens in uninfected 8) crop is called \_\_\_\_\_. a) Exclusion b) Protection c) Eradication resistance d) Answer any four of the following Q.2 08 Define disease a)

#### a) Define best and nother an

- b) Define host and pathogen
- c) What is pathogenicity?

Set

Max. Marks: 40

	d) e) f)	Write the symptoms of Downy mildew of Grapes Name any two fungal disease. What is resistance?	
Q.3	Wri a) b) c)	<b>te short notes on any two of the following</b> Factors affecting infection. Koch's postulates. Symptoms and control measures of Rust of soybean.	08
Q.4	Ans a) b) c)	wer any two of the following. Write the classification of diseases based on pathogens. Explain the methods of inoculation. Write causal organism and symptoms of <i>citrus</i> canker.	08
Q.5	Ans a)	wer any one of the following. Write the classification of diseases based on necrotic symptoms.	08

**b)** Explain the assessment of diseases in crop plants.

No.					Set	Ρ
	В.	Sc. (Semester Prob	r - III) (CBCS) Ex STATISTICS ability Distribution	amiı (Pap	nation: March/April-2023 per–V ) – I (19201329)	
Day & Time:	Date 03:00	: Tuesday, 18-07 ) PM To 05:00 PM	7-2023 M	0113	Max. Marks:	40
Instru	iction	s: 1) All question 2) Figures to t 3) Use of Calo	ns are compulsory. The right indicates ful culator is allowed.	ll mar	rks.	
Q.1	Choc 1)	be the correct a If $X \sim P(\lambda)$ and second the Poisson vanishing a) 43 c) 3	I <b>lternatives</b> econd raw moment a ariate is	about b) d)	origin $(\mu_2)$ is 12, then the mean 12 -4	80
	2)	If $X \sim Geo(p)$ the a) $q^2$ c) $pq^2$	n $P[X \ge 2] = $	b) d)	p² p²q	
	3)	lf $X \sim NB(k, p)$ su a) $k = 5, p = \frac{3}{4}$ c) $k = 15, p = \frac{3}{4}$	$\frac{1}{2}$	nd V( b) d)	(X) = 60, then $k = 5, p = \frac{1}{4}$ $k = 3, p = \frac{1}{5}$	
	4)	Let $(X_1, X_2, X_3, X_4)$ usual notations, a) $4P_3$ c) $P_1P_3$	then $E(X_3)$ is	or foll b) d)	ows multinomial distribution with $4P_3(1-P_3)$ $nP_3$	
	5)	A continuous ran f(x) = kx; 0 < = 0; oth Then k must be a) 1 c) 0	ndom variable X with < <i>x</i> < 1 <i>herwise</i>	n p.d. b) d)	f. f(x) given by 2 None of these	
	6)	If $Mx(t)$ is mgf o a) 1 c) T	f a continuous r.v. X	(, thei b) d)	$ \begin{array}{l} \text{n } Mx(0) = \\ 0 \\ \text{None of these} \end{array} $	
	7)	Which of the follovariables? a) $E(XY) = E(x, y) = f(x, y) = f(x$	owing relations is tru (X)E(Y) $(x)f(y)forallx, y \in X$ $(x)F(y)forallx, y \in Y$	ue, if 2 R R	X and Y are independent random	
	8)	If (X, Y) is a bive 4xy; 0 < x, y a) $3y$ c) $(3/2)y$	riate random variab < 1 then conditiona	le wit al p. d b) d)	h joint p. d. f. $f(x, y) =$ l. f. of Y given X=x is 2y None of the above	

Seat

Set P

#### Q.2 Answer any four the following.

- a) Define Poisson distribution.
- **b)** Define Geometric distribution.
- c) Define Negative Binomial distribution.
- d) Define Multinomial distribution.
- e) Define probability density function.
- f) Define covariance

### **Q.3** Write short note on any two of the following.

- a) If  $X \sim P(\lambda)$  such that  $P(X = 0) = \frac{1}{2}$  find E(X) and V(X)
- b) Find the recurrence relation for probability of negative binomial distribution.
- c) The density function of X is

$$f(x) = \begin{cases} a + bx^2 & ; 0 \le x \le 1\\ 0 & ; otherwise \end{cases}$$
  
If  $E(X) = \frac{1}{5}$ , find a and b

### Q.4 Answer any two of the following.

- **a)** State and prove lack of memory property of geometric distribution.
- **b)** The random variable X has probability density function defined by

$$f(x) = \begin{cases} \frac{1}{2} & ; 0 \le x \le 1\\ \frac{1}{18} (x-4)^2 & ; 1 \le x \le 4\\ 0 & ; otherwise \end{cases}$$

Find the distribution function of x hence find the value of median.

c) The joint probability density function is given by

 $f(x,y) = \begin{cases} 10xy^2 & ; 0 < x < y < 1 \\ 0 & ; otherwise \end{cases}$ 

Find the marginal probability density function of X and Y

### Q.5 Answer any ONE of the following.

- a) Show that Poisson distribution as a limiting case of binomial distribution.
- **b)** If X and Y have joint probability density function

$$f(x,y) = \begin{cases} \frac{3}{4} + xy & ; 0 < x < 1, \ 0 < y < 1 \\ 0 & ; otherwise \end{cases}$$

Find

a) Marginal density function of X.

- b) Marginal density function of Y.
- c) Conditional density function of X given Y = y.
- d) Conditional expectation X given Y = y.

08

08

08

0 1	1			
Seat No.			Set	Ρ
	В	Sc. (Semester - III) (CBCS) Examination: March/Ap. METEOROLOGY (Paper – I) Climatology (19201321)	oril-2023	
Day 8 Time:	03:0	e: Wednesday, 19-07-2023 0 PM To 05:00 PM	Max. Marks	: 40
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever neces</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>	sary.	
Q.1	Cho 1)	ose the correct alternative and rewrite sentences:Climatology is compounded by word.a) Arabb) Greekc) Romand) French		08
	2)	An is an immense body of air. a) Front b) air mass c) Frontolysis d) Humidity		
	3)	is the science which studies the atmosphere.a) Hydrologyb) Climatologyc) Pedologyd) Phytology		
	4)	There are major source region of air masses.a) 6b) 4c) 10d) 8		
	5)	Carbon dioxide occupies% gaseous in the atmosphere. a) 0.09 b) 0.004 c) 21 d) 0.03		
	6)	Monsoon is the wind system of the region. a) Tropical b) Polar c) sub-polar d) sub-tropical		
	7)	Normal lapse rate in the atmosphere is $\{0}^{0}$ C per 1000 m. a) 5.6 b) 7.5 c) 6.5 d) 4.6		
	8)	Isotherm are the lines joining places of equala) Salinityb) Pressurec) Rainfalld) Temperature		
Q.2	Ansv a) b) c) d) e)	wer any four of the following. Regional climatology. Define meteorology. What is mean by climate? Elements of weather. Define monsoon.		08

# Seat No.

Q.3	Writ a) b) c)	e short notes on any two of the following. Explain scope and content of climatology. Describe the planetary wind systems. Continental air mass.	08
Q.4	Ans a) b) c)	<b>wer any Two of the following.</b> Explain general circulation in northern hemisphere. Explain climatology and its branches. Composition of atmosphere.	08
Q.5	Ans a) b)	<b>wer any one of the following.</b> Give an account of Structure of atmosphere. Explain in brief the modification of air masses.	08

Seat No.							Set	Ρ
	B	.Sc. (Seme Int	ester - III) (C GEO-CI croduction t	BCS) Exa IEMISTR` o Geoche	mir Y (P mis	nation: March/April- aper - I ) stry (19201313)	2023	
Day & Time:	03:00	e: Wednesda 0 PM To 05:0	y, 19-07-2023 )0 PM			ן (	Max. Marks	: 40
Instru	I <b>nstructions:</b> 1) All questions are compulsory. 2) Draw neat diagrams and give equations wherever necessary. 3) Figures to the right indicate full marks.							
Q.1	Mult 1)	i <b>ple choice</b> A saturation a) One c) Three	<b>questions.</b> solution of Na	Cl is a	_ pł b) d)	ase system. Two Zero		08
	2)	A phase rule a) Nerst c) Arreniu	e was first disc us	overed by _	b) d)	 Le Chatclier Gibb's		
	3)	Co-ordinatio a) 4 c) 8	n number of b	cc unit cell i	s b) d)	6 2		
	4)	Plastic chara a) Adsort c) capilla	acteristic of cla bed water ry water	iys is due to	b) d)	free water excessive water		
	5)	triple a) 0 c) 2	points are exis	sting in phas	se di b) d)	agram of sulphur systen 1 4	ו.	
	6)	In colloidal s is a) Liquid c) Liquid	ystem emulsio + solid + Liquid	on, the dispe	ersio b) d)	n medium and dispersed Solid + Solid Gas + Liquid	d phase	
	7)	For single co number of P a) 2 c) 0	omponent syst hases	em when de	egree b) d)	e of freedom is 1 (one) th 3 1	hen	
	8)	a) >C = N c) >C = C	example of al \ )	kyne.	b) d)	-C = C-		
Q.2	Ansv a) b) c) d) e) f)	wer any four What is coor What is hom What is mine Write two ele What is the p What are op	of the follow dination numb ologues series eralogical phas ectrical proper principle of cry tical properties	ing. ber? se rule? ties of colloi stal structur s of colloids'	ds. e? ?			08

Q.3	Writ a) b) c)	<b>e short notes on any two of the following.</b> Write the classification of organic compounds. Explain Gibbs phase rule. Write note on lattice energy of crystals.	08
Q.4	Ans <sup>r</sup> a) b) c)	<b>wer any Two of the following.</b> Explain crystal structure of zinc sulphide. Explain origin of charge in colloids. Explain silica as chemical sediment.	08
Q.5	Ans <sup>a</sup> a) b)	<b>wer any one of the following.</b> Explain lattice energy of crystals, radius ratio and structure of Cesium Chloride. Explain general characteristics and classification of organic compounds.	08

Seat No.						Set	Ρ
	В	.Sc. (Semeste	r - III) (CBCS) ZOOLOG	Ex	amination: March/April Paper–V) 19201331)	-2023	
Day 8 Time:	& Date 03:0	e: Wednesday, 19 0 PM To 05:00 PI	о-07-2023 М	уу (	19201331)	Max. Marks	: 40
Instru	uction	<b>1s</b> : 1) All question 2) Figures to t	is are compulso the right indicate	ry. e full	marks		
Q.1	<b>Cho</b> 1)	ose correct alter Single celled org a) Prokaryotic c) Haploid cel	<b>natives</b> ganisms called _ ; cell II	b) d)	_ Eukaryotic cell None of these		08
	2)	Nuclear membra a) Eukaryotic c) Mitochondr	ane is present in cell ia	b) d)	 Prokaryotic cell None of these		
	3)	The infection ma a) Virus c) Fungus	acroscopic agen	t tha b) d)	t replicates in living cell called Bacteria None of these	d	
	4)	The circular RN a) Viroid c) Bacteria	A that infectious	patł b) d)	nogens are Virus None of these		
	5)	Plasma membra a) Cell memb c) Inner mem	ine also called _ rane brane	b) d)	Cell wall None of these		
	6)	The plasma mer a) Protection c) Secretion	mbrane provide <sub>.</sub>	b) d)	 Circulation None of these		
	7)	Singer and Nico a) Fluid mosa b) Davison & c) Coaster & d) None of the	lson model is ca ic mode Danielle mode Grendel Model ese	lled			
	8)	The Endoplasm a) Eukaryotic c) Plant cell	ic Reticulum (EF cell	R) is b) d)	continuous membrane in Cell wall None of these		
Q.2	Solv a) b) c) d)	e any four of the Describe structur Write on structur Describe Endosy What is cytoskele	e <b>following:</b> re a function of G e of mitochondria mbiotic hypothe eton?	Golgi a. sis c	Apparatus. of mitochondria.		08

e) Describe on active and passive Transport plasma membrane.

Q.3	Write sho 1) Cell o 2) Mitos 3) Cell s	<b>rt note</b> cycle sis signaling	08
Q.4	<ul><li>Answer a</li><li>1) Struct</li><li>2) Type</li><li>3) Role</li></ul>	<b>ny two of the following.</b> eture and function of Nucleus s of cell signaling of secondary messengers (cAMP)	08
Q.5	Answer a 1) Nucle 2) Struc	<b>ny one of the following.</b> ear pore complex ture and functions of lysosomes	08

Seat						Cat	
No.						Set	Υ
	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 STATISTICS (Paper–VI) Statistical Methods (19201330)						
Day & Time:	& Date 03:00	:: Thursday, 20-0 ) PM To 05:00 Pl	7-2023 M			Max. Marks	: 40
Instru	uction	<b>is:</b> 1) All question 2) Draw a we 3) All question 4) Use of Cal	ns are compulsory Il diagram wherev n carry equal mari culator is allowed.	/. er neck ks.	essary.		
Q.1	Choo 1)	<b>ose the correct a</b> The order of par a) <i>n</i>	<b>alternative:</b> tial regression co	efficier b)	nt b <sub>12345n</sub> is n + 2		80
	2)	c) $n-1$ With usual notat a) $X_2 = b_{12.3}X_1$ c) $X_2 = b_{12.3}X_2$	tions, the regressi + $b_{32.1}X_3$ + $b_{32.4}X_4$	d) on equ b) d)	n-2 Nation $X_2$ on $X_1$ and $X_3$ is $X_2 = b_{21.3}X_1 + b_{23.1}X_3$ $X_3 = b_{23.2}^2 X_1 + b_{23.2}^2 X_2$	·	
	3)	What is the range a) $[0,1]$ c) $[0,\infty)$	ge of multiple corr	ection b) d)	$\begin{array}{l} x_{2} = b_{12,3}x_{1} + b_{23,1}x_{3} \\ \text{coefficients?} \\ [-1,1] \\ (-\infty,\infty) \end{array}$		
	4)	The correlation (a) $r_{23}$ c) $r_{23.1}$	coefficient betwee	en X <sub>2.1</sub> b) d)	and X <sub>3.1</sub> is r <sub>12</sub> r <sub>31.2</sub>		
	5)	A sample consist a) all units of t b) 50 percent un c) 5 percent un d) any fraction	st of he population units of the popula nits of the populat of the population	ation ion			
	6)	Probability of an SRSWR is a) $\frac{1}{N}$ c) $\frac{1}{n!}$	y one sample of ₅ <sup>.</sup>	b) d)	being drawn out of N un $\frac{\frac{n}{N}}{\frac{1}{N}C_{n}}$	its in	
	7)	Chance variation a) Controlable c) Both (a) and	n in the manufacto d (b)	ured pr b) d)	oduct is Uncontrollable None of these		
	8)	If $\mu$ and $\sigma$ are properties of the second	ocess mean and given by	standa b) d)	rd deviation respectively $\mu \pm 3\sigma$ None of these	y, then 3 $\sigma$	

### Q.2 Answer any four of the following:

- **a)** State the relation of  $r_{13.2}$  with  $b_{13.2}$  and  $b_{31.2}$
- **b)** Define multiple correlation coefficients.
- c) Define partial correlation coefficient.
- d) Define defect and defectives.
- e) Give the  $3\sigma$  control limits for R-chart when standards are not given.
- f) Show that Probability that a specified unit is included in the sample is  $\frac{n}{N}$

### Q.3 Write short note on any two the following:

- a) State any two properties of residual and prove any one.
- b) Discuss advantages of sampling method over census method.
- c) Distinguish between process control and product control.

#### Q.4 Answer any Two of the following:

- a) Explain the construction of  $\overline{X}$  chart when standards are given.
- **b)** Explain SRSWR and SRSWOR
- **c)** Find variance of residual  $X_{1.23}$ ,

### Q.5 Answer any one of the following

- **a)** Derive the equation of plane of regression of  $X_1$  on  $X_2$  and  $X_3$  by least square method.
- **b)** Show that sample mean square is unbiased estimator of population mean square.

80

08

08

B.Sc. (Semester - III) (CBCS) Examination: March/April-
METEOROLOGY (Paper–II)
General Meteorology (19201322)

Day & Date: Friday, 21-07-2023 Time: 03:00 PM To 05:00 PM

Seat No.

Instructions: 1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic table and calculator is allowed.

#### Q.1 Choose the correct alternatives from the options.

1) Which of the following relation hold good for wavelength of violet, yellow and red colours in case of the sunlight?

a)	$\lambda_y > \lambda_v > \lambda_r$	b)	$\lambda_v > \lambda_y > \lambda_r$
c)	$\lambda_r > \lambda_y > \lambda_v$	d)	$\lambda_v > \lambda_r > \lambda_y$

2) By Rayleigh's law of scattering \_\_\_\_

a) $I \propto \frac{1}{1}$	b)	$I \propto \frac{1}{1}$
c) $I \propto \frac{\lambda^{5}}{\lambda}$	d)	$I \propto \frac{\lambda^4}{\lambda^2}$

3) Which of the following has the highest entropy?

- a) Air b) Diamond
- c) Liquid nitrogen d) Mercury
- 4) Which of the following is a motivating force to bring air mass in motion?
  - b) Pressure gradient force
  - c) velocity gradient d) Coriolis force
- 5) Which of the following relation is incorrect?
  - a) velocity gradient =  $\frac{dv}{dr}$  b) density gradient =  $\frac{d\rho}{dz}$
  - c) centrifugal force = mv d) Coriolis force =  $-2m(\vec{\omega} \times \vec{V})$
- A typical output of a solar cell is V = 0.45 volts and I = 15 mA. Its output power is \_\_\_\_\_ mW.

a)	0.03	b)	14.55
c)	33.33	d)	6.75

- 7) During launching of a satellite, the rocket must overcome
  - a) gravitational force to go up in addition to the atmospheric drag
    - b) electrostatic force
    - c) electromagnetic force
    - d) magnetic force

a) pseudo force

- 8) Which of the following statement is incorrect?
  - a) useful energy is called exergy
  - b) worthless energy is called anergy
  - c) coal is conventional resource
  - d) petroleum oil is nonconventional resource



Max. Marks: 40

08

	1) 2) 3) 4) 5) 6)	<ul> <li>What is coherent scattering?</li> <li>How is SMOG formed?</li> <li>Mention different layers of the Earth's atmosphere.</li> <li>State Buys-Ballots law.</li> <li>How chain and modules are formed using solar cells?</li> <li>Write down energy chain for coal fired power plant.</li> </ul>	
Q.3	Writ a) b) c)	<b>te short notes on any two of the following.</b> Explain greenhouse effect. Discuss non-inertial frame of reference and pseudo forces. Discuss interrelation between energy, man, and environment.	08
Q.4	Ans a) b) c)	Explain the radiation budget of earth and its atmosphere in relation with scattering, reflection, and absorption. Explain Geo-strophic wind. Discuss energy demand.	08
Q.5	Ans a) b)	wer any one of the following. Explain the formation of ozone in the stratosphere. Discuss launching of an artificial satellite. What is a geo-synchronous satellite?	08

## Q.2 Answer any four of the following.
# B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 **GEO-CHEMISTRY** Paper-II

Introduction to Solar System and Geo-Sphers (19201314)

Day & Date: Friday, 21-07-2023

Time: 03:00 PM To 05:00 PM

Instructions:	1)	All	ques	tions	are	con	npuls	sory	
					-			-	

- 2) Figures to the right indicate full marks.
- 3) Draw neat diagrams and give equations wherever necessary.
- 4) Use of logarithmic table and calculator is allowed.

(At. Wts.: H=I, C=12, 0=16, N= 14, Na =23, CI = 35.5)

### Choose the correct alternatives from the options. Q.1

- What is the average percentage of SiO<sub>2</sub> in the igneous rocks: 1)
  - 59.14% a)
  - 79.15% c)
- The hydrosphere is the: 2)
  - a) Continuous shell of water
  - Uniform shell of water c)
- Siderites consist essentially of a. 3)
  - Nickle iron alloy a)
  - Silicates only c)
- 4) The Sun's major constituents are
  - b) O2 and N2, a) H & He,
  - d) None of these NH3 and CO2, c)
- Elements which readily-form ions with an outermost 8-electron shell are: 5)
  - a) Siderophile b) Chalcophile
  - d) Atmosphere Lithophile c)
- In the primeval atmosphere, at the first stage of its evolution was 6) major constituent.
  - a) CH<sub>4</sub> b) N<sub>2</sub> c) **O**<sub>2</sub>
    - d) None of the these
- The average composition of terrestrial water is 7)
  - Ca > Na > Mab) Na > Ca > Mg a)
  - d) Ca > Mg > NaMg > Na > Cac)
- 8) The S wave shadow zone is caused by the
  - The crust and mantle boundary a)
  - The outer core b)
  - c) the lower mantle
  - the inner core d)

- b) 55.50 %
- d) 80.00%
- b) Discontinuous shell of water
  - d) None of these.
- b) Nickel-iron alloy and silicates
- d) Silicates and graphite's



Set

Max. Marks: 40

Seat No.

Q.2	Ans a) b) c) d) e) f)	wer any four of the following: What are the compositions of Sial and Sima? Name the two types of Aerolites. What is pyrolite? Names of variable constituents of the atmosphere. What is the thickness of transition zone present in the upper mantle? Which element has affinity towards metallic iron?	80
Q.3	Writ	e short notes on any two of the following:	08
	a) b)	Structure of atmosphere.	
	c)	Structure and composition of lower mantle?	
Q.4	Ans a) b) c)	wer any Two of the following: Describe atmospheric additions and losses during geologic time. Explain in brief the cosmic abundance of elements. Discuss the siderolite	08
Q.5	Ans a) b)	<b>wer any one of the following:</b> Describe in brief zonal structure of the earth. Explain the primary differentiation of elements.	08

### B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 **ZOOLOGY** (Paper–VI) Principles of Ecology (19201332)

Day & Date: Friday, 21-07-2023

Time: 03:00 PM To 05:00 PM

c)

Seat

No.

### Instructions: 1) All questions are compulsory.

- Draw neat diagrams and give equations wherever necessary.
- 2) Figures to the right indicate full marks.
- 3) Use of logarithmic table and calculator is allowed.

(At. Wts.: H=1, C=12, 0=16, N= 14, Na =23, Cl = 35.5)

### Q.1 Choose the correct alternatives from the options.

- The animas which comsumes decaying organic matter is 1) b) Detritivore
  - a) Carnivore
- 2) For the host, the most dangerous relationship with another organism is
  - a) **Symbiosis**
  - Commensalism c)

Herbivore

- 3) The term ectoparasites includes
  - some viruses a)
  - c) some protozoa
- What is food chain? 4)
  - A long chain made of food a)
  - process of preparing food b)
  - food where locked by chain c)
  - pathway that energy and nutrients flow through the ecosystem. d)
- 5) Which of the following food chain correctly describes the flow of energy in an ecosystem?
  - Grass > Lion > human a)
  - Grass > goat. Human c)
- The group of inter-breeding individuals belonging to same species is: 6)
  - Habitat b) a)
  - Community Individual c) d)
- 7) All populations within an ecosystem is:
  - a) Habitat
  - c) Community
- The hotspot of biodiversity in India is 8)
  - Eastern Ghats a) c)
    - Sundarbans d)

b) Parasitism

d) Producers

Mutualism d)

b)

d)

Set

**SLR-QA-120** 

Max. Marks: 40

08

some bacteria

some insects

- Cow > grass > lion b)
- d) leaf > bird > lizard

# Population

- Population b)
- Individual d)
- Gangetic plains b)
- Western ghats

Q.2	Ans a) b) c) d) e) f)	wer any four of the following. Write a note on Mortality. Write a note on Primary consumers with example. Write a note on energy flow in ecosystem. Give an account on diversity indices. Write a note on water hardness. Give an account on History of ecology.	08
Q.3	Writ a) b) c)	<b>te short notes on any two of the following.</b> Describe the effect of Temperature and light on animals. Write a note on Species richness. Give an account an commensalism and mutualism.	08
Q.4	Ans a) b) c)	wer any Two of the following. Give an account on freshwater ecosystem of both lotic and lentic. Give an account on Biodiversity hot-spots and sacred groves in India with examples. What are abiotic factors.	08
Q.5	Ans a)	wer any one of the following. Give an account on Pond ecosystem: with reference to food chain	08

a) Give an account on Pond ecosystem: with reference to food chain.
 b) Give an account on general characteristics & faunal adaptations of terrestrial ecosystem.

Seat No.						Se	tP	
	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 MATHEMATICS Paper - V Differential Calculus (19201319)							
Day & Time:	Date 03:0	e: Sat 0 PM	urday, 22-07 To 5:00 PM	2-2023		Max. Mar	ks: 40	
Instru	ictioi	<b>ns:</b> 1) 2)	All question Figures to t	s are compulsory. he right indicate full	mark	ïS.		
Q.1	Mult 1)	ti <b>ple c</b> The a their a)	hoice quest angle of inter Normal	tions. section of two curve	es is o b) d)	defined as the angle between Tangent None of these	08	
	2)	The p a) c)	polar sub-noi $\frac{dr}{d\theta}$ $r.\frac{dr}{d\theta}$	rmal is equal to	d)  b) d)	$\frac{d\theta}{dr}$ $r.\frac{d\theta}{dr}$		
	3)	Maxir a) c)	num value o e 1/e	f $\log x/x$ is	b) d)	O 1		
	4)	Minim a) c)	num value of a = b a = 4b	$f xy + \frac{a^3}{x} + \frac{a^3}{y} \text{ at } x =$	a,y = b) d)	$a is \$ $a = 2b$ $3a^2$		
	5)	if x = a) c)	$r\cos\theta$ , $y = x$ $\theta$	$r\sin\theta$ then $\frac{\partial(x,y)}{\partial(r,\theta)}$ is	equa b) d)	l to y r		
	6)	$\frac{\frac{\partial(u,v)}{\partial(x,y)}}{a)}$	$\times \frac{\partial(x,y)}{\partial(u,v)} = \_$ 0 2		b) d)	-1 1		
	7)	The in a) c)	ntrinsic form $ \varrho = \frac{dy}{dx} $ $ \varrho = \frac{dx}{dy} $	ula for the radius of	curva b) d)	ature is $ \varrho = \frac{ds}{d\Psi} $ $ \varrho = \frac{d\Psi}{ds} $		
	8)	The p a) c)	$\begin{aligned} \varrho &= r + \frac{dr}{dp} \\ \varrho &= r \cdot \frac{dr}{dp} \end{aligned}$	a for the radius of c	urvatu b) d)	are is $\[ \varrho = r.\frac{dp}{dr} \]$ $\[ \varrho = \frac{1}{r}.\frac{dr}{dp} \]$		

### **SLR-QA-121** Γ

Q.2	Ans	swer any FOUR of the following.	08	
	a)	Give the equation of tangent and normal in Cartesian from.		
	(a (a	Give the formula for length langent and normal at any point to the curve. Prove that $f(c)$ is the maximum value of the function of		
	0)	f'(c) = 0 and $f''(c) > 0$		
	d)	Explain stationary and extreme point.		
	e)	If $x = r \cos \theta$ , $y = r \sin \theta$ then prove that $\frac{\partial(e, \theta)}{\partial(r, r)} = 1/r$		
	f)	Find the formula for radius of curvature in parametric equation.		
Q.3	Ans	swer any two of the following.	08	
	a)	Find the Radius of Curvature in pedal equation with figure.		
	b)	Find the maximum and minimum value of the function. $f(x) = 9x^5 = 15x^4 + 10x^2$		
	c)	$f(x) = \delta x^2 - 15x^2 + 10x$ Find the length of perpendicular from pole to the tangent.		
	-,	5 1 1 5		
Q.4	Ans	swer any two of the following.	08	
	a)	Find the length of polar sub-tangent and polar sub-normal.		
	(a ()	Find the necessary condition for extreme value.		
	0)	Prove that $\frac{1}{\partial(x,y,z)} \cdot \frac{1}{\partial(u,v,w)} = 1$		
Q.5	Ans	swer any one of the following.	08	
	a)	Define radius of curvature and prove that $\frac{ds}{dx} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$		
		(length of are as a function)		
	b)	Determine the pedal equation of a curve where Cartesian an equation is		

given. Also find the pedal equation of the parabola,  $y^2 = 4a(x + a)$ 

	E	- Sc. (Semester.	III) (CBCS) Ex BOTANY (Pa Plant Anatomy	amin aper (192	ation: March/April- - V) 01301)	2023	
Day Time	& Dat : 03:0	e: Sunday, 23-07-202 0 PM To 05:00 PM	3	(102	1	Vax. Marks: ∠	40
Instr	uctio	<b>1s:</b> 1) All questions ar 2) Draw neat diag	e compulsory. rams and give equ	uation	s wherever necessary.		
Q.1	Mult 1)	iple choice questior among the fo a) Epidermis c) Meristem	<b>is:</b> Ilowing cells have	e the a b) d)	bility of continuous cell Idioblast Cutical	( division.	)8
	2)	Cambium occurs in a) Fusiform c) Both a & b	forms.	b) d)	Ray initials Cortrical cells		
	3)	Campanion cells are a) Trachids c) Fibers	e along with	b) d)	Vessels Sieve tube		
	4)	function of A a) Increase in len c) Increase in flow	pical Meristem. gth vering	b) d)	Increase in girt None		
	5)	among the a a) Collenchyma c) Xylem	following is compl	ex tis: b) d)	sue. Parenchyama Sclerenchyama		
	6)	Vessels are only pre a) Gymnosperm c) Pteridophyte	esent in	b) d)	Angiosperm Bryophyte		
	7)	The outer most laye a) Pericycle c) Epidermis	r of stele in dicot	stem i b) d)	s Endodermis None		
	8)	The underground pa a) Shoot system c) Leaf system	art of plant body is	calle b) d)	d Root system Embryonic cell system		
Q.2	Ans a) b) c) d)	<b>wer any four of the f</b> Define Meristem. Enlist the types of sin Give the functions of What is conjugative f	ollowing. mple tissue xylem. issue?			(	)8

- What is epidermis? Give function of epidermis Describe structure of dicot stomata. e)
- f)

Set P

### Seat No.

Page 2 of 2

# SLR-QA-122

# Q.3 Write short notes on any two of the followinga) Give the significance of excretory tissue system.

- **b)** Give basic structure of wood & its types.
- c) Give the classification of Meristematic cells.

### Q.4 Answer any Two of the following.

- a) Vascular bundles of dicot stem & root.
- b) Describe components of cambium with diagram & add a note on its function.
- c) Describe tunica corpous theory.

### Q.5 Answer any one of the following

- a) Describe in brief epidermal tissue system.
- **b**) Describe in detail primary structure of dicot stem with suitable diagram.

### 80

80

### Seat No.

### B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 MATHEMATICS Paper-VI Laplace Transform (19201320)

Day & Date: Monday, 24-07-2023 Time: 03:00 PM To 05:00 PM

Instructions: 1) All questions are compulsory.2) Figures to the right indicate full marks.

### Q.1 Choose Correct Alternatives to each of the following. 1) $L{\sin 3t} =$

<i>L</i> {s	in 3t =		
a)	3	b)	Р
a)	P <sup>2</sup> +9 P	ب ب	$P^{2}+3$
C)	$P^2+9$	a)	$\frac{3}{P^2+3}$

2) If  $L{F(t)} = f(P)$  then initial value theorem is \_\_\_\_\_.

a)	$\lim_{t\to 0} F(t) = \lim_{P\to\infty} PL\{F(t)\}$	b)	$\lim_{t\to\infty}F(t)=\lim_{P\to0}PL\{F(t)\}$
c)	$\lim F(t) = \lim L\{F(t)\}$	d)	$\lim F(t) = \lim L\{F(t)\}$

3) 
$$L\{e^{at}t^n\} =$$
\_\_\_\_\_.  
b)  $n!$ 

a) 
$$\frac{n!}{(p-a)^n}$$
  
b)  $\frac{n!}{p-a}$   
c)  $\frac{n!}{(p+a)^n}$   
d)  $\frac{n!}{(p-a)^{n+1}}$ 

4) 
$$L^{-1}\left\{\frac{P}{P^2+a^2}\right\} =$$
\_\_\_\_\_.  
a) cos at b) sin at

5) 
$$1 * 1 * 1 * \dots * 1$$
 (n times) = \_\_\_\_.  
a)  $\frac{t^{n+1}}{(n-1)!}$   
b)  $\frac{t^{n-1}}{(n-1)!}$   
c)  $\frac{t^{n-1}}{(n+1)!}$   
d)  $\frac{t^n}{n!}$ 

6) 
$$L^{-1}\left\{\frac{1}{p-4}\right\} =$$
\_\_\_\_\_.  
a)  $e^{-4t}$  b)  $e^{2t}$   
c)  $e^{4t}$  d)  $e^{t}$ 

7) If y(x,t) is a function of x and t then  $L\left\{\frac{dy}{dt}\right\} =$  \_\_\_\_\_. a)  $x\bar{y}(x,p) + y(x,p)$  b)  $p\bar{y}(x,p) - y(x,0)$ c)  $p\bar{y}(x,0) - y(x,p)$  d)  $p\bar{y}(x,0) + y(x,p)$ 

1)  $\lim_{t\to\infty} F(t) = \lim_{P\to 0} L\{F(t)\}$ 

### Max. Marks: 40

08

Set

- 8) If y(x,t) is a function of x and t then  $L\left\{\frac{d^2y}{dt^2}\right\} =$ \_\_\_\_\_. a)  $p^2 \bar{y}(x,p) py(x,0) y_t(x,0)$  b)  $p^2 \bar{y}(x,p) + py(x,0)$ c)  $p^2 \bar{y}(x,p) py_t(x,0) y_t(x,0)$  d)  $p^2 \bar{y}(x,p) + p \bar{y}(x,0) y_t(x,0)$

### Attempt any four of the following question. Q.2

- Find  $L = \{\sin t \cos t\}$ a)
- b) State the second shifting theorem for Laplace transforms.
- Find:  $L^{-1}\left\{\frac{P}{P^2+2}+\frac{6p}{p^2-16}\right\}$ C)
- d) State linearity property of Laplace inverse.

**e)** Solve 
$$\frac{d^2y}{dt^2} + y = 0$$
 under the condition that  $y = 1$ ,  $\frac{dy}{dt} = 0$  when  $t = 0$ 

If y(x, t) is a function of x and t, then prove that: f)  $L\left\{\frac{dy}{dx}\right\} = \frac{d\bar{y}}{dx}$ 

### Q.3 Attempt any two of the following.

- Solve  $(D^2 2D + 2)y = 0$ ,  $y = D_y = 1$  when t = 0. a)
- If  $L^{-1}{f(p)} = F(t)$  then show that  $L^{-1}{f(ap)} = \frac{1}{a}F\left(\frac{t}{a}\right)$ . b)
- C) Evaluate:  $\int_0^\infty \frac{e^{-at} - e^{-bt}}{t} dt$

### Attempt any Two of the following. Q.4

- Let F(t) be a periodic function with period T > 0, that is a)
  - F(u + T) = F(u), F(u + 2T) = 4 etc., then show the  $L{F(t)} = \frac{\int_{0}^{T} e^{-pt}F(t)dt}{1 - e^{-pT}}$
- **b)** Find  $L^{-1} \left\{ \log \frac{p+3}{p+2} \right\}$
- Solve ty'' + y' + 4ty = 0, y(0) = 3, y'(0) = 0C)

### Q.5 Attempt any one of the following.

- State and prove Convolution theorem. a)
- If F(t) is a function of class A and  $L{F(t)} = f(p)$ , than prove that b) i)  $L\{tF(t)\} = -f^1(p)$ 
  - Find  $L\{(t+2)^2e^t\}$ ii)

08

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Seat No.	t					S	et	Ρ
	E	3.Sc.	(Semester I	- III) (CBCS) BOTANY Plant Metabo	Exami (Paper lism (1	ination: March/April-2023 r – VI) I9201302)		
Day & Time	& Da : 03:0	te: Tue 00 PM	esday, 25-07- To 05:00 PM	-2023 1		Max. Ma	arks: 4	40
Instr	uctio	o <b>ns:</b> 1) 2 3	) All question: ) Draw neat la ) Figures to ri	s are compulso abeled diagram ght indicate full	ry. whereve marks.	er necessary.		
Q.1	Mul 1)	l <b>tiple d</b> Holo a) c)	choice quest enzyme is ma apoenzyme Co-enzyme	t <b>ions.</b> ade up of and zymogen and prosthetic	 b) d)	Apoenzyme and co-enzyme Prosthetic group and co factor	-	08
	2)	All ei a) c)	nzymes are _ Carbohydra Protein	in nature. te	b) d)	Vitamin Fat		
	3)	Conv a) c)	version of am Ammonifica assimilation	monia to nitrite tion	and ther b) d)	n nitrate is called Denitrification Nitrification		

The hormone auxin is isolated by \_\_\_\_ 4)

- b) Skoog a) Went c) Darwin d) Miller
- The hormone responsible for apical dominance \_\_\_\_\_. 5)
  - ABA b) GA a)
  - IAA d) Kinetin c)
- Out of following \_\_\_\_\_ Macro nutrient. 6)
  - Nitrogen b) Hydrogen a)
  - Oxygen d) Carbon c)
- Sucrose is made up of from two molecules of monosaccharide those are 7)
  - Glucose and Glucose b) Glucose and Ribose a)
  - Glucose and Fructose d) None of these c)
- Interveinal chlorosis in young leaves due to deficiency of \_\_\_\_\_. 8)
  - Potassium a)
  - Sodium c)
- b) Phosphorus
- d) Iron

**SLR-QA-124** 

Seat No.

	SLR	-QA-124
Q.2	<ul> <li>Answer any four the following.</li> <li>a) What is oligosaccharide?</li> <li>b) Define Enzyme.</li> <li>c) Enlist growth inhibitors studied by you.</li> <li>d) Write the significance of Nitrogen fixation.</li> <li>e) Give any two examples of polysaccharide.</li> <li>f) Write the role of Manganese.</li> </ul>	08
Q.3	<ul> <li>Write short note on any two of the following.</li> <li>a) Mechanism of enzyme action.</li> <li>b) Abscisic acid.</li> <li>c) Deficiency symptoms of potassium in plants.</li> </ul>	08
Q.4	<ul> <li>Attempt any two of the following.</li> <li>a) Write the physical role of auxin.</li> <li>b) Explain the properties of enzyme.</li> <li>c) Write the role of Nitrogen in plant health.</li> </ul>	08
Q.5	<ul><li>Attempt any one of the following.</li><li>a) What is monosaccharide? Give the properties of monosaccharide.</li></ul>	08

**b**) Explain in brief mechanism of Nitrogen fixation.

Seat No.		Set P	)						
B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 ELECTRONICS (Paper – V) Electronic Circuits (19201309)									
Day & Time:	Day & Date: Wednesday, 26-07-2023 Max. Marks: 40 Time: 03:00 PM To 05:00 PM								
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat labelled diagram wherever necessary.</li> <li>3) Figures to right indicate full marks.</li> <li>4) Use of log table and calculator is allowed.</li> </ul>							
Q.1	Cho	ose correct alternative from the given options. 08	8						
	1)	In voltage divider bias role of Ce is a) block ac b) by pass ac c) by pas dc d) self-bias							
	2)	circuit reduces ripple from rectified dc voltage. a) rectifier b) filter c) amplifier d) oscillator							
	3)	Cross over distortion is eliminated by power amplifier. a) Class AB b) Class B c) Class A d) Class C							
	4)	is radio frequency oscillator. a) phase shift oscillator b) Wien bridge oscillator c) RC oscillator d) Colpitts oscillator							
	5)	In negative feedback amplifier voltage gain a) increases b) decreases c) remains same d) not affected							
	6)	Ripple factor of half wave rectifier isa) 0.48b) 1.21c) 0.81d) 1.81							
	7)	In amplifier Q point is normally at the of the load line. a) Center b) cut off c) well below d) between cut off and center							
	8)	In oscillator oscillations are sustained if phase shift between input and output is a) 90 b) 180 c) 270 d) 360							
Q.2	Ans a) b)	wer any four of the following.08What are load and line regulation?What is multistage amplifier? If gain of single stage amplifier is 10 then calculate gain of three stage amplifiers.	B						
	c)	What are advantages and disadvantages of negative feedback amplifier?							

- d) What is biasing? What are the types of biasing?e) Give the classification of oscillator.

Q.3	<ul> <li>Write short note on any two of the following.</li> <li>a) Capacitor filter</li> <li>b) Working of LC tank circuit</li> <li>c) DC load line</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain current series negative feedback amplifier?</li> <li>b) Explain RC coupled amplifier.</li> <li>c) Explain construction and working of half wave rectifier.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following</li> <li>a) Explain construction and working of Wien bridge oscillator and give the formulae of its frequency.</li> <li>b) Explain how stability of BJT increases in negative feedback amplifier.</li> </ul>	08

		SLR-QA-12	7			
Seat No.		Set	Ρ			
	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 GEOGRAPHY (Paper – V) Climatology (19201311)					
Day & Time:	& Date : 03:0	e: Wednesday, 26-07-2023 Max. Marks: 4 00 PM To 05:00 PM	40			
Instru	<ul> <li>Instructions: 1) All questions are compulsory.</li> <li>2) Figures to right indicate full marks.</li> <li>3) Draw neat maps and diagrams wherever necessary.</li> <li>4) Use of maps stencil is allowed.</li> </ul>					
Q.1	Cho 1)	ose correct alternative from the given options.(Precipitation has been derived from word.a)a)Romanb)Latinc)Greekd)Indian	08			
	2)	About 97% of the air is concentrated in the lower KM. a) 9 b) 29 c) 19 d) 39				
	3)	CO2 constituents% of the total composition of the atmosphere.a)0.03b)3.03c)30.03d)303.03				
	4)	is the first / lowest layer of the atmosphere. a) Stratosphere b) Troposphere c) Exosphere d) Mesosphere				
	5)	About calories heat is received per sq.km per minuteat the out limitof the atmosphere.a) 1.94b) 2.94c) 3.94d) 4.94				
	6)	The lines drawn on maps joining the places of equal temp, are called a) Isotherms b) Isohyets c) Mesolines d) None of these				
	7)	Koppen published his first scheme of world climate in a) 1980 b) 1900 c) 1950 d) 1910				
	8)	Climatology is compounded of two words, Klima + Logos. a) Greek b) Roman c) Indian d) American				
Q.2	Ans a) b) c) d) e)	wer any four of the following. Jet Stream Troposphere Sunspots Types of rainfall Defination of water vapour	80			

# a) Tropical cyclone b) Monsoon c) Meaning and definition of Climatology Q.4 Answer any two of the following.

- a) What is mean by Insolation & Explain the factors affecting the distribution of Insolation.
- **b)** Explain the structure of the atmosphere.
- c) Define the heat budget & explain it with suitable diagram.

### Q.5 Answer any one of the following.

Q.3 Write short notes of any two.

- a) Explain Koppen's classification of the world climate.
- **b)** Explain the composition of the Atmosphere.

08

08

Seat No.					Set	Ρ
L	B	Sc. (Semester - III) (CBCS) Exa GEOLOGY (Pa Igneous Petrology	mir ape	nation: March/Apri r - V) 9201315)	1-2023	
Day 8 Time:	Day & Date: Thursday, 27-07-2023 Time: 03:00 PM To 05:00 PM					: 40
Instru	<ul> <li>Instructions: 1) All questions are compulsory.</li> <li>2) Draw neat labeled diagram wherever necessary.</li> <li>3) Figures to right indicate full marks.</li> </ul>					
Q.1	Muli 1) 2)	iple choice questions. Gabbro is Igneous rock. a) Intrusive c) Extrusive is coarse grained igneous rock.	b) d)	Volcanic none of these		08
	3)	<ul><li>a) Basalt</li><li>c) Rhyolite</li><li>The essential mineral in Basalt rock are</li></ul>	b) d) e	Trachyte Rhyolite		
	0)	<ul><li>a) Quartz, feldspar</li><li>c) Quartz, olivine</li></ul>	b) d)	Quartz, Augite olivine, Augite		
	4)	Uni component rocks are extremely a) Abundant c) Rare	b) d)	Moderate None of these		
	5)	Quartz is absent rock. a) Acidic c) Basic	b) d)	Ultrabasic None of these		
	6)	The acid magma rich in a) Si, Na and K c) K, Mg and Al	b) d)	Ca, Mg and Fe Fe and Mg		
	7)	The well-developed crystal faces in Ign a) Euhedral c) Subhedral	neou b) d)	is rock are called Anhedral None of these		
	8)	<ul><li>The end product of reaction relation in</li><li>a) Olivine</li><li>c) Amphibole</li></ul>	ma( b) d)	gma is Pyroxene quartz		
Q.2	Ans a) b) c) d) e) f)	wer any four of the following. Define concordant forms? What is magma and lava? What is eutectic point? What is isotherm? Define holocrystalline texture. Minerals in Granite.				08

Q.3	Wri a) b) c)	<b>te short notes on any two of the following.</b> Describe the batholith. Describe Volcanic igneous rock. Describe the glass and crystals.	08
Q.4	Ans a) b) c)	wer any two of the following. Describe the plutonic igneous rock. Describe any two discordant forms of igneous rock. Describe the crystallization of Uni component magma.	08
Q.5	Ans a) b)	wer any one of the following Describe structures of igneous rock. Describe the differentiation process.	08

Seat No.							Set	Ρ
	В	.Sc.	(Semester	r - III) (CBC MICROBIC	S) Exa	mir (Pa	nation: March/April-2023 aper – V)	
<b>D</b> 0	<b>–</b> (	<b></b>	Dacterial		and Ph	ysi	ology (19201317)	40
Day & Time:	03:0	e: Thu 0 PM	rsday, 27-0 To 05:00 PN	7-2023 ∕I			Max. Mark	s: 40
Instru	ctio	ns: 1) 2) 3) 4)	All question Draw neat l Figures to r Use of log t	is are compu abeled diagr ight indicate ables and ca	lsory. am wher full mark Ilculators	eve s. are	necessary. allowed.	
Q.1	Mult	iple c	hoice ques	tions.				08
	1)	The r a) c)	nesosome is Cell wall Flagella	s the invasior	n of	 b) d)	Cell membrane Pili	
	2)	Carb a) c)	oxy some co Carboxylas Carboxy dis	ontains e smutase	_enzyme	e. b) d)	Decarboxylase DE sulfurylase	
:	3)		_ is the com	ponent of ele	ectron tra	nsp	ort chain accept only one	
		electi a) c)	ron. Coenzyme FAD	Q		b) d)	Cytochrome b NAD	
	4)	The e being a)	end product converted t acetic acid	of glycolysis :o	is pyruva	b)	which enters the TCA cycle after	
		C)	Ethanol			d)	acetyl CoA	
;	5)	The p a) c)	oopulation of Death Log	f microorgani	sms rem	ains b) d)	constant in phase. Lag Stationary	
	6)	In the whole a) c)	e arrangeme e surface of Peritrichous Amphitricho	nt of flagella, body of micro s ous	many fla obes is c	agel alleo b) d)	la dispersed randomly over the as flagella. Monotrichous Lophotrichous	
	7)	Mesc range a) c)	ophiles are the of °( 0-20 45-60	ne group of o C.	rganisms	s tha b) d)	at grow within the temperature 20-45 90-100	
	8)	The r a) c)	najor compo Peptidoglyc Phospholip	onent of cell v an ids	vall of Gr	ram- b) d)	positive bacteria is Protein Phosphate	

Page 1 of 2

**SLR-QA-129** 

08

### 08

### 08

08

- Q.4 Answer any two of the following.a) Define photophosphorylation. Discuss in detail non-cyclic photophosphorylation.
  - **b)** Describe in detail TCA cycle.

Answer any four of the following.

Define synchronous growth.

State the function of cell membrane.

Write short notes on any two of the following.

Write a note on fates of pyruvate.

Define mesophiles.

Define plasmolysis.

Define endospore.

Define active transport.

Q.2

Q.3

a) b)

C)

d)

e) f)

a)

b)

C)

c) Describe in detail ultra-structure of flagella.

### Q.5 Answer any one of the following

a) Define growth. Discuss in detail bacterial growth phases.

Describe in detail cell wall of gram-positive bacteria.

Discuss in short effect of pH on growth of microorganism?

**b)** What is oxidative phosphorylation? Describe in detail electron transport chain of prokaryotes.

	_	ELECTRONICS (Pa Pulse & Switching Circu	aper – VI) ite (19201310)
Day Time	& Date : 03:0	te: Friday, 28-07-2023 00 PM To 05:00 PM	Max. Marks: 40
Instr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full mar</li> <li>3) Draw neat diagrams and give equat</li> <li>4) Use of logarithmic table and calculation</li> </ul>	ks. ions wherever necessary. tor is allowed.
Q.1	Mult 1)	tiple choice questions The multivibrator that do not require exte a) astable multivibrator b) c) bistable multivibrator d)	<b>08</b> rnal trigger for its operations is monostable multivibrator both b) and c)
	2)	The circuit that introduces a de level into a) Integrator b) c) Clipper d)	an ac input signal is called Differentiator Clamper
	3)	To use transistor as a switch, the transist a) Saturated region b) c) Active region d)	tor must be operated in Cut-off region Both a and b
	4)	In, the three resistors of five kilo o a) IC 74121 b) c) IC 555 d)	hms are connected in series. IC 7400 IC 810
	5)	The differentiator circuit converts sine wa a) Spikes b) c) Triangular wave d)	ave into Cosine wave Square wave
	6)	Application of IC 555 area) Astable multivibrator.b)c) Battery chargerd)	Bistable multivibrator All of the above
	7)	IC is single shot multivibrator. a) 74131 b) c) 555 d)	74121 7400
	8)	If UJT oscillator circuit is provided by cor waveforms are generated. a) Triangular b) c) Positive ramp d)	istant source then type of Square Saw tooth
Q.2	Ansv a) b)	wer any four of the following Draw the diagram and waveforms of nega Calculate pulse width of monostable multi KQ and $C = 100$ uf are connected	<b>08</b> ative clipper circuit. vibrator using BJT, when $R = 10$
	c)	Give the features of using timer IC 555	

- Define the term sweep speed error and transmission error of time base circuit. What is multivibrator? What are its types? d)
- e)
- What is need of time base circuit? f)

### Seat No.

B.Sc. (Semester - III) (CBCS) Examination: March/April-2023

		3) (13. 17) (2) (2) (3) (4)	) Figures to the right indicate full n ) Draw neat diagrams and give eq ) Use of logarithmic table and calc	narks. uatior ulator	ns wherever necessary. r is allowed.		
Q.1	<b>Multiple choice questions</b> 1) The multivibrator that do not require external trigger for its operations is						
	,	a) c)	astable multivibrator bistable multivibrator	b) d)	monostable multivibrator both b) and c)		
	2)	The a) c)	circuit that introduces a de level in Integrator Clipper	nto ar b) d)	n ac input signal is called Differentiator Clamper		
	3)	To u a) c)	use transistor as a switch, the tran Saturated region Active region	sistor b) d)	must be operated in Cut-off region Both a and b		
	4)	In _ a) c)	, the three resistors of five kil IC 74121 IC 555	o ohn b) d)	ns are connected in series. IC 7400 IC 810		
	5)	The a) c)	differentiator circuit converts sine Spikes Triangular wave	wave b) d)	e into Cosine wave Square wave		
	6)	App a) c)	lication of IC 555 are Astable multivibrator. Battery charger	b) d)	Bistable multivibrator All of the above		
	7)		IC is single shot multivibrator.				

Set P

# a) Action of transistor as a switch. b) IC 555 as a Voltage controlled oscillator. c) Miller integrator. Q.4 Answer any Two of the following: a) Explain A stable multivibrator by using gate. b) Draw diagram and Explain response of RC differentiator with square wave input.

c) Explain construction and working of Schmitt's trigger circuit.

### Q.5 Answer any one of the following:

- a) Explain operation, waveforms and derivation of gate width of Monostable Multivibrator using IC 555.
- **b)** Explain operation, waveforms of a stable multivibrator by using BJT. Derive formulae for its output frequency.

### Q.3 Write short notes on any two of the following:

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80

						SLR-QA-1	31
Seat No.						Set	Ρ
	B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 GEOGRAPHY (Paper – VI) Geography of India (19201312)						
Day & Time:	Date: Fri 03:00 PM	day, 28-07-2 I To 05:00 PI	023 M		,	Max. Marks	: 40
Instru	<b>ctions:</b> 1 2 3	) All questior ) Draw neat ) Use of ster	is are compulsory. diagram wherever n icil is allowed.	eces	sary.		
Q.1	Multiple ( 1) a) c)	<b>choice ques</b> is passed Capricorn Equator	<b>tions.</b> through the center o	of Indi b) d)	a. Tropic of Cancer None of above		08
-	a) c)	Cotton Fruits		b) d)	Coffee Sugarcane		
;	<b>3)</b> Low( a) c)	est Schedule Mizoram Goa	d tribes population i	s fou b) d)	nd in Nagaland Karnataka		
•	<b>4)</b> In a) c)	state Ko Rajasthan Kerala	onkani language is s	poke b) d)	n. Tamilnadu Maharashtra		
	5) Sex a) c)	ratio in India 100 10000	defined as the num	ber o b) d)	f females per 1000 None of above	_ of males.	
	6) The a) b) c) d)	kharif seasor In Decembo With the on At the end In March	n beings er set of south westerr of the south western	n mor I mon	isoon soon		
-	<b>7)</b> Bom a) c)	bay high is fa Petroleum Coal	amous for	b) d)	Gold None of above		
8	8) a) c)	has the hig Kerala Mizoram	ghest sex ratio in Inc	dia. b) d)	Karnataka Tamilnadu		
Q.2	Answera a) Wha b) Wha c) Wha d) Wha e) Wha	any four of the at is tribe? at is climate? at is a power at is information at is population	he following. resource? on technology? on density?				08

f) What is geographical extent of India?

Q.3	Writ a) b) c)	<b>e a Short notes on any two of the following.</b> Growth of Indian population. Automobile Industry in India. Importance of forest.	08
Q.4	Ans a) b) c)	wer any two of the following. What is a mineral resource? Explain the distribution of Ire ore in India? Explain the distribution of population on the basis of Religion? Explain the Climatic regions of India?	08
Q.5	Ans a) b)	<b>wer any one of the following.</b> What is Regionalization? Explain the economic regionalization of India? What is Population? Explain the distribution of Population in India?	08

Seat No.	t	Set P				
B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 GEOLOGY (Paper – VI)						
		Sedimentary and Metamorphic Petrology (19201316)				
Day a Time	& Dat : 03:0	e: Sunday, 30-07-2023 Max. Marks: 40 0 PM To 05:00 PM				
Instr	<ul> <li>Instructions: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat &amp; well labeled diagrams wherever necessary.</li> </ul>					
Q.1	Mult	tiple Choice Questions. 08				
	1)	Greywacke is a variety of				
		a) Sandstone b) Limestone c) Marble d) Granite				
	2)	Which of the following is not metamorphic rock?				
		a) Marble b) Quartzite c) Shale d) Slate				
	3)	facies represent High grade metamorphism.				
		a) Zeolite b) Granulite				
		c) Green schist d) Blue schist				
	4)	Which of the following sediments represent greater transportation history?				
		c) Fractured d) Rounded				
	5)	Platy, foliated, elongated minerals are called minerals.				
	•,	a) anti-stress b) primary				
		c) stress d) accessory				
	6)	Which of the following is anti-stress mineral?				
		a) Muscovite b) Chlorite				
	7)	Marble is formed due to metamorphism of limestone				
	()	a) cataclastic b) plutonic				
		c) thermal d) hydro-thermal				
	8)	Limestone consists of				
		a) Carbonates b) Sulphates				
		c) Silicates d) All the above				
Q.2	Ans	wer any four of the following. 08				
	a)	Give any two names of rocks of showing thermal metamorphism.				
	(a ()	Give two names of rocks showing Granulose structure				
	d)	Define Clastic structure				

- e) What Arenaceous rocks?
- Define Metamorphic Facies. **f**)

Seat	
No.	

Q.3	Writ a) b) c)	<b>te short notes on any two of the following.</b> Stratification structure Greenschist Facies Marble	08
Q.4	Ans a) b) c)	<b>wer any Two of the following.</b> Describe Slaty structure. Explain Residual deposits with examples. Size of sediments	08
Q.5	Ans a) b)	<b>wer any one of the following questions.</b> Define Sedimentary rocks. Describe Conglomerate and Breccia. Define Metamorphic rocks. Describe Agents of Metamorphism.	08

	Bacterial Ge	netics (1	9201318)
Day & Date Time: 03:0	e: Sunday, 30-07-2023 0 PM To 05:00 PM		
Instruction	<ul> <li>ns: 1) All questions are compulse</li> <li>2) Figures to the right indicate</li> <li>3) Draw neat diagrams and get</li> <li>4) Use of logarithmic table are (At. Wts.: H=1, C=12, O=1)</li> </ul>	ory. te full mark give equati nd calculat 16, N=14, N	s. ons wherever nece or is allowed. \a=23, CI=35.5)
<b>Q.1 Mult</b>	i <b>ple Choice Questions.</b> What is the composition of a n	ucleotide?	
')	<ul> <li>a) a sugar + a phosphate</li> <li>c) a base + a phosphate</li> </ul>	b) d)	a base + a sugar a base + a sugar
2)	The sugar in RNA is, the a) deoxyribose, ribose c) ribose, phosphate	ə sugar in [ b) d)	DNA is ribose, deoxyribo ribose, uracil
3)	Which of the following enzymes replication? a) Gyrase c) Helicase	s separate: b) d)	s the two strands o Topoisomerase DNA polymerase
4)	Which one of the following nuc a) Adenine c) Guanine	leotide bas b) d)	es is not found in l Thymine Cytosine
5)	The codon is a a) Singlet c) Triplet	b) d)	Duplet Quadruplet
6)	Name the type of mutation in w	/hich the ca	ause of the mutatio

Seat

No.

erever necessary.

B.Sc. (Semester - III) (CBCS) Examination: March/April-2023 MICROBIOLOGY (Paper-VI)

- owed.
  - CI=35.5)
    - + a sugar

- + a sugar + phosphate
- deoxyribose
- o strands of DNA during
- t found in RNA?
  - uplet
- the mutation is not known?
  - a) Spontaneous mutation b) Suppressor mutation
  - d) Mis-sense mutation c) Nonsense mutation
- 7) In Griffith's experiment which of the following things was identified as the transforming principle?
  - a) DNA b) RNA
  - c) Proteins d) Carbohydrates
- 8) Transfer of genetic material from the donor to recipient bacterium through cell contact is termed as \_\_\_\_\_.
  - a) Transduction b) Recombination
  - c) Conjugation d) Transformation

# **SLR-QA-134**

Set P

Max. Marks: 40

Q.2	Answer any four of the following.		
	a)	Enlist all enzymes involved in replication.	
	b)	Define Mutation.	
	C)	What is spontaneous Mutation?	
	d)	What is Cistron?	
	e)	Enlist all chemical mutagens.	
	f)	Define plasmid.	
Q.3	Write short notes on any two of the following.		08
	a)	Genotype and Phenotype	
	b)	DNA repair mechanism by Photoreactivation	
	c)	Griffith Experiment	
	0)		
Q.4	Answer any Two of the following.		08
	a)	Define Genetic code and explain various properties of the genetic code.	
	b)	Describe various properties of Plasmid.	
	c)	Discuss the mechanism of conjugation.	
0 F	<b>A</b> 10 0	war any and of the following	00
Q.5	Answer any one of the following.		
	a)	Explain in detail the mechanism of DNA replication.	
	D)	Enlist all types of mutations and describe in detail the Nonsense and	
		Missense mutations.	

# B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **CHEMISTRY** (Paper – VII)

### Physical Chemistry (19201407)

Day & Date: Monday, 19-06-2023 Time: 09:00 AM To 11:00 AM

Seat

No.

Instructions: 1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic table and calculator is allowed.

(At. Wt: H=1, C=12, O=16, N=14, Na=23, Ag=108, CI=35.5)

- Q.1 Choose the most correct alternative of the following and rewrite the sentences.
  - 1) Which of the following electrolyte, the equivalent and molecular conductance is the same?
    - Na<sub>2</sub>SO<sub>4</sub> a) b) NaCl
      - H<sub>3</sub>PO<sub>4</sub> C)  $H_2SO_4$ d)
  - 2) The extraction is more efficient.
    - a) single b) double
    - multiple d) None of these c)
  - 3) Following are the four solutions of NaCl. Which will have the highest value of specific conductance.
    - a) 1.0 M b) 0.1 M
    - 0.01 M d) 0.001 M c)
  - Which of the following is springily soluble salt? 4)
    - BaSO<sub>4</sub> b) PbSO<sub>4</sub> a) c)
      - AgCl all of these d)
  - Distribution law was given by \_\_\_\_\_. 5)
    - b) Ostwald Henry a)
      - Nernst d) Van't Hoff c)

The entropy of perfectly crystalline substance at absolute zero Kelvin 6) is

- a) infinite b) zero c)
  - d) all of these non-zero
- Which of the following solid is amorphous in nature? 7)
  - b) diamond sugar a)
    - glass d) common salt c)
- 8) If the transport number of cation is 0.75, then T. N. of anion is
  - a) 0.50 b) 0.25
    - d) 1.75 c) 1.25

**SLR-QA-135** 

Set

Max. Marks: 40

### Q.2 Answer any four of the following.

- a) Explain Miller indices.
- b) What is the principle used in moving boundary method?
- c) Entropy of liquid is higher than that of solid, why?
- d) Define standard entropy.
- e) Define the terms:
  - a) Specific conductance b) Equivalent conductance
- **f)** Draw diagrams showing (100), (110), and (111) planes in simple cubic lattice.

### Q.3 Write short notes on any two of the following.

- a) Describe the entropy change for physical transformations.
- b) State the Nernst distribution law. What are its limitations?
- c) Discuss the various factors that influence the transport number.

### Q.4 Answer any two of the following.

a) Explain the application of distribution law for the determination of molecular weight of solute in different solvents. Succinic acid has normal molecular state in water and ether. When varying amounts of acid were shaken with ether-water mixture. The following results were obtained.

Cwater	25.4	33.3	43.1
Cether	4.2	5.5	7.1

Calculate the partition coefficient and show that these figures illustrate the distribution law.

- **b)** Show that for thermodynamically reversible process, the entropy change is always zero at constant temperature.
- c) Define sparingly soluble salt. For saturated solution of AgCl the specific conductance was found to be 2.7 X 10<sup>-6</sup> mhos/cm and that of water was 1.1 X 10<sup>-6</sup> mhos/cm. The ionic conductance at infinite dilution of Ag<sup>+</sup> and Cl<sup>-</sup> ions are 61.9 and 76.3 mhos/cm respectively. Calculate the solubility of AgCl in g/lit. (At. Wt: Ag = 108, Cl = 35.5)

### Q.5 Answer any one of the following.

- a) What is Bragg's equation? Give a full account of the crystal structure of NaCl.
- **b)** Discuss in detail Hittorf's rule for the migration of ions during electrolysis with the schematic diagram.

80

**08** 

08

2) Figures to right indicate full marks. 3) Use of log tables and calculators allowed. 4) Draw a neat labelled diagram wherever necessary. is a software development life cycle model that is chosen if the development team has less experience on similar projects. a) Iterative Enhancement Model RAD b) Spiral d) Waterfall c) Which of the following is the Characteristics of good software? Transitional Operational b) a) Maintenance d) All of the above c) Which of the following word correctly summarized the importance of software design? Quality Complexity a) b) Efficiency Accuracy c) d) The context diagram is also known as Level-1 DFD Level-0 DFD a) b) Level-2 DFD d) All of the above c) is represented graphically by an arrow into or out of a process. Α Process b) Entity a) Flow Level d) C) White Box techniques are also classified as Structural testing a) Design based testing b) None of the mentioned Error guessing technique d) c)

Day & Date: Tuesday, 20-06-2023 Time: 09:00 AM To 11:00 AM

Seat

No.

Instructions:1) All questions are compulsory.

### Q.1 Choose the correct alternative.

1)

B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **COMPUTER SCIENCE (Paper – VII)** Software Engineering (19201410)

- 2)
- 3)

4)

5)

6)

7) In software maintenance removing errors spotted by users is known as .

d)

- Adaptive Corrective a) b)
- c) Perfective
- Functional testing is a 8)
  - Test design technique a)
  - c) SDLC Model

b) Test level

Preventive

d) Test type **SLR-QA-136** 

Set



Q.2	<ul> <li>Answer any four of the following.</li> <li>1) What is economic feasibility?</li> <li>2) What are the drawbacks of the spiral model?</li> <li>3) What is ERD?</li> <li>4) What is HIPO?</li> <li>5) Which are the various problems in SDLC?</li> <li>6) What is functional dependency?</li> </ul>	08
Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>1) Waterfall Model</li> <li>2) Operational Feasibility</li> <li>3) White box testing</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>1) Explain qualities of software in detail.</li> <li>2) Explain advantages and disadvantages of Decision Tables.</li> <li>3) Explain Interview technique in detail.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following</li> <li>1) Explain Prototyping in detail.</li> <li>2) Draw an ER and DFD diagram for college admission system.</li> </ul>	80

Seat No.	t	Set F	כ		
B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 CHEMISTRY (Paper - VIII) Apolytical & Industrial Inorganic Chemistry (19201408)					
Day a Time	Day & Date: Wednesday, 21-06-2023 Max. Marks: 40 Time: 09:00 AM To 11:00 AM				
Instr	Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Draw neat labelled diagram and give equations wherever necessary.				
Q.1	Q.1Choose the correct alternatives from the options.081)is essential for EDTA titration.				
		a) Acid b) Neutralization c) Unbuffering d) Buffering			
	2)	In Haber's process forward reaction is favoured by in temperature. a) increase b) decrease c) moderate d) None of these			
	3)	In Bessemer process, the hot blast of air is passed from of Bessemer converter. a) top b) bottom c) left side d) right side			
	4)	Al(OH)₃ is mostly precipitate. a) gelatinous b) crystalline c) amorphous d) curdy			
	5)	For phenolphthalein indicator when [HIn = In], colour of the indicator will be a) colourless b) pink c) intermediate d) either colourless or pink			
	6)	Haematite isa) a gangueb) a fluxc) a minerald) an ore			
	7)	The oxine is a chelating agent.a) unidentateb) bidentatec) tridentated) quadridentate			
	8)	The chief product of blast furnace isa) slagb) cementitec) pig irond) furnace gases			
Q.2	Ans a)	wers any four of the following.       0         Give the structural of Eriochrome Black T.	)8		

b)

- What is steel? Give its composition. Give pH of phenolphthalein and methyl red indicator. Define the terms metallurgy and slag. What are industrial heavy chemicals? C) d)
- e)

### Q.3 Write short notes on any two of the following.

- a) Nucleation
- **b)** Froth floatation process
- c) Ostwald's quinoid theory

### Q.4 Answers any two of the following.

- a) Draw a neat labelled diagram for manufacture of ammonia by Haber's process. Give effect of pressure and temperature on the yield of ammonia.
- **b)** Distinguish between co precipitation and post precipitation.
- c) Explain electrolytic reduction of copper.

### Q.5 Answers any one of the following.

- a) Discuss the conversion of cast iron into steel by L. D. process. Discuss advantages of L.D. process.
- **b)** Define neutralization curve. Explain choice of indicator for strong acid and strong base titration with the help of neutralization curve.

80

**08** 

Seat	
No.	

### B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **COMPUTER SCIENCE (Paper- VIII)** Database Management System (19201411)

Day & Date: Thursday, 22-06-2023 Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams must be drawn wherever necessary.
- 4) Use of log table and calculator is allowed.

### Q.1 Choose the correct alternative from the option. 1)

- The term \_\_\_\_\_ is used refer to a row.
  - Attribute Tuple a) b) Field d) Instance c)
- Which of the following cannot be used to modify the data in a database? 2)
  - delete b) update a)
  - d) insert drop c)

### 3) Which one of the following sorts rows in SQL?

- SORT BY b) ALIGN BY a)
- **GROUP BY** d) ORDER BY c)
- Which SQL function is used to find the average value of any column? 4)
  - b) Avg() Mean() a)
  - Average() d) Sum() c)
- In MySQL, which command is used to modify the table values. 5)
  - Select b) Update a)
  - d) Alter Modify c)
- 6) CROSS JOIN and JOIN are similar to
  - INNER JOIN a) b) d) CARTESIAN JOIN
  - OUTER JOIN c)

PL/SQL Variable needs to be declared in the 7)

- b) Declaration Section Variable Section Initialization Section
  - d) None of the above
- 8) Database locking concept is used to solve the problem of
  - Lost Update a)
  - Inconsistent Data c)

### Q.2 Answer any four of the following.

What is Database? a)

a)

c)

- b) What is Normalization?
- Explain 3 tier architecture. C)
- Define concurrency control. d)
- Explain key Constraints. e)
- What is Generalization? **f**)

- b) Uncommitted Dependency
- d) All of the above

NATURAL JOIN

**08** 

08

Max. Marks: 40

Set

Q.3	Write sh         a)       Cor         b)       E-F         c)       Rel	nort notes on any two of the following. mponents of DBMS R model lational Algebra operations	08
Q.4	Answer a) Wr b) Ex c) Wr	any Two of the following. hat are the advantages of DBMS? plain the Database Architecture. hat is Data model? Explain types of Data models.	08
Q.5	Answer a) Wh b) Wh	any one of the following. hat is transaction? Explain properties and states of transaction. hat is join? Explain types of join.	80
B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **PHYSICS (Paper - VII) Optics (19201434)** Dav & Date: Friday, 23-06-2023

Time: 09:00 AM To 11:00 AM

Seat No.

Instructions:1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic table and calculator is allowed.

#### Q.1 Select the correct alternative.

The relation between longitudinal magnification  $m_x$  and lateral magnification 1)  $m_{\nu}$  for an optical system is

,	•			
a)	$m_x = m_y^2$	I	b)	$m^2_x = m_y$
c)	$m_x = m_y$	(	d)	$m_x^3 = m_y$

2) In Fabry-Perot interferometer, the resultant amplitude is obtained by using of vector.

a)	Polygon	b)	triangle
c)	Parallelogram	d)	Conical

The two glass plates in Michelson's interferometer are inclined to the 3) incident beam direction at

a)	45°	b)	30°
c)	60°	d)	90°

4) By Rayleigh's criterion, the two spectral lines are said to be just resolved if the intensity at the dip is \_\_\_\_\_ times the intensity of either of the maxima.

a)	$\frac{8}{\pi^2}$	b)	$\frac{4}{\pi^2}$
c)	$\frac{\pi^2}{8}$	d)	$\frac{\pi^2}{4}$

5) For Negative crystal, except along the optic axis .

a)	Ve < Vo	b)	Ve = Vo = 0

- c) Ve > Vod) Ve = Vo = 1
- Those substances which rotate the plane of vibration of the polarized light 6) towards the right side are known as
  - b) a) laevorotatory optically active dextrorotatory d) none of above
  - c)
- 7) The basic principles of optical fibers is \_\_\_\_\_ a) interference b) total internal reflection
  - reflection d) refraction c)
- The refractive index of the core of graded index fiber varies about the axis 8) in
  - a) parabolic manner b) spherical manner
  - c) linearly d) cylindrical

**SLR-QA-139** 

Max. Marks: 40

### Q.2 Answer any four of the following.

- **1)** State Rayleigh's criterion for limit of resolution.
- 2) What is a Quarter wave plate?
- 3) Define 'numerical aperture'.
- 4) State any four advantages of optical fiber.
- 5) Calculate the thickness of half wave plate for sodium light of wavelength 5890 A° and refractive index  $\mu_0 = 1.54$ ,  $\mu_e = 1.55$
- 6) How F.P. interferometer is superior over Michelson's interferometer?

## Q.3 Write short notes on any two of the following.

- 1) Describe the construction and working of Nicol prism.
- 2) Write note on step index fiber.
- 3) Describe the construction and working of Michelson's interferometer.

## Q.4 Answer any Two of the following.

- **1)** Explain the rectilinear propagation of light on the basis of Fresnel's half period zone.
- 2) Explain application of Fabry-Perot interferometer for measurement of difference in wavelength.
- **3)** Obtain Newton's formula for a lens system.

# Q.5 Answer any one of the following.

- 1) Obtain an expression for equivalent focal length of two thin lenses separated by finite distance.
- 2) How Zone plate is prepared? Explain how a zone plate acts like a lens having multiple foci. Derive an expression for its focal length.

80

80

08

Seat No. B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **BIO-CHEMISTRY** (Paper - III) Nutrition and Metabolism (19201404) Day & Date: Saturday, 01-07-2023 Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
- 3) Figures to the right indicate full marks.

#### Multiple choice questions. Q.1

- During which condition, beta oxidation is stimulated? 1)
  - Well fed condition a)
  - Both d) None of the above c)
- Among blood buffers, the system is most important in regulating 2) blood pH.
  - a) bicarbonate
  - c) nitrate
- The electron transport chain and ATP synthesis system are situated on 3) the
  - a) nuclear envelope
  - c) inner mitochondrial membrane d)
- Extra heat production over calculated calorific value, after metabolism of 4) given food is the action. specific dynamic a)
  - b) energy assimilation
  - c) gastric reflux
- 5) The enzyme involved in renal regulation of pH is
  - ammonium oxidase a) b)
  - carbonic anhydrase d) c)
- The acts as an inhibitor of oxidative phosphorylation. 6)
  - oligomycin a) b) amytal c)
- BMR is elevated in 7)
  - a) under nutrition
  - Hypothyroidism C)
- What is the net gain through the beta oxidation of palmitic acid? 8) 130 ATP
  - 131 ATP a) c) 129 ATP
    - b) d) 132 ATP

**SLR-QA-140** 

Set

# Max. Marks: 40

08

- phosphate
- acetate

Starvation

- d)
- b)

b)

- - b) chromosomes
  - lysosomes

    - d) hunger induced

  - nitrate reductase
  - amino transferase
- - rotenone
  - d) antimycin
  - Starvation

  - d) Hyperthyroidism
  - b)

80

80

80

08

# Q.2 Answer any four of the following.1) Write the meaning of respiratory chain.

- 2) What are the functions of water?
- 3) Write the meaning of lipid metabolism.
- 4) What is pH regulation?
- 5) Define transamination, and deamination.
- 6) What are the sources of atoms in pyrimidine?

# Q.3 Write short notes on any two of the following.

- 1) Explain  $\beta$ -oxidation of palmitic acid.
- 2) Write the general reactions of amino acid metabolism.
- 3) Write note on production of acid and base by body.

# Q.4 Answer any Two of the following.

- 1) Explain components of respiratory chain.
- 2) What are the nutritional aspects of carbohydrates?
- 3) Write note on inhibitors of electron transport chain.

### Q.5 Answer any One of the following.

- 1) Write note on minerals in diet. Explain role of essential and non-essential fatty acids.
- 2) What is decarboxylation? Explain in detail Urea cycle.

				SL	.R-QA-1	41
Seat No.					Set	Ρ
	B	B.Sc.(Semester - IV) (CBC PLANT PRO Introduction to Weeds	S) Examin FECTION (I & non Inse	ation: March/April Paper - VII) ect Pests (1920143	-2023 57)	
Day & Time:	& Date : 09:00	e: Saturday, 01-07-2023 0 AM To 11:00 AM			Max. Marks	: 40
Instru	uctior	<b>1s:</b> 1) All questions are compuls 2) Figures to the right indica	sory. ite full marks.			
Q.1	Multi 1)	i <b>ple choice questions.</b> Weed seeds produce within o a) Binneal weeds c) Perenneal	ne season ar b) d)	e known as Annual weeds None of these		08
	2)	is a mesophytic weed a) Oscillatoria Sp. c) Cyperus Sp.	l. b) d)	Ulva Sp. Sargassum Sp.		
	3)	<ul><li>Argemone Mexicana weeds h</li><li>a) Leaves without spines</li><li>c) Prickles</li></ul>	as b) d)	Leaves with spines None of these		
	4)	Dustor used for a) Dusting solid particles c) Incubation	b) d)	Spraying Centrifugation		
	5)	Hoeing takes place by a) Vila c) Pins	 b) d)	Nails Khurapi		
	6)	<ul><li>Biological control of weeds tal</li><li>a) Jassids</li><li>c) Zygograma bicoloratae</li></ul>	kes place by b) b) d)	nsect Thrips None of these		
	7)	are used to control rat a) Sodium c) Calcium	attack. b) d)	Ammonium sulphate Barium sulphate		
	8)	are also used for mulcl a) Metals c) Sand	ning. b) d)	Metal strips Wheat straws		
Q.2	<b>Ansv</b> 1) 2) 3)	wer any four of the following. Give classification of weeds ba Enlist aquatic weeds. What are parasitic weeds?	ased on ecolo	gy.		08

- 4) Give in brief losses caused by birds.
  5) Use of Mira-71.
  6) What are snails?

# Q.3 Write short notes on the following (Any Two)

- 1) Losses caused by rats in storage and field.
- 2) Ploughing
- 3) 2-4 D

### Q.4 Answer the following (Any Two)

- 1) Management of weed Cynadon dactylon.
- 2) Explain the Parasitic weeds.
- 3) Write on biological method of management by insect.

### Q.5 Answer the following (Any One)

- 1) Give morphology, reproduction, ecology, dispersal and management of *Parthenium hysteroporus* weed.
- 2) Give morphology, reproduction, ecology, dispersal and management of *Euphorbia hirta*.

80

80

Day Time	& Da e: 09:0	: Sunday, 02-07-2023 Max. Marks: 40 AM To 11:00 AM
Instr	ructio	<ul> <li>s: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat labelled diagram and give equations wherever necessary.</li> <li>4) Use of log table and calculator is allowed.</li> </ul>
Q.1	Cho 1)	se the correct alternatives from the options.08The theory of matter waves was proposed bya) De Broglieb) Comptonc) Finsteind) Newton
	2)	Anamolous Zeeman effect produces when external magnetic field applied o spectral lines is a) Weak b) Strong
	3)	<ul> <li>a) Zero</li> <li>b) One half</li> <li>c) Two</li> <li>d) Infinite</li> <li>d) One</li> </ul>
	4)	The value of change in Compton wavelength $d\lambda =$ a) 24.20 AU b) 2.42 AU c) 0.0242 AU d) 0.242 AU
	5)	According to special theory of relativity the velocity of light in free spacea) increasesb) decreasesc) zerod) remains constant
	6)	n chain reaction if effective multiplication factor K=1, then the size and nass of core is a) Critical b) Supercritical c) Subcritical d) None of these
	7)	Navelength of matter wave is independent of

# B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **PHYSICS (Paper – VIII)** Modern Physics (19201435)

**SLR-QA-142** 

Set Ρ

- bace \_\_\_\_.
- and
- Wavelength of matter wave is independent of \_\_\_\_\_
  - a) Mass b) Momentum
  - d) Velocity c) Charge
- 8) The inertial frame of reference is \_\_\_\_\_ frame of reference.
  - a) accelerated b) unaccelerated c) rotating d) constant

Q.2	Answeight         a)       S         b)       S         c)       V         d)       V         e)       S         f)       D	ers any four of the following. State postulates of Eienstein's special theory of relativity. State any two hypothesis of matter waves. Vrite any one neutron induced reaction. Vhat is nuclear fission? State Pouli's exclusion principle. Define phase velocity and group velocity.	08
Q.3	<b>Write</b> a) W b) O c) W	<b>short notes on any two of the following.</b> /rite note on L-S and J-J coupling. btain Einstein's mass energy relation. /rite note on quantum numbers associated with vector atom model.	08
Q.4	Answa a) E b) E c) A B	<b>ers any two of the following.</b> Explain in short nuclear reactor with labelled diagram. Explain construction and working of Stern-Gerlach experiment. A body of mass 200 gm is moving with velocity of 10 m/s. Find its De- Broglie wavelength. (Given h = 6.62 x 10 <sup>-34</sup> JS)	08
Q.5	Answ a) E	ers any one of the following. Explain Michelson-Morley experiment and obtain the equation for fringe	08

a) Explain Michelson-Morley experiment and obtain the equation for fringe width.b) Obtain an expression for change in wavelength of scattered radiations.

### **BIO-CHEMISTRY (Paper - IV)** Molecular Biochemistry & Diseases (19201405) Day & Date: Monday, 03-07-2023 Time: 09:00 AM To 11:00 AM Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. Q.1 Multiple choice questions. 1) a) gp210 b) gp120 c) gp220 d) gp320 In genetic engineering experiment, restriction enzymes can be used for . 2) a) bacterial DNA only b) viral DNA only c) any DNA fragment

IgG molecule is formed from \_\_\_\_\_ polypeptide chains joined by disulphide 3) bonds.

- a) 2 b) 3
- c) 4 d) 5
- Aromatic hydrocarbon present in \_\_\_\_\_ cause lung cancer. 4)
  - alcohol b) cigarette a)
  - juice d) milk c)
- 5) Building blocks of nucleic acids are
  - a) Nucleotides b) Nucleosides c) Amino acids d) Histones
- 6) Pancreas secret hormone.
  - adrenaline b) insulin a) c) growth d) thyroxine
- antibody has ability of placental transfer. 7)
  - lgD b) IgE a) lgG d) IgA c)
- Insulin is made of \_\_\_\_\_ amino acids. 8) b) 41 a) 30
  - d) 21 c) 51

### Q.2 Answer any four of the following.

- Write the factors stimulating insulin secretion. 1)
- Write 2-3 applications of bioinformatics. 2)
- Explain the active site of enzyme. 3)
- What are hypoglycemic drugs? 4)
- Write the characteristics of tumor cells. 5)
- What is Operon concept? 6)

Seat No.

# B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023

3) Draw neat diagrams and give equations wherever necessary.

Glycoprotein \_\_\_\_\_\_ is used for detection of AIDS.

- d) Eukaryotic DNA only

Max. Marks: 40

08

Set

**08** 

# **SLR-QA-143**

### Page **2** of **2**

Q.3	Wri 1) 2) 3)	te short notes on any Two of the following. Write the derivation of Michaelis-Menten equation for single substrate. Illustrate Gene cloning technique with insulin gene cloning. Explain tumor markers- $\alpha$ -fetoprotein (AFP) in cancer.	08
Q.4	Ans 1) 2) 3)	swer any Two of the following. Write note on natural and acquired immunity. Explain immunological abnormalities in AIDS. What is retinopathy and cardiovascular disease.	08
Q.5	Ans 1) 2)	swer any One of the following. Explain Lock & key model and induced fit hypothesis. Explain replication of DNA. What is transcription in prokaryotes and translation in prokaryotes?	08

Seat	
No.	

# B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **PLANT PROTECTION (Paper – VIII)** Insect Pests and their Management (19201438)

Day & Date: Monday, 03-07-2023 Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams must be drawn wherever necessary.
- 4) Use of log table and calculator is allowed.
- Q.1 Rewrite the following sentences by choosing correct answer from the 08 given alternatives. A person who studies insects is an 1) a) Etymologist b) Entymologist
  - - Insectologist c)

#### 2) An Insecticides are classified on the basis of

- Mode of action a)
  - Mode of entry c)
- A chemical or physical source which induces insects to move towards is 3) called
  - a) Attractant
  - Chemosterilent d) Repellent c)
- 4) is an insect pest.
  - Red spider a)
    - c) Mite
- is the pest of stored grains. 5)
  - Stem borer b) Jassid a)
  - c) Pulse beetle d) Thrip

6) The Brinjal crop is generally affected by pest.

- Jassid b) Fruit borer a)
- Stem borer d) Pod borer c)
- 7) is used as contact poison obtained from Tobacco plant.
  - Pyrethrin b) Nimbin a)
  - Nimbidine c) d) Nicotine
- is the most serious pest of gram. 8)
  - Red spider a) b) Pod borer
  - Cut worm d) Stem borer c)

### Q.2 Answer any four of the following. (Any Four)

- Explain the mouth parts of pod borer. a)
- Write the damage caused by white grub. b)
- Write the marks of identification of Red Spider. C)
- Explain microbial insecticides. d)
- What are pheromones? e)
- Write the host range and damage caused by pulse beetle. **f**)



Set

d) Entomologist

- b) Chemical nature
- d) All of these
- b) Antifeedant

b) Snail

### d) Rat

Q.3	Writ a) b) c)	<b>e short note on any two of the following.</b> Effect of insecticides on respiratory and nervous system of insects. Rice weevil Losses caused by insect pests.	08
Q.4	Ans	wer any Two of the following.	08
	a)	Write an account of Jowar stem borer w.r.t scientific name, marks of identification and damage caused.	
	b)	Describe the principles of pest control.	
	C)	Describe the plant origin insecticides.	
Q.5	Ans a)	wer any one of the following. Write the general characters of typical insect with reference to mouth parts, types of legs and abdomen	08
	b)	Write an account of wooly aphid w.r.t marks of identification, life cycle and damage caused.	

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No.		
Seat		

## B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **STATISTICS (Paper - VII)** Probability Distributions - II (19201443)

Day & Date: Tuesday, 04-07-2023 Time: 09:00 AM To 11:00 AM

Instructions:1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
  - 3) Figures to the right indicate full marks.
  - 4) Use of logarithmic table and calculator is allowed.

### Q.1 Choose correct alternative from the option. 1)

- Uniform distribution is \_\_\_\_\_.
  - a) Symmetric b) Positively skewed Negatively skewed both b & c c) d)
- 2) Let the r. v. X have exponential distribution with parameter  $\theta$ , then mean of X is

b)

Mean > Median > Mode

None of these

- a)  $\theta^2$ b) θ d)  $1/\theta^2$ c)  $1/\theta$
- If X ~ N ( $\mu$ ,  $\sigma^2$ ), then \_\_\_\_\_ 3)
  - a) Mean = Median = Mode
    - c) Mean < Median < Mode d)
- 4) If  $X \sim G(4,3)$  then distribution of 2X is b) exp (2) a) G(2,3)
  - c) G(4, 3/2)G(4,2) d)
- If  $X \sim N(0, 1)$  then distribution of  $X^2$  is 5) Chi-square with n d. f. a) Chi-square with 1 d. f. b) c) Normal distribution None of these d)
- If  $X \sim \beta_I(m, n)$  distribution, then 1 X has 6) distribution. a)  $\beta_{II}(m,n)$  $\beta_{I}(n,m)$ b)
  - c)  $\beta_{II}(n,m)$ d) None of these

7) Third order central moment of student's t - distribution.

- a) n b) 1 c) 0 d) does not exists
- 8) If t ~  $t_n$  then distribution of  $t^2$  is distribution.
  - a)  $F_{1.n}$ b)  $F_{n1.n2}$
  - c) t<sub>n</sub> d) None of these

### Q.2 Attempt any four of the following.

- To find mean of U [a,b] distribution. 1)
- 2) State mean and variance  $N(\mu, \sigma^2)$  distribution.
- State additive property of gamma distribution. 3)
- Write definition of Snedecor's F- distribution. 4)
- 5) State m.g.f of N( $\mu$ ,  $\sigma^2$ ) distribution.

Set

**SLR-QA-145** 

Max. Marks: 40

**08** 

# 08

- Q.3 Attempt any Two of the following questions.
  - State and prove lack of memory property of exponential distribution.
     Find harmonic mean of beta distribution of first kind.
  - 3) Let  $X \sim N$  ( $\mu$ ,  $\sigma^2$ ) distribution, then find distribution of Y = aX + b

# Q.4 Attempt any Two of the following questions.

- 1) If  $X \sim \beta_{II}(m, n)$ , then find E(X).
- 2) Find mode of chi-square variate with n d.f.
- 3) Find m.g.f. of U[a, b] distribution

# Q.5 Attempt any One of the following questions.

- 1) If  $X \sim G(\alpha, \lambda_1)$  and  $Y \sim G(\alpha, \lambda_2)$  and X & Y are independent variates then find distribution of  $\frac{X}{X+Y}$
- 2) Derive the pdf of chi-square variate with n d.f.

80

#### Max. Marks: 40 2) Figures to the right indicate full marks. 3) Draw neat diagrams and give equations wherever necessary. 4) Use of logarithmic table and calculator is allowed. Choose the correct alternative and rewrite sentences. Surface pressure varies routinely from about mb to 1050 mb. 1) 950 b) 955 a) c) 960 d) 965 The last Tiros was launched in \_\_\_\_. 2) b) 1960 1965 a) 1970 1975 c) d) The term 'forecast' was first applied in meteorology by \_\_\_\_\_. 3) Miller Fitzrov a) b) Coriolis Trewartha c) d) Statistical method is used for \_\_\_\_\_ range forecasting of weather. 4) Medium shore b) a) d) Daily c) long 5) When the isobars are widely speed the pressure gradient is Moderate a) gentle b) Vertical c) steep d)

- 6) The primary purpose of clothing is to protect man against and improve him physiological compare.
  - humidity a) b) Temperature
    - wind d) Weather c)
- The heal island are formed due to additional of heal from automobile. 7)
  - a) hamlet b) Rural
  - urban d) Village c)

The grand bank is noted for hazard's to shipping due to and icebergs. 8)

- laze b) Fog a) c) mist d) Smog

### Q.2 Answer any four of the following.

- 1) Human body comfort.
- Define urban climate. 2)
- Define atmospheric pressure. 3)
- What is Coriolis effect? 4)
- What is heat island? 5)
- Short range weather forecasting. 6)

B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **METEOROLOGY** (Paper – III)

# Applied Climatology (19201431)

Day & Date: Wednesday, 05-07-2023 Time: 09:00 AM To 11:00 AM

Seat

No.

Instructions: 1) All questions are compulsory.

# Q.1

08

**SLR-QA-146** 

# Set

Q.3	Writ 1) 2) 3)	<b>te short notes on any two of the following.</b> State the importance of air operation in transportation. Give an account of atmospheric pressure. Explain rotational force.	08
Q.4	Writ 1) 2) 3)	<b>te notes on any two of the following.</b> Write on historical background of weather forecasting studies. Explain the importance of pressure gradient in atmosphere. Explain urban climate on body comfort.	08
Q.5	Ans 1) 2)	<b>wer any one of the following.</b> State the importance of air operations marine activates. Importance of weather in transportation.	08

	B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 GEO-CHEMISTRY (Paper – III)						
_	Principles of Geochemistry (19201419)						
Day a Time	& Date : 09:00	e: Wednesday, 05-07-2023 0 AM To 11:00 AM	Max. Marks: 40				
Instr	uctior	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat diagrams and give equation</li> </ul>	ns wherever necessary.				
Q.1	Mult 1)	ciple choice questions.The example of aliphatic compound isa) Naphthaleneb) Ec) Butaned) F	 Benzene Phenol				
	2)	In Van't Hoff isotherm, when the reactions a) $\Delta G > 0$ b) $\Delta G$ c) $\Delta G = 0$ d) $\Delta G$	on moves in backward direction. $\Delta G < 0$ $\Delta G$ is absent				
	3)	According to Bronsted- Lowery theory, Acid a) proton acceptor b) p c) electron pair donar d) e	l is proton donar electron pair acceptor				
	4)	When water is polluted by bacteria, viruses a) physiological b) p c) biological d) c	is known as pollution. physical chemical				
	5)	Chemical equilibrium is independent ofa) timeb) tc) pressured) c	 emperature concentration				
	6)	The purest form of Coal isa) sugarb) control	liamond lolomite				
	7)	The dehydration of skin of aquatic animals	due to increase of				
		a) COD b) E c) TDS d) T	3OD FSS				
	8)	According to Arrhenius theory, base is a su in water. a) OH <sup>-</sup> b) H c) H <sup>+</sup> d) (	bstance which gives ion 1 <sup>_</sup> 21 <sup>_</sup>				
Q.2	Ansv 1) 2) 3) 4)	wer the following questions. (any four) What is law of mass action? Write only types of organic reactions. What is BOD? What are acids and bases?	08				

- 5) Write on origin of coal.6) Write Van't Hoff isotherm equation.

Set P

Seat No.

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>1) Explain treatment on water pollutant by total dissolved solid (TDS).</li> <li>2) Write note on carbon compounds as reducing agents.</li> <li>3) Write note on hydrolysis of Na<sub>2</sub>CO<sub>3</sub>.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following questions.</li> <li>1) Write note on types of water pollution.</li> <li>2) Write note on organic materials in sediments.</li> <li>3) Write note on Le Chateliar's rule.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>1) What carbonate equilibrium? Explain changes in pressure and organic reactivity for acids and bases.</li> <li>2) What is chemical equilibrium? Explain with examples HCl, CO<sub>2</sub> in water and Calcium sulphate.</li> </ul>	08

No.			
	B.Sc. (Semester Funda	r – IV) (CBCS) Examin ZOOLOGY (Paper - mentals of Biochemis	ation: March/April-2 – VII) strv (19201446)
Day & Time:	& Date: Wednesday, 08 09:00 AM To 11:00 A	5-07-2023 M	ма <b>, (</b> тошот то,) М
Instru	u <b>ctions:</b> 1) All question 2) Figures to 3) Draw neat	ns are compulsory. the right indicate full marks diagrams and give equatio	s. ns wherever necessary.

Seat

### Q.1 Multiple choice Questions.

- Milk sugar contains \_\_\_\_\_. 1)
  - a) mannose b) Lactose d) Glucose
  - galactose c)
- 2) Building blocks of lipids are \_\_\_\_\_. a) amino acids
  - b) nucleotides c) fatty acids d) monosaccharaides
- 3) The simplest amino acid is \_\_\_\_\_.
  - a) proline b) methionine glycine d) serine c)
- 4) How many amino acids make up a protein?
  - 10 b) 20 a) 30 d) 40 c)
- 5) Globulins of the blood plasma are responsible for
  - a) Defence mechanism
  - oxygen transport osmotic balance c) d)
- Nucleoside is composed of \_\_\_\_\_. 6)
  - a) a base + a sugar
  - c) a base + a phosphate
- 7) Left hands DNA is \_\_\_\_.
  - a) A-DNA b)
    - c) C-DNA d)
- What is nature of enzyme \_\_\_\_\_. 8)
  - a) carbohydrates c) fatty acids

### Answer any four of the following. Q.2

- 1) Monosaccharaides
- Significance of lipid 2)
- Immunoglobulins 3)
- Purine and pyrimidine base 4)
- Properties of enzymes 5)
- Conjugated protein 6)

- b) a base + a sugar + phosphate
- d) none of these

blood clotting

- B- DNA
- Z- DNA
- b) fats

b)

d) protein

08

**SLR-QA-148** 

### Ρ Set ) Examination: March/April-2023

Max. Marks: 40

Q.3	Write 1) 2) 3)	<b>e short notes on any two of the following.</b> Explain plication of DNA. Describe classification of enzymes. Explain denaturation and renaturation of DNA.	80
Q.4	Ansv 1) 2) 3)	<b>ver any two of the following.</b> Describe transcription in prokaryotes. Explain biological significance of carbohydrates. Describe translation in prokaryotes.	80
Q.5	Ansv 1) 2)	<b>ver any one of the following.</b> Explain the structure of DNA. Describe the structure of RNA.	80

Seat No.						Set	Ρ
	В	.Sc. (Semest	er - IV) (CBCS) STATISTICS Applied Statis	Examin 6 (Paper	ation: March/April - VIII) 201444)	-2023	
Day & Time:	& Date 09:00	e: Thursday, 06- ) AM To 11:00 /	-07-2023 AM	51103 (13	201777)	Max. Marks	: 40
Instru	uction	<b>is:</b> 1) All questic 2) Figures to 3) Use of Ca	ns are compulsory. the right indicate fu lculator is allowed.	ull marks.			
Q.1	<b>Choo</b> 1)	bse the correct Long term fluc a) seasonal c) trend	a <b>lternative:</b> tuations in time seri	ies are ca b) d)	lled variations. cyclical irregular		08
	2)	In the theory o variation. a) trend c) seasonal	f time series, variati	ions due t b) d)	o COVID-19 are due to cyclical irregular	)	
	3)	Level of signifi a) Type I err c) Not comn	cance is the probat or nitting error	bility of b) d)	Type II error None of these		
	4)	Paired t- test is a) paired c) equal in n	applicable when thumber	he observa b) d)	ations in the two sampl uncorrelated a), b) and c)	es are	<u> </u>
	5)	For testing goo a) Normal c) t	odness of fit	_ test is us b) d)	ed. F Chi-square		
	6)	In India, the ch a) 20-24 yea c) 15-49 yea	ild bearing age is _ ars ars	 b) d)	13-48 years none of these		
	7)	For a continuo $P[ X - E(X)  \ge$ a) $V(X) < \infty$ c) both a) ar	us distribution Chelt $\geq C] \leq \frac{V(X)}{C^2}$ provided and b)	byscheve' I b) d)	s inequality can be stat $V(X) < C^2$ neither a) nor b)	ed as	
	8)	If Xi are iid N(C a) $\overline{X}$	),1) r.v.s., then limit	ing distrib b)	ution of Z = is N $\frac{\overline{X}}{\sqrt{n}}$	(0,1).	
		c) $\overline{X}\sqrt{n}$		d)	$\overline{X} + \sqrt{n}$		

Page 1 of 2

# **08**

80

- **08**

08

- Q.2 Answer any four of the following.
  - Define Alternative Hypothesis. 1)
  - 2) Define Type-I error.
  - 3) Explain Two-tailed test.
  - State Central limit theorem. 4)
  - Define CDR. 5)
  - 6) Define TFR.

### Q.3 Write short notes on any two of the following.

- Describe the procedure to test for testing population mean  $\mu = \mu_0$  based on 1) t- distribution.
- Describe the large sample test for testing the equality of means  $\mu_1 = \mu_2$ . 2)
- Define 'Time series' and give illustrations of time series from various fields. 3)

### Q.4 Answer any two of the following.

- 1) Define General Fertility Rate (GFR). Also state the merits and demerits of GFR.
- 2) Explain the test procedure for testing the goodness of fit.
- 3) For the distribution with pmf  $p(x) = 2^{-X} X = 1, 2, 3, ---$ ; prove that Chebycheve's inequality gives  $P(|X - 2| \le 2) \ge \frac{1}{2}$ , while the actual probability is  $\frac{15}{16}$ .

# Q.5 Answer any One of the following.

For the  $2 \times 2$  contingency table, prove that the chi-square test for 1) independence given

$$\chi^{2} = \frac{N(ad - bc)^{2}}{(a + c)(b + d)(a + b)(c + d)}$$

2) Explain the method of simple averages for obtaining indices of seasonal variations. Discuss its merits, demerits.

# B.Sc. (Semester - IV) (CBCS) Examination- March/April-2023 **METEOROLOGY** (Paper – IV) Meteorological Instruments (19201432) Day & Date: Friday, 07-07-2023 Time: 09:00 AM To 11:00 AM Instructions: 1) All questions are compulsory.

- 2) Draw neat diagrams and give equations wherever necessary.
  - 3) Figures to the right indicate full marks.
  - 4) Use of logarithmic table and calculator is allowed.

#### Q.1 Multiple choice questions.

Seat

No.

- While measuring rainfall it is assumed that the 1)
  - a) the rainfall is non-uniform over the given region or city.
  - b) the rainfall is uniform over the given region or city.
  - c) the rainfall is uniform over the given observatory.
  - d) the rainfall is uniform over the observatory only.
- Liquid-in-glass thermometer has \_\_\_\_ 2) a) wide range
- c) no range On the Fahrenheit scale, the interval between the lower and upper fixed 3)
  - points is divided into \_\_\_\_\_.
    - a) 50 equal parts c) 100 equal parts
- The lines joining places of equal \_\_\_\_\_ are called isobars. 4)
  - a) wind speed
  - c) pressure
- Aneroid barometer is used to measure 5)
  - a) Density of air
  - c) Atmospheric temperature
- 6) Air in motion is known as \_\_\_\_\_.
  - a) spinning
  - c) rotation

A force due to \_\_\_\_\_ brings air-mass in motion. 7)

- a) Velocity gradient
- c) Pressure gradient
- Heat stored in water vapor is \_\_\_\_\_. 8)
  - a) Specific heat
  - c) Absolute heat
- Answer any four of the following. Q.2
  - What is precipitation? a)
  - Differentiate between ordinary rain gauge and self-recording rain gauge. b)
  - A doctor measures body temperature of his Patient as 104°F. How much is C) patient's body temperature in °C?
  - What is a barometer? d)

- Set |
  - Max. Marks: 40

08

- b) Atmospheric pressure
- d) Humidity of fair
- b) wind
- d) revolution
- b) Rate of change of force
- d) Rate of change of displacement
- b) Latent heat
- d) Relative heat

- b) temperature
- d) humidity
- b) 90 equal parts d) 180 equal parts
- b) unlimited range d) limited range

**SLR-QA-150** 

	e) f)	What are advantages of anemograph over an anemometer? What is humidity?	
Q.3	Writ a) b) c)	<b>e short notes on any two of the following.</b> Draw neat diagram of mercury barometer. Draw neat labelled diagram of dry and wet bulb thermometer. What is thermocouple?	08
Q.4	Ans a) b) c)	wer any two of the following. Write a note on "The different temperature scale." With neat diagram explain construction and working of Thermograph. Draw neat labelled diagram of Aneriod barometer and describe its constructions and working.	08
Q.5	Ans a)	<b>wer any one of the following.</b> With neat diagram explain constructions and working of automatic siphon gauge.	08

**b)** With neat diagram explain constructions and working of cup anemometer.

Seat	
No.	

# B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 GEO-CHEMISTRY (Paper-IV) Chemistry of the Earth (19201420)

Day & Date: Friday, 07-07-2023 Time: 09:00 AM To 11:00 AM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

## Q.1 Multiple choice questions.

- 1) Which of the following statements is true about SMOG?
  - a) SMOG is derived from the fog
  - b) SMOG is derived from smoke
  - c) SMOG is derived from the water vapour
  - d) SMOG is derived from the fog and smoke.
- 2) Why is organic matter (humus) an important part of soil?
  - a) It helps to improve water infiltration
  - b) It can break down organic pollutants
  - c) It converts nitrogen in the air into nitrates used by plants
  - d) It is rich in nutrients, which is important for fertility
- 3) Ionic potential is:
  - a) Charge on the ions
  - c) Charge divided by radius
- 4) Which is the most stable mineral towards weathering?
  - a) Quartz c) Hornblende
- b) Feldspard) Olivine
- 5) The angle between the bonds joining the hydrogen nuclei to the center of the oxygen atom in a water molecule is:
  - a) 90° b) 96°
  - c) 105° d) 115°
- 6) \_\_\_\_\_ type of clay structure has one tetrahedral layer linked with one octahedral layer.
  - a) Smectite b) Montmorillonite
  - c) Kaolinite d) Soil
- 7) Which of the following is the application of isotopes.
  - a) Use of radiogenic isotopes as "clocks" to date the crystallization ages of rocks
  - b) Crystallization ages of meteorites
  - c) The formation and evolution of ancient continental crust
  - d) All the above
- 8) The transformation from parent rock to soil is generally accompanied by:
  - a) Decrease in Ca, Mg, Na and K and increase in Si
  - b) Increases in Ca, Mg, Na and K and decrease in Si
  - c) Much loss of Al and Fe
  - d) No change in parent composition

and hy plante



- b) Charge multiplied by radius
- d) Radius divided by charge

Max. Marks: 40

08

023

Set

Q.2	Ans a) b) c) d) e) f)	swer any four of the following. Define Secular changes. What is soil erosion? Write reaction of minerals for 'oxidation' type of chemical weathering. What is mean by geochronology? List of causes of water pollution. Name the types of chemical weathering.	08
Q.3	Wri a) b) c)	<b>te short notes on any two of the following.</b> Using Eh-pH diagram explain why permanganates are not stable in the geological environment. Explain in brief the characteristics of Montmorillonite clay mineral. Write note on Soil profile.	08
Q.4	Ans a) b) c)	<b>Swer any two of the following.</b> Write note on Hydrogen ion concentration. Explain in the brief carbon 14 method of dating. Discuss the geochemical cycle with neat labeled diagram.	08
Q.5	Ans a)	swer any one of the following. Define pollution. Explain in brief the types of air pollutions.	80

**b**) Describe the origin, classification, structural units and chemical composition of clay minerals.

<b>A</b>	B.S	Sc. (	(Semester - IV) (CBCS) Exa ZOOLOGY (P	amina Paper-	tion - March/April - 2023 -VIII)	•
Ar Day a Time	11 <b>ma</b> & Date : 09:00	Pn : Fri ) AN	iday, 07-07-2023 I To 11:00 AM	Coord	Max. Marks	<b>)</b> : 40
Instr	uctior	<b>is:</b> 1 2 3	<ol> <li>All questions are compulsory.</li> <li>Draw neat diagrams and give e</li> <li>Figures to the right indicate full</li> </ol>	quatio marks	ns wherever necessary.	
Q.1	Multi 1)	<b>ple</b> Gra a) c)	<b>choice questions.</b> affian follicle is a part of Kidney Lungs	b) d)	Ovary Stomach	08
	2)	a) c)	is a permanent steralisation s Vasectomy Tubectomy	urgery b) d)	meant for men. Hysterectomy IUD	
	3)	An a) b) c) d)	ode of Ranvier is The point of near contact betwee Characteristics of unmyelinated A constriction of the axon A nerve receptor	en the fibers	processes of two neurons	
	4)	ln _ a) c)	connective tissue the matri Areolar Muscular	x is tou b) d)	ugh. Adipose Skeletal	
	5)	The a) c)	e major constituent of enamel is a Collagen Phosphate	b) d)	 Sodium Calcium	
	6)	Hor of c a) c)	rmone is responsible for re child Oxytonic FSH	elaxatic b) d)	on of pelvic ligament during birth Progesterone Estrogen	
	7)	a) c)	ion is needed for muscle cont Na Ca	tractior b) d)	n. K Mg	
	8)	fun a) c)	is a group of similar kind of ce ction in the body. Cell Tissue	ells spe b) d)	ecialized to perform a particular Organ System	
Q.2	Ansv a)	<b>ver</b> a Type	<b>any four of the following.</b> es of muscles			08

- Epithelial tissue b)
- T.S of Stomach c)
- e)

Set P

Seat No.

- d)
- Androgens Role of pancreas

Q.3	Writ a) b) c)	<b>e short notes on any two of the following.</b> Structure of Neuron Types of blood cells Oral contraceptives	08
Q.4	Ans a) b) c)	<b>wer any two of the following.</b> Ultra structure of muscle fiber IVF Disorders of Thyroid	08
Q.5	Ans a) b)	<b>wer any one of the following.</b> Describe structure of synapse and Synaptic transmission. Give an account on Menstrual cycle.	08

Date 09:00	e: Saturday, 08-07-2023 0 AM To 11:00 AM	(	· · · · <b>/</b>	Max. Marl
uction	<b>ns:</b> 1) All questions are compulsory. 2) Figures to the right indicate full n	narks.		
Choc 1)	The solution of the differential equation a) $(y - 4x - c)(y - 3x - c) = 0$ c) $(y + 4x - c)(y - 3x - c) = 0$	of the on P <sup>2</sup> b) d)	following. + $P - 12 = 0$ is (y - 4x - c)(y + 3x - c)(y + 4x - c)(y + 3x - c)(y +	c) = 0 c) = 0
2)	The solution of the differential equation a) $y = cx - \sin^{-1} c$ c) $y = cx - \sin c$	on sin b) d)	(Px - y = P) is $y = cx + \sin^{-1} c$ $y = cx + \sin c$	
3)	If $2 + 2Px + Qx^2 = 0$ then the one solution $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = 0 \text{ is } y = \underline{\qquad}.$ a) $e^x$ c) $x$	b) d)	of the differential equation $e^{-x}$	lion.
4)	In solving the equation $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + QY = R$ by using change complete solution is given by $y = uv$ , a) $e^{\frac{1}{2}\int pdx}$ c) $e^{\int pdx}$	of de where b) d)	bendent variable method $e u = \$ $e^{-\frac{1}{2}\int pdx}$ $e^{-\int pdx}$	od, the
5)	A homogeneous linear differential equation with constant coevariable from x to z by the substitution a) $x = e^{-z}$ c) $z = e^{x}$	uation efficien n b) d)	can be transformed in the by using the indeper- $x = e^{z}$ $z = e^{-x}$	to a linear ndent
6)	The one solution of the equation $x \frac{d^2y}{dx^2} - (2x - 1)\frac{dy}{dx} + (x - 1)y = 0$ is a) $y = x$	b)	-· y = -x	

d)  $y = e^{-x}$ 

# Seat No.

## B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **MATHEMATICS** (Paper - VII) Differential Equations (19201428)

Day & Dat Time: 09:0

Q.1

7)

c)  $y = e^x$ 

b)

A differential equitation of the type

a) Simultaneous differential equation Total differential equation

c) Homogeneous linear equation d) Linear differential equation

(where P, Q, R are functions of x, y, z) are called as .

Pdx + Qdy + Rdz = 0

Instructio

**SLR-QA-153** 

Set P

Max. Marks: 40

b)  $x = c_1 y$ ,  $y = c_2 z$ d)  $x^2 - y^2 = c_1$ ,  $x + y = c_2$ 

8) The complete solution of the equation

$$\frac{dx}{x} = \frac{dy}{y} = \frac{dz}{z} \text{ is } \_\_\_.$$
  
a)  $xy = c_1, yz = c_2$ 

c) 
$$x + y = c_1, xy = c_2$$

- 1) Solve  $x^2p^2 + 3xyp + 2y^2 = 0$
- 2) Solve  $x^2 \frac{d^2 y}{dx^2} 4x \frac{dy}{dx} + 6y = 0$

3) Solve 
$$\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{zy}$$

- 4) Solve  $P^{2}(x^{2} a^{2}) 2xyp + (y^{2} + a^{4}) = 0$
- 5) Test for the integrability. yzdx + zxdy + xydz = 0
- 6) Solve  $\frac{xdx}{y^2z} = \frac{dy}{xz} = \frac{dz}{y^2}$

### Q.3 Answer any two of the following.

- 1) Solve  $y = 2Px + x^2P^4$
- 2) Explain the method of solving homogeneous linear equation.

$$x^{n}\frac{d^{n}y}{dx^{n}} + P_{1}x^{n-1}\frac{d^{n-1}y}{dx^{n-1}} + \dots + P_{n-1}x\frac{dy}{dx} + P_{n}y = X$$

(where  $P_1, P_2, \dots, P_n$  are constants and X is a function of x)

3) Solve 
$$\frac{dx}{x(y-z)} = \frac{dy}{y(z-x)} = \frac{dz}{z(x-y)}$$

### Q.4 Answer any two of the following.

- 1) Solve xy(y px) = x + py
- 2) Solve  $(x+1)^2 \frac{d^2y}{dx^2} + (x+1)\frac{dy}{dx} y = 2\log(x+1)$
- 3) Show that the necessary condition for integrability of the total differential equation Pdx + Qdy + Rdz = 0 is that

$$P\left(\frac{\partial Q}{\partial z} - \frac{\partial R}{\partial y}\right) + Q\left(\frac{\partial R}{\partial x} - \frac{\partial P}{\partial z}\right) + R\left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x}\right) = 0$$

### Q.5 Answer any One of the following.

1) Explain the method of solving the equation  $\frac{d^2y}{dx^2} + P \frac{dy}{dx} + QY = R$  by changing the dependent variable *y* to *V*. (where *P*, *Q*, *R* are the functions of *x* only)

2) i) Solve 
$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - 4y = x^2$$
  
ii) Solve  $\frac{dx}{dx} = \frac{dy}{dx} = \frac{dz}{dx}$ 

) Solve 
$$\frac{dx}{y^2} = \frac{dy}{x^2} = \frac{dz}{x^2 y^2 z^2}$$

08

08

08

		<ul><li>2) Figures to the right indicate fu</li><li>3) Draw neat diagrams and give</li></ul>	ll marl equat	ks. ions wherever necessary.
Q.1	<b>Multi</b> 1)	i <b>ple choice questions.</b> among the following is Da a) Rice c) Wheat	y neu b) d)	tral plant. Maize Cotton
	2)	Mass flow hypothesis was propose a) Candolle c) Both a & b	d by _ b) d)	 Munch Darwin
	3)	element is required for chlor a) Copper c) Cobalt	ophyll b) d)	synthesis. Magnesium Chlorine
	4)	In c3 pants is first stable compo a) OAA c) RUDP	ound. b) d)	PGAL PGA
	5)	is called as power house of ca a) Collenchyma c) Mitochondria	ell. b) d)	Ribosome Nucleus
	6)	Photorespiration takes place in a) Ribosome c) Cytoplasm	 b) d)	Chloroplast None
	7)	Translocation of organic solvents o a) Xylem c) Fibers	ccur tł b) d)	nrough Phloem none
	8)	Phytochrome exist in form. a) Pr c) Both a & b	b) d)	Pfr Pbr
Q.2	Ansv 1) 2)	<b>ver any four of the following.</b> Define Photorespiration. Draw Calvin cycle.		

# B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 BOTANÝ (Paper-VII) Plant Physiology (19201401)

Day & Date: Monday, 10-07-2023 Time: 09:00 AM To 11:00 AM

Seat

No.

Instructions: 1) All questions are compulsory.

- 3) Define vernalization.
- Draw well labelled structure of mitochondria. 4)
- Define light & dark reaction. 5)
- What is phloem transport? 6)

Set

Max. Marks: 40

Ρ

08

80

**SLR-QA-154** 

Q.3	Writ 1) 2) 3)	<b>e short notes on any two of following.</b> Describe mass flow hypothesis. Describe photosynthetic apparatus. Explain in brief process of vernalization.	08
Q.4	Ans <sup>•</sup> 1) 2) 3)	<b>wer any two of the following.</b> Write a note on Long Day Plant. Describe CAM pathway. Write a note on photosynthetic pigments.	08
Q.5	Ansv 1) 2)	<b>wer any one of the following.</b> Describe cyclic & non cyclic photophosphorylation. Explain in brief phloem loading & unloading.	08

Seat No.					Set	Ρ
	B.Sc. (Seme	ester - IV) (CBCS MATHEMAT Abstract Alge	) Exa ICS ( bra -	amination: March/Apri (Paper–VIII) - I (19201/29)	il-2023	
Day & Time:	Date: Tuesday, 1 09:00 AM To 11:0	1-07-2023 00 AM	ыа -	-1(13201-23)	Max. Marks	: 40
Instru	ctions: 1) All que 2) Figure	stions are compulso s to the right indicate	ry. e full n	narks		
Q.1	Choose correct 1) Which of th a) $< Z$ , + c) $< N$ , +	alternatives e following is not a g -> ->	roup. b) d)	< R, +> < C, +>		08
	2) The cycle o a) 1 c) 3	f length is cal	led tra b) d)	ansposition. 2 4		
	3) The value c a) [2] c) [3]	of the expression [2]	⊙ [4] b) d)	in Z <sub>5</sub> is [4] [5]		
	4) For Euler's a) 40 c) 42	$\emptyset$ function $\emptyset(41) = _{-}$	b) d)	41 39		
:	5) The numbe a) 1 c) 4	r of generators of the	e grou b) d)	p Z <sub>12</sub> is 2 11		
(	6) Every group a) Cyclic c) not cyc	o of order 11 is and abelian clic	b) d)	Cyclic but not abelian none of these		
-	7) A homomor a) into c) one-or	phic mapping from <i>f</i> ne	f:G→ b) d)	<i>G'</i> is epimorphic it <i>f</i> is onto both one-one onto		
8	8) Let $f: G \rightarrow G$ a) $\{x \in G$ c) $\{x \in G\}$	G' be homomorphism $ f(x) = e'\}$ $' f(x) = e\}$	n then b) d)	$ker f = \_$ $\{x \in G   f(x) = e\}$ $\{x \in G'   f(x) = x\}$		

#### Q.2 Solve any four of the following:

- Compute the product of cycles (1327) (486) that are permutations of a) {1,2,3,4,5,6,7,8}
- In a group *G* prove that  $(a^{-1})^{-1} = a$ b)
- Determine the night cosets of  $\langle [3] \rangle$  in  $Z_{12}$ C)
- Solve the equation (12)x = (123) in  $S_3$ d)
- Find order of element of a group  $\{i, -i, 1, -1\}$  under complex multiplication e)
- Show that intersection of any two normal subgroup is normal subgroup f)

# Q.3

- Answer any two of the following. 1) If  $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$  and  $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$  is  $S_4$ compute  $\alpha \circ \beta, \alpha^{-1} \circ \beta^{-1}, \beta \circ \alpha, \beta^{-1} \circ \alpha^{-1}$
- 2) Find the subgroups of  $Z_{12}$  also construct the subgroup lattice.
- show that the function  $f(R +) \rightarrow (R^+ \cdot)$  given by  $f(x) = e^x$  is an 3) isomorphism of group

#### Q.4 Answer any two of the following.

- Show that every subgroup of cyclic group is cyclic. 1)
- Find *gcd* of 616 and 427 and express (616, 427) = 616x + 427y2)
- If  $G = \{0, 1, 2, 3, 4, 5\}$  and  $+_6$  is addition modulo 6 is binary operation then 3) show that  $(G, +_6)$  is abelian group.

#### Q.5 Answer any one of the following.

- 1) State and prove Lagrange's theorem
- If  $f: G \to G'$  be onto homomorphism with K = kerf, then show that  $\frac{G}{K} \cong G'$ 2)

80

80

		EMBRYOLOGY OF ANGIOSPERMS (19201402)				
Day Time	& Da e: 09:	e: Wednesday, 12-07-2023 00 AM To 11:00 AM				
Instr	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat labelled diagram and give equations wherever r</li> </ul>				
Q.1	Cho	ose the correct alternatives from the options.				
	1)	The stamens are also known as				
		a) Anthers b) pollens c) Sporophylls d) microsporophyll				
	2)	The pollen tube of angiosperms contains				
		a) 1 - male gamete b) 2- male gametes				
		c) 3- male gametes d) 4- male gametes				
	3)	Ovule is attached to the placenta by a small stalk is called				
		a) Chalaza b) Raphe c) hilum d) Funiculus				
	4) Orthotropous ovule is type of ovule					
	-1)	a) Straight b) Inverted				
		c) Transverse d) Curved				
	5)	True endosperm is found in				
		a) gymnosperms b) Pteridophyte				
	•	c) Bryophytes d) anglosperms				
	6)	The dispersal of seeds in <i>Calatropis</i> occurred by				
		a) Wind b) Water c) Air d) Animal				
	7) ondespermis characterized by chaspes of free					
	• •	a) cellular b) nuclear				
		c) Helobial d) all of the above				
	The entry of pollen tube in ovule through micropyle is called					
	-,	a) Misogamy b) chalazogamy				

Q.2 Answers any four of the following.

a) Define flower.

Seat

No.

- Explain Circinotropous ovule. b)
- Define pollination with its types. C)
- Define megasporogenesis. d)
- What is endosperm? e)
- What is seed? f)

Set Ρ

# **SLR-QA-156**

Max. Marks: 40

08

necessary.

B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **BOTANY (Paper-VIII)** 

divisions.

- c) Porogamy
  - d) Syngamy

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Structure of tetrasporangiate anther</li> <li>b) Cellular endosperm</li> <li>c) Structure of dicot seed</li> </ul>	08				
Q.4	<ul> <li>Answers any two of the following.</li> <li>a) State the different agencies involved in pollination.</li> <li>b) Explain the different whorls of flower.</li> <li>c) Describe the development of bisporic embryo sac.</li> </ul>	08				
Q.5	<ul> <li>Answers any one of the following.</li> <li>a) Describe the mechanism of seed dispersal.</li> <li>b) Explain the flower as modified shoot with suitable examples.</li> </ul>	80				
Seat No.					Set	Ρ
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	B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 GEOGRAPHY (Paper-VII) Economic Geography (19201416)					
Day & Time:	& Date 09:00	– e: Thursday, 13-0 0 AM To 11:00 Al	7-2023 M	· • <b>y</b> ·	Max. Marks	s: 40
Instru	<ul> <li>Instructions: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat maps and diagrams wherever necessary.</li> <li>4) Use of maps stencil is allowed.</li> </ul>					
Q.1	Multi	iple choice ques	tions.			08
	1)	The national hig a) Agra with k c) Delhi with l	hway No.3 joins: (olkata ⁄lumbai	- b) d)	Delhi with Ahmedabad Agra with Mumbai	
	2)	GDP means a) Gross dom c) Gross daily	 estic product product	b) d)	Giga domestic product Gram domestic product	
	3)	is the large	est producer of cotto	n in th	e world accounting for about 22%	
		of the world cott a) America c) India	on production.	b) d)	China Pakistan	
	4)	World Fisheries communities act a) 21	Day is celebrated or oss the world.	י b)	_ November every year by fishing 11	
		c) 31		d)	41	
	5)	Economic geogr a) Natural c) Human	aphy is the subfield	of b) d)	_ geography. Physical None of these	
	6)	Electronic city lc a) Hyderabad c) Mumbai	cated in in	India. b) d)	Bangalore Kolkata	
	7)	Modes of transp a) Air & water c) Cable, Spa	ort include? ce & Pipelines	b) d)	Road & Rail All of these	
	8)	SEZ approvals ( a) 2000 c) 2010	granted under the SE	EZ Act b) d)	2005 2015	
Q.2	Ansv	wer any four of t	he following.			08
	a) b) c) d)	Concept of Econ Forestry Mining Secondary Activi	omic Geography			

f)

SLR-QA-157 Set P

#### Q.3 Write short notes on any Two of the following. Fishing a) Tertiary Activity b) C) SEZ Answer the any two of the following. Q.4 Explain the modes of transport & it's importance in Indian economy. a) Describes Vonthunen land use model. b) What is mean by Agriculture & Explain commercial agriculture pattern. C) Q.5 Answer any one of the following. Explain the Industrial Location Theory by Alfred Weber. a)

b) Define the Economic Geography & Explain the classification of economic activity.

#### 08

80

Seat No.		Set F	כ		
	B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 ELECTRONICS (Paper–VII) Operational Amplifier and Applications (19201413)				
Day 8 Time:	09:00	: Thursday, 13-07-2023 Max. Marks: 4 AM To 11:00 AM	0		
Instru	uction	<ul> <li>s: 1) All questions are compulsory.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic tables and calculator is allowed.</li> </ul>			
Q.1	Multi 1)	ple choice questions.0The common mode gain of the differential amplifier isa) unitya) unityb) zeroc) infinityd) finite	8		
	2)	<ul> <li>A differential amplifier can be used to amplify</li> <li>a) ac signals only</li> <li>b) dc signals only</li> <li>c) both ac and dc signals</li> <li>d) none of these</li> </ul>			
	3)	The input offset current is         a) Ib1-Ib2       b) (Ib1-Ib2)/2         c)  Ib1-Ib2        d) ( Ib1-Ib2 )/2			
	4)	Op-amp integrator can be used as filter. a) high pass b) low pass c) band pass d) band stop			
	5)	In case of zero crossing detector using Op-Amp hasreference voltage. a) +Vcc b) -Vcc c) zero volt d) one volt			
	6)	In phase shift oscillator, op-amp is used in mode. a) Inverting b) non-inverting c) differential d) voltage follower			
	7)	The closed loop gain in Wein bridge oscillator isa) 29b) >29c) 13d) 3			
	8)	Offset null pins provided to op-amp IC 741 are a) 2 and 3 b) 4 and 7 c) 1 and 5 d) 4 and 8			
Q.2	Ansv a) b)	<b>Ver any four of the following.</b> State the various types of differential amplifiers. Draw the equivalent circuit of op-amp.	18		

- C)
- d)
- e)
- Draw the circuit diagram of integrator using op-amp. Give any two applications of comparator. Draw the diagram of sawtooth oscillator with the help of op-amp. In case of differential amplifier, if CMRR=4000, Ac=0.3 determine Ad. f)

Q.3	Write a) b) c)	<b>e short notes on any Two of the following.</b> Emitter coupled differential amplifier Phase shift oscillator using op-amp Current to voltage converter using op-amp	08
Q.4	Ansv a) b) c)	<b>wer the any two of the following.</b> Explain Precision half wave rectifier using op-amp. Explain current mirror bias circuit. Draw the block diagram of op-amp and explain it.	08
Q.5	Ansv a) b)	<b>wer any one of the following.</b> Explain op-amp as monostable multi vibrator and obtain expression for pulse width. Explain voltage to current converter using op-amp.	08

	4) Use of logarithmic table and calculator is allowed.	
Sel 1)	ect correct one.The fossils are commonly used for the strata.a) Correlationb) Paleoclimatec) Fresh/marined) All of these	08
2)	The major units of the geological time are called a) Eras b) Periods c) Epoch d) Stage	
3)	is the recent period. a) Proterozoic b) Cambrian c) Ordovician d) Quaternary	
4)	Dharwar and Aravali Groups are in Era. a) Quaternary b) Tertiary c) Mesozoic d) Precambrian	
5)	The peninsular India lies to the of the plains of Indus and Gangariver system.a) Northb) Southc) Eastd) West	
6)	system is un fossiliferous. a) Archean b) Gondwana c) Carboniferous d) Creataceous	
7)	The majority of the Deccan trap flows are a) Granite b) Limestone c) Basalt d) Sandstone	
8)	Himalayan mountains were formed due to activity. a) Earthquake b) Volcanic c) Tectonic d) None of these	
Ans a) b) c)	swer any four of the following. What is lithostratigraohic correlation. Use of fossils in stratigraphy. What is chronostratigraphy?	08

Day & Date: Friday, 14-07-2023 Time: 09:00 AM To 11:00 AM

Seat

No.

Instructions: 1) All questions are compulsory.

2) Draw neat diagrams and give equations wherever necessary.

B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 **GEOLOGY** (Paper – VII) Stratigraphy (19201422)

#### Q.1

- Q.2
  - at is chronostratigraphy? C)
  - Name the Precambrian succession. d)
  - What is index fossil? e)
  - Name the rocks in cuddapah formation. f)

Page 1 of 2

**SLR-QA-160** 

Set Ρ

Max. Marks: 40

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Explain Dharwar formations.</li> <li>b) Write Geological Time Scale.</li> <li>c) Explain Triassic of spiti.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain classification of Delhi super group.</li> <li>b) Explain Cretaceous of Tiruchirapalli.</li> <li>c) Explain Deccan Volcanic province.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain physiographic divisions of India.</li> <li>b) Explain methods of Stratigraphic correlation.</li> </ul>	08

Page	<b>1</b> of	2

08

No.									001	
	B	S.Sc.	(Semeste Immunolo	r - IV) (CB MICROBIC ogy & Med	CS) Exami DLOGY (Pa ical Micro	nation aper – biolog	1: March/ VII) y (19201-	April-20: 425)	23	
Day o Time	& Dat : 09:0	te: Frid 00 AM	day, 14-07-2   To 11:00 A	2023 M				Max	. Marks	: 40
Instr	uctio	o <b>ns:</b> 1) 2 3 4	) All questior ) Draw neat ) Figures to ) Use of loga	ns are compu diagrams an the right indi- arithmic table	ulsory. Id give equat cate full mar e and calcula	ions wh ks. tor is all	erever nec lowed.	essary.		
Q.1	Mul 1)	tiple ( Whic a) c)	<b>Choice ques</b> th of the follo T cells Mast cells	stions. owing cells a	re involved i b) d)	n Cell m B cells All of t	ediated im s the above	munity?		08
	2)	Inter	ferons are a	ssociated wi	th Infe	ection.				

- a) Bacterial b) Viral d) Protozoal c) Fungal
- Kupffer cells are present in \_\_\_\_\_. 3) a) Stomach b) Liver
  - Lung d) Kidney c)
- How many types are antibodies are there? 4)
  - Two b) Three a) c) Four d) Five
- 5) Vaccination induces type of \_\_\_\_\_ Immunity.
  - a) Natural active b) Natural Passive
    - c) Artificial active d) artificial passive
- 6) Antibody is present in secretions?
  - lgG b) IgA a) lgD c)
    - d) IgM
- VDRL stands for \_\_\_\_\_. 7)

Seat

- a) Veneral disease research laboratory
- b) Video download and rearrangement laboratory
- various diseases research laboratory c)
- d) very distant research laboratory

#### After collection of blood what should be added to it to avoid coagulation? 8)

- b) Saline Heparin a)
- Buffer c) d) NaOH

#### Answer any four of the following. Q.2

- Acquired immunity- Definition and types. a)
- Define antigen. b)
- Define antibody. C)
- Define in flammation. d)
- Define agglutination e)
- What are the symptoms of dengue fever? f)

**SLR-QA-161** 

Set Ρ

Q.3	Writ a) b) c)	<b>e short notes on any two of the following.</b> Diagnosis of enteric fever. Mechanism of innate immunity. Immunoprecipitation.	08
Q.4	Ans a) b) c)	<b>wer any two of the following.</b> Elaborate complement fixation test with example. What are the factors affecting antigenicity? Explain in detail predisposing actors of candidiasis.	08
Q.5	Ans a) b)	<b>wer any one of the following.</b> Write a note on ELISA. Elaborate five classes of Imunoglobulins.	08

Seat No.		5	3et	Ρ
	E	B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 GEOGRAPHY (Paper – VIII) Environmental Geography (19201417)		
Day & Time:	& Dat : 09:0	te: Saturday, 15-07-2023 Max. M 00 AM To 11:00 AM	1arks	: 40
Instru	uctio	ons:1) All questions are compulsory. 2) Draw neat diagrams and give equations wherever necessary. 3) Figures to the right indicate full marks. 4) Use of Stencils is allowed.		
Q.1	Mult 1)	tiple choice questions: is responsible for air pollution.a) Chemical Fertilizersb) Industriesc) Cultural Functionsd) None of these		08
	2)	The term Environment means a) Region b) Land c) Surrounding d) Area		
	3)	The word Ecosystem was coined by a) Tansley b) Fosobarg c) Lindeman d) Park		
	4)	is responsible for soil pollution. a) Industries b) Transportation c) Chemical Fertilizers d) None of these		
	5)	Solar energy is used by plants to make food such process is known as a) Hydration b) Photosynthesis c) Oxidation d) None of these		_·
	6)	is most important organisms for an ecosystem. a) Herbivorous b) Carnivorous c) Green Plants d) Patozoa		
	7)	gas is responsible for global warming. a) Carbon dioxide b) Carbon monoxide c) Oxygen d) Nitrogen		
	8)	Marine life is in danger due to pollution. a) Air		
Q.2	Ans 1) 2) 3) 4) 5) 6)	wer any four of the following. What is environmental Geography? What is Ecosystem? What is food chain? What is Air Pollution? What is Soil Pollution? What is Global Warming?		08

# Set P

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Page 1 of 2

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>1) Acid Rain</li> <li>2) Desertification</li> <li>3) Importance of Environmental Geography</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>1) Scope of the Environmental Geography.</li> <li>2) Explain the Grassland Ecosystem.</li> <li>3) Explain the Climate Changes.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following</li> <li>1) What is Biome? Explain the types of Aquatic Biomes.</li> <li>2) What is Water Pollution? Explain the causes and effects of Water Pollutions.</li> </ul>	08

Seat		Set	Ρ
NO.			
	В	Sc. (Semester - IV) (CBCS) Examination: March/April-2023 ELECTRONICS (Paper – VII)	
		Digital Techniques and Microprocessor (19201414)	
Day & Time:	k Date 09:00	Saturday, 15-07-2023         Max. Marks: 4           AM To 11:00 AM         Max. Marks: 4	10
Instru	ctions	<ol> <li>All questions are compulsory.</li> <li>Draw neat diagrams and give equations wherever necessary.</li> <li>Figures to the right indicate full marks.</li> <li>Use of a logarithmic table and calculator is allowed.</li> </ol>	
Q.1	Multi	ble choice questions:	)8
	1)	The data storing capacity of memory chip 2764 is	
		c) $12 \text{ KB}$ d) $16 \text{ KB}$	
	2)	A 4-bit binary weighted DAC, if $1K\Omega$ resistor is connected at MSB position, then the resistor at LSB position is of	
		c) $4K\Omega$ d) $8K\Omega$	
	3)	interrupt has highest priority among all interrupts of 8085. a) RST 7.5 b) RST 6.5 c) TRAP d) RST 5.5	
	4)	CMA is an example of addressing mode. a) Implied b) Immediate c) Register d) Direct	
	5)	In absolute address decoding address lines are used for decoding purpose. a) only one unused b) all unused c) no d) all used	
	6)	instruction is a program control transfer group of instruction. a) RRC b) RRL c) RET d) XCHG	
	7)	The suitable clock frequency for 8085 microprocessors is a) 9 MHz b) 6 MHz c) 12 MHz d) 3 MHz	
	8)	The memory access capacity of 8085 microprocessor is a)  64 KB         b)  32 KB c)  16 KB           d)  8 KB	

#### Give the important features of memory IC 2764. 1) Define accuracy and resolution of DAC. 2) 3) State the roll of program counter. Write four salient features of 8085 processor. 4) 5) Write the name of ICs 74244 i) 74245 ii) iii) 74138 iv) 74373

#### Q.3 Write short notes on any two of the following.

- Semiconductor memories. 1)
- 2) 4-bit R-2R ladder network DAC.
- 3) Demultiplexing of the Address/Data bus.

#### Answer any two of the following. Q.4

- 1) What is flow chart? Draw three symbols with their meaning.
- 2) Determine the analog output for 4-bit R-2R ladder network DAC, if 0 = 0V and 1= 5 V for digital input
  - 1110 i)
  - 1010 ii)
- 3) Classify instruction set of 8085 according to the size of instruction with suitable example.

#### Answer any one of the following Q.5

- 1) What is addressing mode? With suitable example explain different types of addressing mode supported by 8085 processor.
- Draw the internal block diagram of 8085 processor and explain ALU, and Flag 2) register.

### Q.2 Answer any four of the following.

80

80

80

Seat		Set F	2			
	B	Sc. (Semester - IV) (CBCS) Examination: March/April-2023 GEOLOGY (Paper - VIII) Paleontology (19201423)				
Day 8 Time:	Day & Date: Sunday, 16-07-2023 Max. Marks: 40					
Instru	uction	<ul> <li>is: 1) All questions are compulsory.</li> <li>2) Draw neat and well labeled diagrams give wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> </ul>				
Q.1	Multi 1)	ple choice questions:0Fossils are helpful in exploration ofa) Natural oil depositsb) copper depositsc) ground waterd) miss deposits	8			
	2)	<ul> <li>a) Physical geology</li> <li>b) Paleontology</li> <li>c) Petrology</li> <li>d) Mica deposits</li> <li>e) Positive distribution is called as</li> <li>a) Stratigraphy</li> </ul>				
	3)	Which of the following suggest modes of preservation?a) Petrificationb) Mould & castsc) Carbonizationd) all of these				
	4)	Most important conditions of preservation of fossils area) presence of hard partsb) immediate burialc) dry climated) A + B				
	5)	Which process of formation of fossils involves molecule by moleculereplacement?a) Petrificationb) Mould & castsc) Carbonizationd) Imprints				
	6)	Conversion of buried plants in to coal by decay and decomposition is calleda) Petrificationb) Mould & castsc) Carbonizationd) all of these				
	7)	Remains of ancient organisms preserved in the rocks are called asa) Mineralsb) Dykec) Fossilsd) Crystals				
	8)	Species Nautilus belongs to Class.a) Gastropodb) Cephalopodac) Lamellibranchesd) none of these				
Q.2	Answ 1) 2) 3)	<b>ver any four of the following. 0</b> Define paleontology. Name the fossils of trilobites. Define suture line in fossil.	8			

5)

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- Conditions of fossilization **4**)
- Describe physa.

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>Petrification</li> <li>Cardium</li> <li>Goniatite and nautilus</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>1) Describe the Glossopteris and gangamopteris.</li> <li>2) Describe the echinoderms.</li> <li>3) Describe the gastropods.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>1) Describe uses of fossils.</li> <li>2) Describe mode of preservation of fossil.</li> </ul>	08

### Seat No.

#### B.Sc. (Semester - IV) (CBCS) Examination: March/April-2023 MICROBIOLOGY (PAPER–VIII) Industrial Microbiology (19201426)

Day & Date: Sunday, 16-07-2023

Time: 09:00 AM To 11:00 AM

**Instructions:**1) All questions are compulsory.

- 2) Draw neat diagrams give equations wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic table and calculator is allowed.
- (At. Wts.:H=1, C=12, O=16, N=14, Na=23, CI=35.5)

#### Q.1 Multiple choice questions:

1) During Penicillin fermentation temperature of the system is maintained at \_\_\_\_\_ for optimum production.

- a) Room temperature b) 26°C
- c) 36°C d) 46°C
- 2) \_\_\_\_\_ of the following carbohydrates is majorly present in whey.
  - a) Lactose b) Glucose
  - c) Fructose d) Mannose
- **3)** \_\_\_\_\_ is the main purpose of strain improvement.
  - a) To increase the productivity
  - b) Regulating the activity of the enzyme
  - c) To introduce new genetic properties
  - d) All of the above
- 4) The recovery of the fermentation products is also called as \_\_\_\_\_

b)

d)

- a) upstream processing
- c) right stream processing
- 5) Scale up means

6)

- a) Decreasing the scale of fermentation
- b) Increasing the scale of the fermentation
- c) Decreasing the rate of agitation
- d) Increasing the rate of agitation

#### \_\_\_\_\_ of the following is crystallization.

- a) Solid-solid separation b)
- c) Solid to gas separation d)
- 7) Full-form of ATCC is \_\_\_\_
  - a) American Type Culture Collection
  - b) Automatic Type Counter & Classifier
  - c) American Type Counter Collection
  - d) American Type Classifier and Collection

Max. Marks: 40

Solid to liquid separation

downstream processing

left stream processing



et P

	8)	<ul> <li>of the following method is not used in isolation and screening of desired microorganisms.</li> <li>a) Crowded plate technique</li> <li>b) Auxanographic technique</li> <li>c) Enrichment Culture technique</li> <li>d) Hanging Drop technique</li> </ul>	
Q.2	Ans	swer any four of the following.	08
	1)	Name of the organism used for penicillin fermentation.	
	2) 3)	Define SCP. Enlist industrially important organisms with their products	
	4)	What are the applications of Amylase?	
	5)	What are the advantages of continuous culture?	
	6)	Define strain improvement.	
Q.3	Wri	te short notes on any two of the following.	08
	1)	Write a short note on use of waste in fermentation media.	
	2) 3)	Draw and explain the design of typical bioreactor/Fermenter.	
	0,	erve list of various media components used in termentation.	
Q.4	Ans	swer any two of the following.	08
	1) 2)	Explain primary screening with one suitable example.	
	3)	Describe methods of preservation of Industrially important micro-organisms.	
• -	,		• •
Q.5	Ans	Swer any one of the following	08

- Describe the recovery procedure for penicillin rom fermented broth.
   Write in detail Industrial production of Alcohol by fermentation.

B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **ENGLISH** (Compulsory) Literary Mindscapes – I (19201500) Day & Date: Sunday, 02-07-2023 Time: 03:00 PM To 05:00 PM Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. Rewrite the sentence by filling the blanks with the correct answer from the given options. What did Jim sell to buy a gift for Della? 1) His motorbike

# Q.1

- b)
  - His old house a)
  - Wedding ring c)
- What did Phatik lose? 2)

#### Cycle a)

School text book c)

#### 3) The story 'The Homecoming' ends with

- Phatik's death from illness a)
- Phatik's birth in the hospital c)
- 4) What did the poet in 'The Solitary Reaper' carry in his heart? b) The boy's beauty
  - The beauty of the Tiger a)
  - The girl's song c)
- Who snatched the Queen's mirror in 'The Queen's Rival'? 5)
  - Her son a)
  - c) The King
- 6) What did the schoolmaster in the poem 'The Village Schoolmaster' love?
  - **Religious books** a)
  - Learning c)
- 7) The gate by the watchman.
  - had opened a)
    - c) opened
- It is not easy \_ the meeting. 8)
  - to get rid off a)
  - to send off c) d)

#### Q.2 Write answer in short. (Any 4 out of 6)

- Why was Della sad in the beginning of the story 'The Gift of the Magi'? 1)
- 2) How did Phatik feel arriving at the uncle's house?
- Describe the Reaper in the poem 'The Solitary Reaper'. 3)
- Why is the Queen unsatisfied in 'The Queen's Rival'? 4)
- 5) Describe the character of Schoolmaster in the poem 'The Village Schoolmaster'.
- Where did Della go to buy Jim's gift? 6)

- Max. Marks: 40
- No.

Seat



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**08** 

- Pocket
- d) Shoes
- b) Phatik's death in an accident
- d) Phatik's arriving to his village
- d) The necklace
  - b) Her daughter
  - The father d)
  - b) Debate
  - Gossiping d)
  - b) was opened
  - d) has opened
  - b) to tie up
    - to call off

12

Heirloom watch

- b)

d)

Q.3	Answer any One of following.				
	1)				
		OR			
	2)	Write a detailed note on learning and literacy skills.			
Q.4	Des	cribe in detail the four C's. in your own words.	10		

#### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **PHYSICS (Special Paper-IX)** Mathematical Physics & Statistical Physics (19201511) Day & Date: Monday, 03-07-2023 Time: 03:00 PM To 06:00 PM Instructions: 1) All questions are compulsory. 2) Draw neat diagrams wherever necessary. 3) Figures to right indicate full marks. 4) Use of log tables and calculator is allowed. Q.1 A) Select the correct alternative from the following. Integration of a vector along a curve is called \_\_\_\_\_ 1) a) volume integral closed integral b) c) line integral d) surface integral

2) The entropy has its maximum value for thermodynamic assembly in state.

a)	an equilibrium	b)	an inequillibrium
c)	a normal	d)	non homogeneous

#### Thermodynamics cannot be applied to \_\_\_\_\_ ensemble. 3)

- a) microcanonical canonical b)
- c) grand canonical d) microensemble
- The three coordinates of spherical polar coordinate system are \_\_\_\_\_. 4)

a) 
$$(x, y, z)$$
 b)  $(r, \theta, \phi)$ 

c) 
$$(r, \theta, z)$$
 d)  $(x, y, \phi)$ 

5) The most probable speed for the molecules in assembly on Maxwell Boltzmann distribution law is\_\_\_\_\_.

a)	$v_{mp} = $	$\frac{2KT}{m}$	b)	$v_{mp} = $	3KT 2m
c)	$v_{mp} = $	Kt 2m	d)	$v_{mp} = $	3Kt m

The ratio of most probable speed and average speed of gas molecule 6) is\_\_\_\_. h)  $\sqrt{\pi}$ 

a) 
$$\frac{\sqrt{\pi}}{2}$$
  
c) 1 d)  $\pi$   
The Bose-Einstein distribution law is

7) b)  $n_i = \frac{g_i}{\varepsilon^{\alpha} \varepsilon^{u_i/KT} - 1}$ a)  $n_i = \frac{g_i}{\varepsilon^{\alpha} \varepsilon^{u_i/KT} + 1}$ c)  $n_i = \frac{g_i}{\epsilon^{\alpha} \epsilon^{u_i/KT}}$ d)  $n_i = \frac{g_i}{\varepsilon^{\alpha}\varepsilon^{u_i}}$ 

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**SLR-QA-168** 

Seat No.

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Max. Marks: 80

				00				
		8)	Rayleigh-Jean's law agrees well with the experimental results atwavelengths.a) allb)longerc) shorterd)none of these					
		9)	<ul> <li>Fermi-Dirac distribution law is widely applied in the</li> <li>a) band theory of solids</li> <li>b) free electrons theory of metals</li> <li>c) Debye theory of specific heat</li> <li>d) classical theory</li> </ul>					
		10)	Fermi-Dirac statistics is based ona) equipartition of energyb)Pauli's exclusion principlec) Classical theoryd)Planck's theory					
	B)	<ul> <li>Fill in the blanks.</li> <li>1) The microstates which are allowed under given restriction are called</li> <li>2) In coordinate system the coordinate surfaces are mutually perpendicular.</li> <li>3) Maxwell Boltzmann distribution law for the most probable distribution of molecules is based on the following conditions.</li> <li>4) The energy of the highest filled quantum state in an atom is called</li> <li>5) What is the volume of cell in phase space is</li> <li>6) Which of the formula agrees well with the experimental results Lummer and Pringsheim for all the frequencies?</li> </ul>						
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	ye any State Defir i) ii) Wha For g Wha Write Dedu Write Dedu Write Defir Wha	<b>Fight of the following.</b> a Gauss divergence theorem with mathematical relation. The. Macrostate Microstate of a system at do you mean by an ensemble? given volume V find $\iint r. ds$ where $r$ is position vector. at is phase space? a Laplacian operator $\nabla^2$ in orthogonal curvilinear co-ordinates. Use Wien's displacement law from Planck's radiation formula. basic postulates of Fermi-Dirac statistics. The Microcanonical and Canonical ensembles. at are bosons? Which statistics is used to study them?	16				
Q.3	A)	<b>Atter</b> 1) 2) 3)	<b>mpt any Two of the following.</b> Describe Concept of orthogonal curvilinear coordinates. Obtain the relation for average speed of gas molecules. Define thermodynamic probability. Obtain an expression for thermodynamic probability	10				
	B) 1) 2)	<b>Ansv</b> Deriv Dedu	wer the following. (Any One) ve an expression for Maxwell-Boltzmann distribution law. uce the functional relation between entropy and Probability.	06				

### Q.4 A) Attempt any Two of the following.

- 1) Obtain the expression for curl of vector field in orthogonal curvilinear coordinates.
- 2) What are the thermodynamic functions? Express them in terms of Boltzmann partition function.
- 3) Compare M.B, B.E and F. D. statistics.

### B) Attempt any One of the following

- 1) If a black body at a temperature  $6174^{\circ}$ K emits  $4700A^{0}$  with maximum energy, calculate the temperature at which it will emit a wavelength of  $1.4 \times 10^{-5}$  m with maximum energy.
- 2) Deduce Green's theorem from Gauss Divergence theorem.

### Q.5 Attempt any Two of the following.

- a) Derive Plank's radiation formula in terms of frequency and wavelength.
- **b)** State and prove Stoke's theorem in vector field.
- **c)** Derive an expression for Fermi-Dirac distribution law.

80

08

Set

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### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 CHEMISTRY (Special Paper- IX) Physical Chemistry (19201506)

Day & Date: Monday, 03-07-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Use of logarithmic table/scientific calculator is allowed.
- 4) Neat diagrams must be drawn whenever necessary.

#### Q.1 A) Choose correct alternative and rewrite the sentence.

- 1) In case of one component system when all the three phases are in equilibrium, the system is \_\_\_\_\_.
  - a) Tri-variant b) Bi-variant
    - c) Uni-variant d) Non-variant

# 2) Only the light that is absorbed by the system is capable to produce the photochemical Change is known as \_\_\_\_\_ law.

- a) Einstein's equivalence b) Avogadro's
- c) Gtotthus-Draper d) Beer's

#### 3) For cell reaction to be spontaneous, the change in free energy is \_\_\_\_\_.

- a) positive b) zero
- c) negative d) both a and b
- 4) According to IUPAC nomenclature, double vertical line in the cell represents \_\_\_\_\_.
  - a) Direct contact b) Salt bridges
  - c) Mixed system d) All of these
- 5) In some photochemical reactions low quantum yield is obtained. It is due to \_\_\_\_\_.
  - a) Deactivation of reacting molecules
  - b) Occurrence of reverse primary molecules
  - c) Recombination of Dissociated fragments
  - d) All of these

6) The wavelength range 400 nm to 750 nm belongs to \_\_\_\_\_ region.

- a) UV b) visible
- c) IR d) All of these
- 7)  $Cu^{2+}/Cu_{(S)}$  represents \_\_\_\_\_ electrode.
  - a) amalgam b) metal-metal ion
  - c) metal insoluble salt d) oxidation-reduction
- 8) \_\_\_\_\_ equation is known as de Broglie equation.
  - a)  $\lambda = h/mv$ b)  $\lambda = h/mc$ c)  $\lambda = mvr$ d)  $\lambda = hv$
- 9) For a pure gas the degree of freedom is \_\_\_\_\_.
  - a) 3 b) 2 c) 1 d) 0

Max. Marks: 80

10

Ρ

sensitized reactions. f measurement in the determination of salt.	
ts characteristics.	06
I. ct.	08
rium? Explain with respect to ne?	
xplain with example of water system.	08
constant from cell emf? Calculate the e cell reaction in Daniel cell at 298 K	
n= -0.76 V and E° <sub>Cu</sub> = 0.34 V)	

		<ul> <li>Give one example of reversible cell.</li> <li>Give the representation of metal insoluble salt electrode.</li> <li>In photosynthesis process acts as photosensitizer.</li> <li>Black body is perfect absorber and emitter. (True/False)</li> </ul>						
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	<ul> <li>ve any Eight of the following.</li> <li>What do you mean by electrochemical series?</li> <li>Define the term cryohydric point.</li> <li>Explain amalgam electrode.</li> <li>What is luminescence?</li> <li>How emf of the cell is used to calculate Gibbs free energy change?</li> <li>What is polymorphism?</li> <li>What is mathematical equation for phase rule?</li> <li>What are thermal reactions?</li> <li>What is Heisenberg's uncertainty principle?</li> <li>Define the term photoelectron.</li> </ul>						
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>Write a note on Pattinson's process for desilverization of lead.</li> <li>Give a brief account on photosensitized reactions.</li> <li>Discuss the application of emf measurement in the determination of solubility of sparingly soluble salt.</li> </ul>	10					
	B)	Solve the following. What is photoelectric effect? Give its characteristics.	06					
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>Write a note on Compton Effect.</li> <li>What is photochemical equilibrium? Explain with respect to photodimerization of anthracene?</li> <li>Define the term triple point. Explain with example of water system.</li> </ul>	08					
	<ul> <li>B) Solve the following. How will you determine equilibrium constant from cell emf? Calculate value of equilibrium constant for the cell reaction in Daniel cell at 298 Zn(s) + Cu<sup>2+</sup> → Zn<sup>2+</sup> + Cu(s) (E°zn= -0.76 V and E°cu= 0.34 V)</li> </ul>		08					
Q.5	Atte a)	<b>pt any Two of the following.</b> Vhat are concentration cells? Explain in detail electrode concentration cell vith suitable example.	16					
	b)	State and explain the law of photochemical equivalence. What are the						

10) The dotted line in the phase diagram represents

b)

d)

Answer in short/Fill in the blanks/ One Word answer/True or False

Define congruent melting point in salt-water system.

In phase diagram of water system curves are invariant systems.

metastable

most stable

a) true

c) real

(True/False)

B)

1)

2)

- reasons for high and low quantum yield? C) What is transition temperature? Discuss in detail the application of phase
- rule to sulphur system.

**SLR-QA-169** 

equilibrium.

B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **BOTANY (Special Paper - IX)** Plant Systematics (19201501) Day & Date: Monday, 03-07-2023 Max. Marks: 80 Time: 03:00 PM To 06:00 PM **Instructions:** 1) All questions are compulsory. 2) Draw neat diagrams wherever necessary. 3) Figures to right indicate full marks. A) Rewrite the sentences bu choosing correct answer from the given 10 alternatives. On the basis of nutritional habit, the heterophytes are classified into . 1) a) Saprophytes b) Parasites d) All of these c) Insectivores Verticillaster inflorescence is characteristic of plant. 2) a) Sunflower b) Ficus c) Euphorbia d) Ocimum corolla is polypetalous irregular form of corolla. 3) a) Ligulate b) Tabular c) Cruciform d) Papilionaceous 4) Caryopsis type of fruit is found in crops. a) Maize b) Jowar c) Wheat All of these d) method of plant identification involved the comparism of plant 5) species with herbaria or herbarium. a) Indirect b) Easv c) Direct Moderate d) Herbaria are very important for the 6) a) General public b) **Research workers** c) Scientists d) All of these Monochlamydae in Bentham and Hooker's system includes \_\_\_\_\_ series. 7)

3 a) 8 b) c) 21 25 d)

8) The total number of recognized families in APG III system is .

a) 303 b) 415 c) 201 d) 457

Ochreate stipule is found in the family 9)

- a) Bignoniaceae b) Polygonaceae
- c) Orchidaceae d) Lamiaceae
- 10) Spathodea Companulata belongs to the family \_\_\_\_\_.
  - a) Annonaceae b) Poaceae
  - c) Bignoniaceae Rubiaceae d)

## **SLR-QA-170**

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No.	

Q.1

Page 2 of 2

### **SLR-QA-170**

06

		<ol> <li>Write the name of total root parasite.</li> <li>Write the symbol showing actinomorphic condition of flower in F.F.</li> <li>What is species?</li> <li>Name the place of Indian Botanical Garden.</li> <li>What is the full form of APG?</li> <li>What is the type of fruit in <i>Citrus</i>?</li> </ol>				
Q.2	<ol> <li>Solve any Eight of the following.</li> <li>Define habitat.</li> <li>Name the whorls of flower.</li> <li>Define simple fruit with 1 example.</li> <li>Explain synandrous condition of stamen.</li> <li>Write any two types of stipules with example.</li> <li>Name the steps in preparation of herbarium.</li> <li>Write the botanical names of any two plants of family - Annonaceae.</li> <li>Explain the Calyx of family Bignoniaceae.</li> <li>Write the systematic position of family Rubiaceae.</li> <li>Sketch the structure of Orchid flower with proper label.</li> </ol>					
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write distinguishing characters of family Nyctaginaceae.</li> <li>2) Write the principles of ICBN.</li> <li>3) Explain the forms of Polypetalous regular corolla.</li> </ul>	10			
	B)	Write short note on - "Importance of Botanical Gardens"	06			
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write the economic importance of the family Malvaceae.</li> <li>2) Explain any two modifications of tap roots with examples.</li> <li>3) Describe Binomial nomenclature of plants.</li> </ul>	08			
	B)	Describe any four types of Racemose Inflorescence with diagram.	08			
Q.5	Atte a)	empt any Two of the following. Describe underground modifications of stem. Describe Bentham and Hocker's system of classification	16			

- **b)** Describe Bentham and Hooker's system of classification.
- c) Describe the key features of Lead Botanical Garden.

B)

Answer in One sentence.

No.								Set	Ρ
	B.So	c. (S	emester -	V) (New) (C Zoology ( Molecular	BCS) Specia Biolog	Exar al Pa y (19	nination: March/Ap per- IX) 9201520)	ril-2023	
Day & Time:	Date 03:00	e: Moi 0 PM	nday, 03-07 To 06:00 P	-2023 M				Max. Marks	;: 80
Instru	ctior	<b>is:</b> 1) 2) 3)	All question Draw neat Figures to	ns are compuls diagrams whe right indicate f	sory. rever ne ull mark	ecessa s.	ary.		
Q.1	A)	<b>Cho</b> (1)	ose correc Which of th a) ATGC c) ABCG Who is kno	t <b>alternatives.</b> ne following is own as father o	DNA ma	ade o b) d) ular b	AUGC ADGC iology?		10
		-)	a) Mende c) Paulin	g	k k	) d)	Watson Crick		
		3)	Proteins a a) CHO c) nuclei	e made up of		b) d)	Amino acids fatty acids		
		4)	Which RN/ a) tRNA c) MRNA	A is involved ir	n ribosor	me? b) d)	rRNA SiRNA		
		5)	Which of th a) Transo c) RNA F	ne following do cription Processing	bes not t	ake p b) d)	art in gene expression? Replication Translation		
		6)	enz a) DNA F c) gyrase	yme seperates olymerase	s two str	ands b) d)	of DNA during replicatio Helicase topoisomersase	n.	
		7)	DNA replic a) Conse c) Semic	ation is rvative onservative	·	b) d)	dispersive intermediate		
		8)	Conversion a) Transl c) Replic	n of codons on ation ation	mRNA	into p b) d)	rotein is Transcription Repair		
		9)	Which of th a) AGG c) ACG	ne following is	start co	don _ b) d)	? AUG UAG		
		10)	Non coding a) exons c) solicor	g regions are c ns	alled	b) d)	introns recon		

Seat

	B)	Give One Word answer.1)Splicing2)SOS Mechanism3)Kornberg enzyme4)DNA ligase5)Pyramidine6)Exon	06
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	e any Eight of the following. miRNA Activator lac operon tRNA RNA interference R-DNA technology thymine dimer Photoexcision repair Ribosomes in prokaryotes promoter	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Give the structure of RNA polymerase and its role.</li> <li>2) Explain any two DNA repair mechanisms.</li> <li>3) Give the steps in rDNA technology.</li> </ul>	10
	B)	Write short note on structure of DNA.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe post transcriptional modifications.</li> <li>2) What is genetic code, Explain wobble hypothesis?</li> <li>3) Give salient features of DNA.</li> </ul>	08
	B)	Describe DNA replication in prokaryote.	08
Q.5	Atte a) b)	<b>mpt any Two of the following.</b> Describe translation in eukaryotes. Discuss the application of recombinant DNA technology in agriculture and health.	16

c) Describe regulation of gene expression in prokaryotes.

				SLR-QA-1	72					
Seat No.				Set	Ρ					
B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Special Paper - IX) Algebra – II (19201524)										
Day & Dat Time: 03:0	Day & Date: Monday, 03-07-2023 Max. Marks: 80 Time: 03:00 PM To 06:00 PM									
Instructio	<b>ns:</b> 1 2	) All questions are compulsory. ?) Figures to the right indicate full r	nark	З.						
Q.1 A)	<b>Cho</b> 1)	ose the correct alternatives from In the ring ( $\{0,1,2,3,4,5,6,\}, t_7, X_7$ ) a) 1 c) 3	<b>n the</b> , 4X <sub>7</sub> b) d)	<b>e options.</b> (-5) = 2 4	10					
	2)	The ring Z <sub>16</sub> is a) Not a ring c) Integral domain but not field	b) d)	Ring but not integral domain Field						
	3)	If <i>I</i> is an ideal of <i>R</i> and $1 \in I$ , the a) $I \subset R$ c) $I = R$	n b) d)	$R \subset I$ None of these						
	4)	$R = \{0,1,2,3,4\} \mod 5$ has charac a) 0 c) 3	terist b) d)	ic. 1 5						
	5)	If $W_1$ and $W_2$ are two subspaces $V(F)$ then dim $W_1$ + dim $W_2$ = a) dim $(W_1 \cup W_2)$ b) dim $(W_1 \cap W_2)$ c) dim $(W_1 + W_2)$ + dim $(W_1 \cap W_2)$ d) dim $(W_1 \cup W_2)$ + dim $(W_1 \cap W_2)$	of a f  V <sub>2</sub> ) V <sub>2</sub> )	inite dimensional vector spaces						
	6)	Let $u = (1, -1, 2), V = (0, 2, 1)$ . The a) 5 c) 1	en < b) d)	$\begin{array}{c} u, v >= \underline{\qquad} \\ 3 \\ 0 \end{array}$						
	7)	If the vectors $V_1 = (a_1, a_2)$ and $V_2$ dependent if a) $a_1b_2 - a_2b_1 = 0$ c) $a_1a_2 - b_1b_2 = 0$	b) d)	$(b_1, b_2)$ in $R^2(R)$ are linearly $a_1b_2 - a_2b_1 \neq 0$ $a_1a_2 - b_1b_2 \neq 0$						
	8)	Which of the following is not a field a) $\frac{z}{2z}$ c) $\frac{z}{5z}$	eld? b) d)	$\frac{z}{3z}$ $\frac{z}{4z}$						

Page 1 of 3

06

16

10

9) Let  $T: \mathbb{R}^3 \to \mathbb{R}^3$  be the linear transformation defined by T(x, y, z) = (x + y, y + z, z + x) for all  $(x, y, z) \in \mathbb{R}^3$ . Then nullity  $(T) = \_$ . a) 0 b) 1 c) 2 b) 1 c) 2 d) 3 10) The vector space  $M_{n \times n}(F)$  has dimension  $\_$ .

a) n b) n+1c)  $n^2$  d) n-1

#### B) Fill in the blanks with suitable answer.

- 1) Let *V* and *W* be vector spaces and let  $T: V \to W$  be linear. Then *T* is one to one iff N(T)=\_\_\_\_\_.
- If R is non zero integral domain then characteristic of R is either \_\_\_\_\_ or \_\_\_\_.
- 3) Let *V* be a vector space and let  $S_1 \subseteq S_2 \subseteq V$ . If  $S_1$  is linearly dependent then  $S_2$  is \_\_\_\_\_.
- 4) In the ring  $(\{0,1,2,3,4,5,6,\},+_7,X_7),3X_74 = \_$ .
- 5) Let V be an inner product space over F. then  $||x + y|| \le$ \_\_\_\_\_.
- 6) The vector space  $F^n$  has dimension = \_\_\_\_\_.

#### Q.2 Answer the followings (Any Eight):

- **a)** Prove that ||cx|| = |c| ||x||
- **b)** If  $f: R \to R^1$  is a ring homomorphism. Then prove that f(-a) = -f(a)
- c) Find the characteristic of each of the following ring
  - 1)  $Z_2 \times 2Z$
  - 2)  $Z_5 \times Z$
- d) Let  $T: \mathbb{R}^2 \to \mathbb{R}^3$  be a linear defined by  $T(x_1, x_2) = (x_1 x_2, x_2 x_1, -x_1)$ Show that *T* is one - one,
- e) Let  $T: \mathbb{R}^3 \to \mathbb{R}^3$  be a linear map defined by  $T(x_1, x_2, x_3) = (x_1, x_2, 0)$ . Find  $\mathbb{R}(T)$
- **f)** Prove that  $\langle x, cy \rangle = \bar{c} \langle x, y \rangle$
- **g)** Show that  $W = \{(x, 0, 0) : x \in R\}$  is subspace of the vector space  $R^3$
- **h)** Show that the set  $S = \{(1,2), (3,4)\}$  is linearly independent.
- i) Find all ideals of  $Z_{16}$
- j) Let  $u = (4 + 5i, 6i, 2, 0), V = (3 i, 1 + i, 0, 1 + 9i) \in C^4$ . Then find  $\langle u, v \rangle$ .

#### Q.3 A) Answer the followings (Any two):

1) Determine whether the following set is linearly dependent or linearly independent.

$$S = \left\{ \begin{bmatrix} 1 & -3 \\ -2 & 4 \end{bmatrix}, \begin{bmatrix} -2 & 6 \\ 4 & -8 \end{bmatrix} \right\} \text{ in } M_{2 \times 2}(R)$$

- 2) Prove that the intersection of two ideals is an ideal.
- 3) Show that the set  $S = \{(2,2,0), (2,-2,2), (-2,2,4)\}$  is an orthogonal set.
- B) Find the co-ordinate vector of V = (3,5,-2) relative to the basis of  $\{V_1 = (1,1,1), V_2 = (0,2,3), V_3 = (0,2,-1)\}$

#### Q.4 A) Answer the followings (Any two):

- 1) Show that  $S = \{0, 2, 4, 6, 8\}$  is a subring of  $Z_{10}$
- 2) Let *V* and *W* be vector spaces over field  $\overline{F}$  and let  $T, U: V \to W$  be linear transformation then prove that aT + U is linear transformation.
- 3) Let *V* be the vector space of polynomial with inner product given by  $\langle f,g \rangle = \int_0^1 f(t)g(t)dt$ . Let  $f(t) = t,g(t) = e^t$ , then find i) ||f|| ii) ||g||
- **B)** Let  $U: P_3(R) \to P_2(R)$  and  $T: P_2(R) \to P_3(R)$  be the linear transformations defined by  $U(f(x)) = f^1(x)$  and  $T(f(x)) = \int_0^x f(t) dt$ . Let  $\alpha$  and  $\beta$  be the standard ordered bases of  $P_3(R)$  and  $P_2(R)$ . Compute 1)  $[T]_{\beta}^{\alpha}$  2)  $[U]_{\alpha}^{\beta}$

#### Q.5 Answer the following (Any Two).

- a) State and prove Dimension Theorem.
- b) If  $Z_5 = \{0,1,2,3,4\}$  then prove that  $(Z_5, t_5, X_5)$  is a field.
- c) State and prove Cauchy-Schwarz Inequality.

#### 08

Seat						Set	Ρ
<u>но.</u> В.	Sc. (	Semest	」 er - V) (New) (CBCS) Ex	ami	nation: March/A	pril-2023	L
	-		STATISTICS (Specia	al Pa	per- IX)		
	Nata: N	Acadey 0	Statistical interence -	- 1 (1	9201528)	Max Marka	00
Time: 03	3:00 F	PM To 06:	00 PM			Max. Marks	. 00
Instruct	ions:	1) All que 2) Figure 3) Use o	estions are compulsory. es to the right indicate full ma f log table and calculators is a	rks. allow	ed.		
Q.1 A	() C	hoose th	e correct alternatives from	the c	options.		10
	1)	a)	ency of an estimator is relate Mean	a io _ b)	 Median		
		c)	Mode	d)	Variance		
	2)	) Likeli a) c)	hood function is a function of Sample only Either sample or parameter	b) d)	 Parameter only Sample and param	eter	
	3)	) Bias a) c)	of an estimator can be Positive Either positive or negative	 b) d)	Negative Always Zero		
	4)	) Whic a) c)	h one of the following is uniq Unbiased U.M.V.U.E.	ue es b) d)	stimator? Biased sufficient		
	5)	) Mom a) c)	ent estimators cannot be obt Laplace Cauchy	ained b) d)	l for distributio Lognormal Exponential	on.	
	6)	The e	estimator $\frac{\sum X_i}{\sum x_i}$ of population me	ean is	- 		
		a) c)	An Unbiased estimator both a and b	b) d)	An biased estimato None of these	r	
	7)	) An es a) b) c) d)	stimator is considered to be b Continuous Discrete Concentrated about the true Normal	oest if parar	f its distribution is meter value	·	
	8)	) Samı a) c)	ole variance is estimat Unbiased Both a) and b)	or of b) d)	population variance Consistent None of these		

Set P

- 9) If T is unbiased for  $\theta$  then  $\phi(T)$  is unbiased for  $\phi(\theta)$  if  $\phi$  is .
  - a) Linear Continuous b)
  - c) Onto d) One-to-one
- 10) The M.L.E. of Exponential distribution based a random sample of size n given by b) sample median

d)

 $X_{(1)}$ 

- sample mean a)
- C)  $X_{(n)}$

#### B) Fill in the blanks.

- An statistic is a function of \_\_\_\_ 1)
- Factorization theorem for sufficiency is known as . 2)
- 3) A statistic  $T = t(X_1, X_2, ..., X_n)$  is said to be sufficient for a parameter  $\theta$ , if the conditional distribution of  $X_1, X_2, \dots X_n$  given T = t is
- If statistic T is unbiased estimator of parameter  $\theta$  then unbiased 4) estimator of  $4\theta - 1$  is
- If an Estimator Tn of population parameter  $\theta$  converges in probability 5) to  $\theta$  an *n* tends to infinity is said to be
- 6) The denominator in the Crammer-Rao inequality is known as

#### Q.2 Answer the followings (Any Eight):

- Define a Parameter and give one example. a)
- b) Define sufficient estimator.
- State Neyman factorization theorem. C)
- Define likelihood function of a random variable  $X_1, X_2, \dots X_n$  from geometric d) distribution with parameter  $\theta$ .
- Prove that sample SD is always biased estimator of population SD. e)
- Define a biased estimator and unbiased estimator. f)
- Define information function  $I(\theta)$  of parameter  $\theta$ . **g**)
- State any two properties of Maximum Likelihood Estimator (MLE). h)
- What are the requirements of good estimator? i)
- Define sampling distribution of an estimator. j)

#### Q.3 A) Attempt any two of the following.

- Let  $X_1, X_2, \dots X_n$  be iid r.v. with Geometric distribution with parameter  $\theta$ 1) then find Sufficient statistic for  $\theta$ .
- 2) Obtain Fisher Information function  $I(\theta)$  based on a random sample  $X_1, X_2, \dots, X_n$  from exponential distribution with parameter  $\theta$ .
- Prove that two distinct unbiased estimators of  $\phi(\theta)$  give rise to 3) infinitely many Unbiased Estimators of  $\phi(\theta)$ .
- Let  $X_1, X_2, ..., X_n$  be a r.s. from  $N(\mu, \sigma^2)$  distribution. Find the estimators of  $\mu$ 06 B) and  $\sigma^2$  by the Method of moments.

10

06

#### Q.4 A) Attempt any two of the following.

- 1) Obtain the MLE of the parameter  $\theta$  based on a r.s. of size n from Bernoulli Distribution.
- 2) State and prove sufficient condition for consistency for  $\theta$ .
- 3) Find moment estimator of  $\theta$  if

Let  $X_1$  and  $X_2$  is a.r.s. from  $N(\mu, \sigma^2)$  distribution let  $T_1 = \frac{X_1 + X_2}{2}$ ,  $T_2 = \frac{X_1 + 2X_2}{3}$ 08 B) Show that  $T_1$  and  $T_2$  are unbiased estimator of  $\mu$  and also find the efficiency of  $T_2$  in relative to  $T_1$ .

 $f(x) = (1 + \theta)X^{\theta} ; 0 < X < 1$ 0; otherwise

#### Answer the following (Any Two). Q.5

a) Find MLE and Moment estimator of  $\theta$  based on a sample of size *n* from

$$f(x,\theta) = 1 \qquad \qquad \theta - \frac{1}{2} < x < \theta + \frac{1}{2} \\ 0 \qquad \qquad \text{otherwise}$$

- b) Define Uniformly Minimum Variance Unbiased Estimator (UMVUE) and show that it is unique when it exists.
- c) State and prove Crammer Rao Inequality.

16

E	8.Sc.	(Serr	neste	er - V) (New) (CBCS) Ex GEOLOGY (Special Economic Geology	kam   Pa (19	ination: March/April-2023 per- IX) 201534)	
Day Time	& Date : 03:0	e: Mon 0 PM <sup>-</sup>	nday, To 06	03-07-2023 :00 PM		Max. Marks	: 80
Instr	uctior	<b>15:</b> 1) 2) 3)	All qu Draw Figur	lestions are compulsory. neat labeled diagrams whe es to the right indicate full m	reve arks	r necessary. S.	
Q.1	A)	Multi 1)	i <b>ple c</b> Hydr intru calle	<b>hoice questions.</b> othermal deposits, which ar sive and within the temperat d	e foi ure	rmed at great depths, near the range of 300°c to 500°c is	10
			a) c)	Hypothermal deposits Epithermal deposits	b) d)	Mesothermal deposits Syngenetic deposits	
		2)	Supe a) c)	ergene sulphide enrichment Above the water table Near the ground surface	zon b) d)	e is found Below the water table In oxidizing zone	
		3)	The a) c)	process responsible for the concentration. Mechanical Magmatic	form b) d)	nation of placer deposits is Residual Chemical	
		4)	Dian a) c)	nond in kimberlite are good o Disseminated deposit Injected deposit	exan b) d)	nple of Segregated deposit Pegmatitic deposit	
		5)	Whic a) c)	ch of the following is the high Lignite Anthracite	nest b) d)	quality of coal? Peat Bituminous	
		6)	Inga a) c)	ldhal copper deposits in Kar Chitradurg Bababudhan	nata b) d)	ka belongs to formation. Peninsular gneissic complex Sargur group	
		7)	The a) c)	placer deposits along the cc Gold Rutile	basta b) d)	al tract of Maharashtra is Zircon Ilmenite	
		8)	Mosi a) c)	t of the contact metasomatic Batholiths Dyke	dep b) d)	oosits are associated with Sill Laccolith	÷
		9)	The a) c)	surficial indicator of the hidd host rock ore mineral	en c b) d)	ore deposit is gossan gauge mineral	

Set Ρ

		<ul> <li>10) Residual liquid segregation deposits are deposits.</li> <li>a) Exogenetic</li> <li>b) Metasomatic</li> <li>c) Late magmatic concentration</li> <li>d) Residual</li> </ul>	
	B)	<ul> <li>Answer the following.</li> <li>1) What is skarn?</li> <li>2) What type of deposits the aluminium rich Bauxite is?</li> <li>3) What do you mean by Syngenetic?</li> <li>4) What are Gangue minerals?</li> <li>5) What is Magmatic segregation?</li> <li>6) Explain the reservoir rock in one sentence.</li> </ul>	06
Q.2	Ansv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	ver any Eight of the following. Define Epigenetic ore deposits. Name two endogenous deposits associated with folded regions. Name two ore deposits formed by metamorphism. Define Alloy. Give any two Indian examples of hydrothermal ore deposits. Name the types of Magmatic deposits. Name the ore minerals of copper metal. Define the term Tenor of ores. What are fossil fuels? Give essential conditions for formation of placer deposits.	16
Q.3	A)	<ul> <li>Attempt any Two of the following:</li> <li>1) What is Magmatic concentration? Explain late magmatic concentration deposits.</li> <li>2) Discuss the occurrence and distribution of manganese deposits of India.</li> <li>3) Explain in brief contact metasomatic deposits with suitable example.</li> </ul>	10
	B)	Write short note on mechanical concentration of ore deposits.	06
Q.4	A)	<ul> <li>Attempt any Two of the following:</li> <li>1) Explain the oxidation and supergene enrichment processes of ore deposit with Indian example.</li> <li>2) Discuss the origin and distribution of copper deposits of India.</li> <li>3) Explain the concept and need of conservation of minerals, give examples.</li> </ul>	08
	B)	Explain in brief the formation of mineral deposits by sedimentation processes.	08
Q.5	Atter a) [ b) [	<b>npt any Two of the following:</b> Describe in brief the origin and classification of the coal deposits. Discuss the distribution of petroliferous basins of India	16

b) Discuss the distribution of petroliferous basins of India.c) Discuss any four cavity filling hydrothermal deposits.

I	B.Sc	:. (Se	emester - V) (New) (CBCS) Examination: March/April-2023 MICROBIOLOGY ( Special Paper- IX ) Virology (19201539)	
Day & Time:	& Dat 03:0	e: Moi 0 PM	nday, 03-07-2023 Max. Marks: 8 To 06:00 PM	30
Instru	uctio	ns: 1) 2) 3)	) All questions are compulsory. ) Draw neat labeled diagrams whenever necessary. ) Figures to right indicate full marks.	
Q.1	A)	Mult 1)	iple Choice Questions.1is not a characteristic of virus.is not a characteristic of virus.a) They are obligate intracellular parasiteb) They require only living mediac) They contain Both DNA and RNAd) They are connecting link between living and non-living	10
		2)	The virus which has double stranded RNA is a) Bunyavirus b) Reovirus c) Calcivirus d) Rhabdovirus	
		3)	<ul> <li>The basic structural unit of capsid is called as</li> <li>a) Peplomer</li> <li>b) Capsomer</li> <li>c) Nucleocapsid</li> <li>d) 20 triangular faces, 30 edges and 12 Corners</li> </ul>	
		4)	<ul> <li>The distinguishing feature of T even coliphages from T odd coliphages is</li> <li>a) T even coliphages contains contractile sheath</li> <li>b) T even coliphages contain 5-hydroxymethyl cytosine</li> <li>c) T odd coliphages are complex capsid or Binal symmetry</li> <li>d) Both a and b</li> </ul>	
		5)	During reproduction (In Attachment process) of T4 bacteriophage are required for unfolding of tail fibers.a) Tryptophanb) N formyl Methioninec) Mg** and Ca** ionsd) Both a and c	
		6)	Terminal protein of 55k is attached to the 5' end of the DNA ofvirusa) Influenzab) Adenovirusc) Poliod) Pox	
		7)	Antigenic Shift and drift mechanism is occurs in Virus a) Polyoma b) SV40 c) Influenza d) Adeno	
		8)	is the property of oncogenic cell. a) Angiogenesis b) Reduced serum requirement c) Loss of Contact Inhibition d) All of the above	

# **SLR-QA-175** Set P

Seat No.
		9)	Viruses can be purified through precipitation with a) Polyethylene Glycol b) Cesium Acetate c) Sucrose d) Silica gel	
		10)	<ul> <li>is not a method of control of plant virus disease.</li> <li>a) Removal of Source of Infection</li> <li>b) Use of Virus free vegetative stock or disease resistance crop varieties</li> <li>c) Use of Antibacterial Chemicals</li> <li>d) Modified planting and harvesting procedures</li> </ul>	
	B)	Fill if 1) 2) 3) 4) 5) 6)	n the blanks. In Virus Enumeration, PFU stands for Infectious Protein particles are called as In Lambda phage reproductive cycle gene carry out excision and integration of phage DNA into bacterial chromosome. Tumor in which tissue cells do not invade surrounding tissues and remain localized as a compact mass is called as Family name of viruses have suffix In cultivation of coliphage, Chloroform treatment is given for	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	Ve any Write ICTV Write Draw Antigo Write Desco Write Differ	<ul> <li>y eight of the following.</li> <li>in short about general properties of the virus.</li> <li>i (International committee) system of virus classification.</li> <li>in short about general characters of viroid.</li> <li>y neat labeled diagram of HIV virus.</li> <li>enic shift and drift process.</li> <li>in short about Pock assay.</li> <li>ribe in short about general characters of the prions.</li> <li>in short about LHT system of Viral Classification.</li> <li>in short about Symptoms of the cauliflower mosaic disease.</li> </ul>	16
Q.3	A)	Atten 1) [ 2) [ v 3) V	<b>npt any Two of the following.</b> Describe in detail about one step growth experiment. Define oncogenic virus and explain in detail about types of oncogenic <i>v</i> irus. Write in detail about techniques used for isolation of animal virus.	10
	B)	Desc	ribe in short about Lytic cycle of T4 Bacteriophage.	06
Q.4	A)	Atten 1) V 2) V 3) V	<b>mpt any two of the following.</b> Write in short about structure of TMV, and symptoms for Mosaic Disease of Tobacco. Write in short about structure of Adeno virus. Write in short about characteristics of the cancerous cell.	08
	B)	Defin	e cancer and write in detail about hypothesis of cancer.	80
Q.5	Atte a) b)	mpt a Desc Write	any two of the following. The in detail about the purification techniques for viruses. In detail about the prevention and control of plant viral diseases.	16

c) Define temperate phage and write in detail about the lysogenic cycle of Lambda Phage.

Page	1	of	2

110.		
	B.Sc. (S Lii	emester - V) (New) (CBCS) Examination: March/April-2023 ELECTRONICS (Special Paper- IX) near Integrated Circuits and Applications (19201548)
Day Time	& Date: M e: 03:00 PN	onday, 03-07-2023 Max. Marks: 80 M To 6:00 PM
Insti	ructions:	1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary. 3) Figures to the right indicate full marks. 4) Use of log table and calculators is allowed.
Q.1	A) Ch 1)	ose correct alternative and rewrite the sentence.10 process is use for growing a single crystal silicon structure10upon an original silicon substrate.10a) Oxidationb) Lithographyc) Ion Implantationd) Epitaxial
	2)	a) tunnel diode b) varicap c) precision diode d) photo diode
	3)	Another name for the all-pass filter is a) notch filter b) delay filter c) band stop filter d) band pass filter
	4)	LM 317 is a voltage regulator IC. a) adjustable positive b) fixed positive c) adjustable negative d) fixed negative
	5)	When PLL is locked, VCO frequency the input frequency. a) more than b) less than c) equal to d) less than or equal to
	6)	If the control voltage to a VCO increases, the output frequency is a) decreases b) increases c) remain same d) none of these
	7)	In an IC regulator is used to increase the current capacity of the regulator. a) reference voltage source b) protection circuits c) error amplifier d) pass transistor
	8)	In filter the minimum attenuation is occur at the center frequency. a) wide band stop b) wide band pass c) narrow band pass d) high pass
	9)	circuit is used to add a desired dc level to the output voltage.

d) S/H c) Clamper

Seat No.

Set P

		<ul> <li>An integrated circuit offers</li> <li>a) low power consumption b)</li> <li>c) high speed d)</li> </ul>	improved performance all of these
	В)	<ul> <li>Define the following terms.</li> <li>1) Monolithic IC</li> <li>2) Precision rectifier</li> <li>3) Cut off frequency of filter</li> <li>4) Line regulation</li> <li>5) Low pass filter</li> <li>6) VCO</li> </ul>	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	Ye any Eight of the following. State the disadvantages of an integrated circ Define active peak detector. Define center frequency of band pass filter. Write the important features of the three term Draw the circuit diagram of PLL as frequency Calculate the value of IC resistance having sl and has aspect ratio L:W=20:1. Draw the diagram of sample and hold circuit. State the advantages of active filters. Calculate cut off frequency of second order h R1 = R2 = 1 K $\Omega$ and C1 = C2 = 0.1 $\mu$ F. Draw the basic block diagram IC regulator.	uit. inal regulators. demodulator. heet resistance of 200 $\Omega$ / sq. igh pass filter if
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain fabrication process of monolithic</li> <li>2) Explain working of positive clipper.</li> <li>3) Explain second order Butterworth Low page</li> </ul>	10 capacitor.
	B)	Explain basic operation of voltage-controlled	oscillator. 06
Q.4	A) B)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain working of adjustable positive reg</li> <li>2) Explain working of PLL as a frequency m</li> <li>3) Explain working of antilog amplifier.</li> <li>Explain working of PLL with its transfer characterized</li> </ul>	08gulator.nultiplier.acteristics.08
Q.5	Atte	mpt any Two of the following.	16 M 221
	a)	Explain working F to v converter by using ICI	

- b) Give the classification of filter and explain wide band pass filter.c) Explain in brief the steps involved in the fabrication of IC.

Seat	
No.	

### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **COMPUTER SCIENCE (Special Paper-IX)** Visual Programming Using C# (19201543)

Day & Date: Monday, 03-07-2023 Time: 03:00 PM To 06:00 PM

<b>nstructions:</b> 1) All questions are compulsory.
--

- 2) Draw neat labeled diagrams wherever necessary.
- 3) Figures to right indicate full marks.
- 4) Use of log table and calculator is allowed.

#### Multiple choice questions. Q.1 A)

c)

- The is not types of access modifiers in C#. 1)
  - internal protect b) external protect a)
    - Internal Protect c) d)
- An Event has as default return type. 2)
  - Strina Integer a) b) Double
    - No return type for events d)
- What is the Difference between Convert.ToInt32 and Int.Parse? 3)
  - Both are Same a)
  - b) Convert.ToInt32 Can't Handle Null Values
  - Int.Parse Can't Handle Null values c)
  - Both can Handle Null Values d)

If you don't want to override the method then 4) keyword is used.

- Final a) b) Sealed
- c) Constant d) Virtual
- Defining two methods with the same name but with different parameters 5) are called as
  - a) Overloading Static
- Overriding b) d) Virtual
- A delegate defines 6)

c)

- a means of passing arrays into methods a)
- a class that encapsulates methods b)
- a substitute for an inherited method c)
- d) None of these
- 7) Every class directly or indirectly extends from the class.
  - a) System b) Object
  - Drawing c) d) Console
- Exception objects are derived from the class. 8)
  - Exception a) b) Error
  - Event c) d) System
- 9) In C# Thread.Sleep(time) measures time in
  - Milliseconds Seconds a) b)
  - c) Nanoseconds d) Minutes

**SLR-QA-177** 

Set

Max. Marks: 80

- **10)** The \_\_\_\_\_ classes provide the operation of reading from and writing to the console in C#.NET.
  - a) System.InOutput
- b) System.Array
- c) System.ReadLine
- d) System.Console
- n.ReadLine d)

16

10

08

16

- B) Fill in the blanks.
  - 1) In windows application, SDI stands for \_\_\_\_
  - 2) The \_\_\_\_\_ number of input methods defined by the stream method Console.In in C#.NET.
  - 3) The \_\_\_\_\_ keyword is used to refer parent class constructor to child class constructor.
  - 4) The \_\_\_\_\_ modifier is used to define a class which does not have objects of its own but acts as a base class for its subclass.
  - 5) The \_\_\_\_\_ event occurs when a key is pressed while the form has the focus.
  - 6) Form's \_\_\_\_\_ property is used to specify the position on the screen.

### Q.2 Solve any Eight of the following.

- a) What is assembly and its types?
- **b)** What is manage code?
- c) What is garbage collection?
- d) How to create textbox control at runtime? Give example.
- e) What is enumeration data type? Give example.
- f) What is difference between method overloading and method overriding?
- g) What is abstract class with example?
- **h**) What is indexer?
- i) What is use of property? How to write read only property.
- j) What is use of menu control? How to create menu?

### Q.3 A) Attempt any Two of the following.

- 1) What is thread synchronization? Explain with example.
- 2) What is stream class? Write a program to copy one file into another file.
- 3) Explain container control group with example.
- B) What are different parameter passing technique in c#? Explain with 06 example.

### Q.4 A) Attempt any Two of the following.

- 1) Explain value type and reference type in detail.
- 2) Write windows application for basic arithmetic operation.
- 3) What is boxing and unboxing? Explain with example.
- B) What is delegate and its types? Explain anonymous delegate with example. 08

### Q.5 Solve any Two of the following.

- a) What is operator overloading? Write a program to overload any two comparison operator.
- **b)** What is custom exception? Explain how to create custom exception with example.
- c) What is interface? Explain interface with example.

Seat No.						Set	: <b>P</b>
В	.Sc.	(Se	mester -	V) (New) (CBCS) I PHYSICS (Specia Solid State Physic	Exam Il Pap s (19	nination: March/April-2023 per – X) 9201512)	;
Day & Time: (	Date: 03:00	Tue PM	sday, 04-0 To 06:00 l	07-2023 PM		Max. Mark	(s: 80
Instruc	ctions	s: 1) 2) 3) 4)	All question Draw near Figures to Use of log	ons are compulsory. It labeled diagram wher o right indicate full mark g table and calculators	rever r (s. is allo	necessary. wed.	
Q.1 /	<b>4) N</b> 1	Multi  )	ple choic If <i>a ≠ b ≠</i> a) cut c) ortl	<b>e questions.</b> $c \& \propto = \beta = \gamma = 90^{\circ}$ , t bic horhombic	hen th b) d)	ie crystal system is hexagonal Monoclinic	10
	2	2)	Reciproca a) rec c) obl	al of reciprocal lattice is iprocal ique	b) d)	_ lattice. Direct Square	
	3	3)	Number o a) zer c) laro	of free electrons in com o ge	pletely b) d)	/ filled band is very large none of these	
	2	•)	Retentivit a) Dia c) Pa	y is observed in amagnetic ramagnetic	matei b) d)	rials. Ferromagnetic Ferrimagnetic	
	Ę	5)	When a s becomes a) Dia c) Fei	superconductor is place  amagnetic rrimagnetic	d in a b) d)	constant magnetic field it Ferromagnetic Paramagnetic	
	e	5)	The width a) Zei c) Lai	n of forbidden energy ba ro rge	and in b) d)	insulator is Negative None of these	
	7	7)	The pack a) 0.3 c) 0.6	ing fraction of simple cu 4 8	ubic ci b) d)	rystal structure is 0.52 0.72	
	8	3)	Volume o volume o a) dire c) not	f unit cell in reciprocal l f unit cell in direct lattice ectly	lattice e. b) d)	is proportional to the inversely all of these	
	g	))	The ratio proportion a) T c) T <sup>3</sup>	of electrical conductivit nal to	y to th b) d)	ermal conductivity of metals is T <sup>2</sup> T <sup>4</sup>	
	1	0)	Hall coeff a) ele c) γ-ra	icient is positive for ctrons ays	b) d)	Holes ∝-ray	

	В)	<ul> <li>Answer the following.</li> <li>1) What is superconductor?</li> <li>2) State Widmann-Franz relation.</li> <li>3) Define unit cell.</li> <li>4) What is valence band?</li> <li>5) State Bragg's law of diffraction.</li> <li>6) State any two properties of metals.</li> </ul>	06
Q.2	Solv a) b) c) d) e) f) g) h) i) j)	<ul> <li>we any eight of the following.</li> <li>What are ferromagnetic domains?</li> <li>Define space lattice &amp; basis.</li> <li>State two properties of reciprocal lattice.</li> <li>Define fermi energy.</li> <li>Define co-ordination number.</li> <li>Draw the plane in cubic system whose miller Indices are &lt; 2,2,2 &gt;.</li> <li>What is forbidden energy gap.</li> <li>State any two applications of superconductors.</li> <li>Write any two properties of ferromagnetic materials.</li> <li>Give relation between transition temperature Tc &amp; critical field Hc for a superconductor.</li> </ul>	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain types I &amp; type II superconductors.</li> <li>2) Explain Fermi-Dirac distribution function of free electrons.</li> <li>3) Explain hysteresis in ferromagnetic materials.</li> </ul>	10
	B)	Write short note on hall effect.	06
Q.4	<b>A)</b>	<ul> <li>Attempt any two of the following.</li> <li>1) State &amp; explain Meissner effect in superconductivity.</li> <li>2) Write short note on ferrites.</li> <li>3) In NaCl crystal (a = 2.814 A°) the first order reflection is observed from plane (1,0,0) by using X ray beam of wave-length 0.75A°. Calculate the angle of diffraction.</li> </ul>	08
	<b>–</b> 1	Descuites Massia Descussional de la detail	
	B)	Describe Kronig-Penney model in detail.	08

#### B) Answer the following.

Seat		Set [	
No.			
В.	Sc. (Se	nester - V) (New) (CBCS) Examination: March/April-2023 CHEMISTRY (Special Paper- X) Inorganic Chemistry X (19201507)	
Day & [ Time: 0	Date: Tue 3:00 PM	day, 04-07-2023 Max. Marks: 8 o 06:00 PM	0
Instruc	tions: 1) 2) 3) 4)	Il questions are compulsory. Draw neat labeled diagram wherever necessary. Figures to right indicate full marks. Jse of log table and calculators is allowed.	
Q.1 A	a) Selec 1)	the most correct alternative.1The excess of nitrogen fertilizers leads to problems.1a) pestb) Growthc) fruitingd) Flowering	0
	2)	The nutrients which are used by field crops in very small quantities are known as plant nutrients. a) major b) Minor c) normal d) Less	
	3)	A substance which poisons the activity of catalyst is a) promoter b) Inhibitor c) auto-catalyst d) induced catalyst	
	4)	The enzyme which can catalyse the conversion of glucose to ethanol s a) maltase b) invertase c) zymase d) urease	
	5)	The main function of myoglobin is to         a)       transport O2         b)       transport CO2         c)       store O2	
	6)	/lajor metal present in human body is a) Mg b) Na c) K d) Ca	
	7)	n fast breeder reactor material is used. a) Fissile                b) Fertile c) Radioactive           d) all of these	
	8)	are used in tracer technique. a) radio isotopes b) Non radioactive metals c) non metals d) transition elements	
	9)	$\begin{array}{llllllllllllllllllllllllllllllllllll$	
	10)	According to MOT, in octahedral complexes orbitals are non bonding MOs. a) a1g b) t1u c) t2g d) eg	

	B)	Fill in the blanks.	06
	,	1) According to CFT, bonding between metal and ligand is 100%	
		2) The isotope emitting radioactivity is called as isotope.	
		3) $_7N^{14} + _1H^1 \rightarrow \ + _2He^4$ .	
		4) The geometry of deoxyhaemoglobin is	
		5) A reaction in which catalyst and reactants are present in gaseous	
		state is called catalysis.	
		6) Urea contains % nitrogen.	
Q.2	Sol	ve any EIGHT of the following.	16
	a)	What is positive catalysis? Give example.	
	b)	What is the function of calcium in living being?	
	c)	Draw the shapes of d - orbitals.	
	d)	What are limitations of CFT?	
	e)	What is projectile capture reaction?	
	f)	What is artificial transmutation?	
	g)	Explain the use of radioisotope for chemical investigation.	
	h)	What are qualities of ideal fertilizers?	
	i)	Mention the types of fertilizers.	
	j)	Advantages of complex fertilizers.	
Q.3	A)	Attempt any TWO of the following.	10
Q.3	A)	<ul><li>Attempt any TWO of the following.</li><li>What are the characteristics of catalysts?</li></ul>	10
Q.3	A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with</li> </ul>	10
Q.3	A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> </ul>	10
Q.3	A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> </ul>	10
Q.3	A) B)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> </ul>	10 06
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> </ul>	10 06 08
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> </ul>	10 06 08
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> </ul>	10 06 08
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> <li>3) What is Jahn - Teller Distortion theorem?</li> </ul>	10 06 08
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> <li>3) What is Jahn - Teller Distortion theorem?</li> <li>What is catalysis? Explain adsorption theory of catalysis. Give any two</li> </ul>	10 06 08 08
Q.3 Q.4	A) B) A) B)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> <li>3) What is Jahn - Teller Distortion theorem?</li> <li>What is catalysis? Explain adsorption theory of catalysis. Give any two industrial applications of catalysis.</li> </ul>	10 06 08 08
Q.3 Q.4 Q.5	A) B) A) B)	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> <li>3) What is Jahn - Teller Distortion theorem?</li> <li>What is catalysis? Explain adsorption theory of catalysis. Give any two industrial applications of catalysis.</li> </ul>	10 06 08 08
Q.3 Q.4 Q.5	A) B) A) B) Atte	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> <li>3) What is Jahn - Teller Distortion theorem?</li> <li>What is catalysis? Explain adsorption theory of catalysis. Give any two industrial applications of catalysis.</li> <li>empt any TWO of the following.</li> <li>On the basis of MO diagram compare [FeFe<sub>6</sub>]<sup>3-</sup> complex with [Fe (CN)<sub>6</sub>]<sup>3-</sup></li> </ul>	10 06 08 08 16
Q.3 Q.4 Q.5	A) B) A) B) Atte	<ul> <li>Attempt any TWO of the following.</li> <li>1) What are the characteristics of catalysts?</li> <li>2) What is crystal field splitting? Explain it for tetrahedral complex with suitable example.</li> <li>3) Write a short note on oxygen binding curves.</li> <li>What is chain reaction? Explain uncontrolled chain reaction.</li> <li>Attempt any TWO of following.</li> <li>1) What are superphosphates? Give advantages of superphosphates.</li> <li>2) Give the factors affecting crystal field splitting.</li> <li>3) What is Jahn - Teller Distortion theorem?</li> <li>What is catalysis? Explain adsorption theory of catalysis. Give any two industrial applications of catalysis.</li> <li>empt any TWO of the following.</li> <li>On the basis of MO diagram compare [FeFe<sub>6</sub>]<sup>3-</sup> complex with [Fe (CN)<sub>6</sub>]<sup>3-</sup> Complex.</li> </ul>	10 06 08 08 16

c) Give the function, structure and working of haemoglobin.

						SLR-QA-180
Seat No.	t					Set P
	B.So	c. (Se	emester - `	V) (New) (CBCS) BOTANY (Spec Genetics (19	Exan ial Pa 92015	nination: March/April-2023 aper- X) 502)
Day a Time	& Dat : 03:0	te: Tu 00 PN	esday, 04-0 I To 06:00 P	7-2023 M		Max. Marks: 80
Instr	uctio	o <b>ns:</b> 1 2 3	) All questio ) Draw neat ) Figures to	ns are compulsory. labeled diagram whe right indicate full mai	erever rks.	necessary.
Q.1	A)	Mul 1)	tiple choice As per Mer called a) Rec c) co d	e <b>questions.</b> ndel, the character th character. essive lominant	b) d)	<b>10</b> pressed in F1 generation is Dominant Inhibitory
		2)	The phenc a) 1:2: c) 1:3	typic ratio of monohy 1	/brid c b) d)	ross is 3:1 2:1:1
		3)	The term li a) Corr c) Mor	nkage was coined by rens ghan	/ b) d)	 Mendel De Vries
		4)	Crossing o a) Lepi c) Ana	over occurs in the totene phase	sta b) d)	age. Pachytene Diakinesis
		5)	Haemophi a) dom b) dom c) rece d) rece	lia is more common i ninant character carrie ninant character carrie essive character carri essive character carri	n male ed by 2 ed by 3 ed by 3 ed by 3	es because it is a X chromosome Y chromosome X chromosome Y chromosome
		6)	The chrom called a) Auto c) Allel	iosome responsible f  psomes les	or the b) d)	determination of sex are Allosomes Lysosomes
		7)	The trait w a) gen c) qua	hich shows continuo etic disorder ntitative trait	us vari b) d)	iation is called phenotypic variation qualitative trait
		8)	When two the same v a) poly c) mor	or more nonallelic ge vay, it is called genic inheritance logenic inheritance	ene pa _ <sup>-</sup> b) d)	irs affect the same character in Pleiotropy Mendelian inheritance
		9)	Cytoplasm a) only b) only c) only d) mito	ic inheritance is due plastid mitochondria chloroplast chondria, chloroplas	to t and c	 cytoplasmic particles.

		10)	Kappa particles in paramecium indicates inheritance.a)Nuclearb)Cytoplasmicc)Mutationald)Nucleo cytoplasmic	
	В)	Ansv 1) 2) 3) 4) 5) 6)	ver the following.       In pea plant, round shape of seed is Character.         When two different genes come from the same parent they tend to remain together is called       How many X chromosomes are present in triploid <i>Drosophila</i> .         In Hardy- Weinberg law p + q =       Corolla length in tobacco shows inheritance.         Genes related to the cytoplasmic male sterility found on Genome.	)6
Q.2	Solv a) b) c) d) e) f) g) h) i)	ve any What A tall What What Show How o Define How s Write What	eight of the following. is test cross? plant crossed with dwarf plant. What will be the phenotype of F1? is linkage? is chiasma? diagrammatic representation of sex determination in man. colour blindness is determined? e polygenic inheritance. survival rate is calculated? the dominant and recessive character of colour of seed in pea plant. is mean by cytoplasmic inheritance?	16
Q.3	A)	Attem 1) 2) 3)	<b>npt any Two of the following.</b> Write a note on colour blindness in man. What is mean by monohybrid cross? Explain with suitable example with its phenotypic and genotypic ratio. Write the features of polygenic inheritance.	10
	B)	Write <i>tabac</i>	short note on polygenic inheritance in corolla length of <i>Nicotiana</i> ( <i>cum</i> .	)6
Q.4	A)	Attem 1) 2) 3)	npt any two of the following. Explain in brief Mendel's law of segregation. Write a note on factors affect on Hardey Weinberg law. Describe in brief cytoplasmic inheritance in <i>Paramoecium</i> .	)8
	B)	Descr	ribe in brief cytoplasmic inheritance in <i>Mirabilis jalapa.</i>	)8
Q.5	Atte a)	<b>mpt a</b> Expla	<b>ny Two of the following.</b> in Law of independent assortment with suitable example.	16

- a) Explain Law of independent assortment with suitable example.b) Explain in brief balance concept of Sex determination in *Drosophila*.
- c) What is mean by coupling and repulsion? Write significance of crossing over.

Seat No.						Set	Ρ
	B.S	c. (S	emester - P	V) (New) (CB ZOOLOGY (S rinciples of G	CS) Exa Special P enetics	mination: March/April-2023 aper - X) (19201521)	
Day & Time:	6 Date 03:0	e: Tue 0 PM	esday, 04-07 To 06:00 P	-2023 M		Max. Mark	s: 80
Instru	uctio	n <b>s:</b> 1) 2)	All question Figures to	ns are compulsor right indicate full	y. marks.		
Q.1	A)	Sele 1)	ct the correct The geneti single type a) Two c) Four	ect alternative fr c interaction occu of gene.	om the fo ur is betwe b) d)	<b>llowing.</b> en allelomorphs of a Three None of these	10
		2)	In inter ger or different a) Non-H c) Polylog	nic genetic interac chromosomes. omologous gues	ction the _ b) d)	genes located on the same Homologous none of these	
		3)	The gene i a) Chemi c) Prelog	s a determ cal ical	nine. b) d)	Physical None	
		4)	The enzym a) Proteir c) Fat	ies are de າ	termined b b) d)	by gene. Carbohydrate None	
		5)	Each cellul substance a) Precur c) Hypos	ar chemical reac called sor tatic gene	tion involv b) d)	es step wise conversion of our Epistatic gene None	
		6)	Originally a the arbor o a) Suppre c) Homol	a gene or locus w f gene at another essor gene ogous gene	as termed locus, it t b) d)	which suppressed or masked ermed as Hypostatic gene None of these	
		7)	The Domin a) 12:3:1 c) 9.3:3:1	ant Epistatic Rat	ion is b) d)	- 9:3:4 None	
		8)	The two ind of phenoty a) supple c) Compl	dependent pairs o pic trait. There ge mentary gene ementary gene	of genes h enes are ca b) d)	ave interacted in the production alled Lethal gene None	
		9)	The ratio o a) 9:3: c) 2:1:	f supplementary 14 1	gene mod b) d)	ified in 3 : 1 None	

		called as a) Complementary gene b) Homologous gene c) Epistatic gene d) None					
	В)	<ul> <li>Fill in the blanks/definitions/one sentence answer/one word/give the name/predicate.</li> <li>1) In certain cases two pairs of genes determined the same phenotype by</li> <li>2) The alternative forms of same gene influenced on same trait is called</li> <li>3) Crossing variations of the gene are known as</li> <li>4) Multiple alleles occurs more than genes.</li> <li>5) The tendency of genes to stay together in a chromosome is called</li> <li>6) The exchange of chromosome between non sister chromatids form gametes is called</li> </ul>					
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	e any Eight of the following. 1 Mutation Down syndrome Turner's syndrome Extra chromosomal inheritors Chromosomal mapping Chromosomal abbreviations Transformation Conjugation Polygenic in heritances					
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain the cyclogical detection of crossing over.</li> <li>2) What is differences between linkage map &amp; Chromosomal map?</li> <li>3) X and Y chromosomes</li> </ul>	10				
	B)	Describe mechanism of sex determination.					
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe sex determinations in Drosophila.</li> <li>2) Types of sex chromosomal mechanism.</li> <li>3) Describe crossing over.</li> </ul>	<b>D</b> 8				
	B)	Explain Transposons in bacteria.	08				
Q.5	Atteı a) b)	n <b>pt any Two of the following.</b> Explain polygenic inheritance. Describe Transduction with examples.	16				

10) Both dominant alleles are present together complement each other

**c)** Sex determination in Human

		SLR-QA-18	2				
Seat No.		Set F	כ				
В.	B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Special Paper- X) Complex Analysis (19201525)						
Day & [ Time: 0	Date: Tu 3:00 PM	esday, 04-07-2023 Max. Marks: 8 I To 06:00 PM	30				
Instruc	<b>tions:</b> 1 2 3 4	) All questions are compulsory. ) Draw neat labeled diagram wherever necessary. ) Figures to right indicate full marks. ) Use of log table and calculators is allowed.					
Q.1 A	.) Mult 1)	tiple choice questions. 1 The residue of $\frac{z^3}{(z-1)^4(z-2)(z-3)}$ at z=2 is.	0				
		a) -8 b) 7 c) 5 d) 8					
	2)	The kind of singularity of $f(z) = \frac{1}{sin - \cos z}$ at $z = \frac{\pi}{4}$ is a) Removable b) simple pole c) essential singularity d) pop isolated singularity					
	3)	$f(z) = \frac{z - \sin z}{z^3} \text{ at } z = 0 \text{ is } \$ a) simple pole b) pole of order 2					
	4)	c) removable singularity d) essential singularity The analytic function whose real part is $e^x \cos y$ is a) $e^z + c$ b) $e^{2z}$ c) $xe^z$ d) $ze^z$					
	5)	Which of the following function is not analytic in complex plane a) $\sin z$ b) $\frac{1}{z-1}$ c) $az^2 + bz + c$ d) $\cos z$					
	6)	Which of the following functions f(z) satisfies Cauchy-Riemann Equations a) $f(z) = x - iy \text{ at } z = 1 + i$ b) $f(z) =  z ^2 \text{ at } z (z \neq 0)$ c) $f(z) = \sqrt{ xy } \text{ at } z = 0$ d) $f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, z \neq 0, f(0) = 0$					
	7)	If $f(z) = u(x, y) + iv(x, y)$ is analytic and $u = log(x^2 + y^2)$ then $v$ is a) $2 \arctan\left(\frac{y}{x}\right) + c$ b) $\frac{1}{2} \arctan\left(\frac{y}{x}\right) + c$ c) $\arctan\cos\left(\frac{y}{x}\right) + c$ d) $\arctan\left(\frac{y}{x}\right) + c$					

- The residue of  $\cos \frac{1}{z-2}$  is \_\_\_\_\_. a) 1 8) b) 0 2 d) If L represents a square bounded by  $x = \pm a$ ,  $y = \pm a$  then the value 9) of  $\int_L \frac{dz}{z}$  is \_\_\_\_\_. a)  $2\pi i$ b) *πi*
- The series  $\sum_{n=0}^{\infty} (-1)^n \frac{z^{2n}}{(2n)!}$  for  $|z| < \infty$  represents \_\_\_\_\_. a) sin z b) cos z c) tan z d) sec z 10)
- Fill in the blank/Definition/one sentence answer/ one word B) answer/give the name/ predict the product etc.
  - The function  $f(z) = \log z$  has \_\_\_\_\_\_ singularity at z = 0. The residue of  $f(z) = \frac{z}{(z+1)(z+2)}$  at z = -1 is \_\_\_\_\_. 1)
  - 2)
  - A curve  $z(t) = x(t) + iy(t), \alpha \le t \le \beta$  is called Jordan arc if  $t_1 \ne t_2 \Rightarrow$ 3)

d)

1

- $\overline{\text{If } f(z)} = u = iv$  be an analytic function of z = x + iy then the families 4) of curves u = constant and v = constant are to each other.
- If v = 2xy then it corresponding harmonic conjugate u is \_\_\_\_\_. 5)
- The residue of  $f(z) = \frac{1}{(z^2+a^2)^2}$  at z = ia \_\_\_\_\_. 6)

#### Q.2 Solve any eight of the following.

c)

0

- Using C-R equation, show that w = f(z) = sin z is analytic function. a)
- Evaluate residue of  $\frac{z^2}{(z-1)(z-2)(z-3)}$  at z = 2. b)
- Find Taylor's series expansion of the function  $f(z) = \frac{1}{1+z}$  around z=0. C)
- d)
- Prove that  $u = e^x(x \sin y y \cos y)$  is harmonic function. Show that for  $0 < |z| < 4 \frac{1}{4z-z^2} = \sum_{n=0}^{\infty} \frac{z^{n-1}}{(4^n+1)}$ e)
- Evaluate  $\int_{c} \bar{z} dz$  along the line z = 0 to z = 4 + 2i along the curve C given f) by  $z = t^2 + it$ .
- Define Removable singularity and give one example. g)
- Determine order of the pole cosec z. h)
- Show that the function f(z) = xy + iy is everywhere continuous but is not i) analytic.
- For what values of z the function w defined by  $z = e^{-v}(\cos u + i \sin u)$ j) ceases to be analytic.

#### Attempt any Two of the following. Q.3 A)

- If  $u + v = \frac{2sin2x}{e^{2y} + e^{-2y} 2cos}$  and f(z) = u + iv is an analytic function of z = x + iy find f(z) in terms z. Show  $\int_{0}^{2\pi} \frac{d\theta}{1 + a\cos\theta} = \frac{2\pi}{\sqrt{1 a^2}}$  if  $a^2 < 1$ . 1)
- 2)
- 3) Expand  $\frac{1}{(z+1)(z+3)}$  in Laurent's series valid for 1 < |z| < 3.

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**B)** Prove the polar form of Cauchy Riemann equations  $\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta} and \frac{\partial v}{\partial r} = -\frac{1}{r} \frac{\partial u}{\partial \theta} \text{ where } r = \sqrt{x^2 + y^2}, \theta = \tan^{-1}\left(\frac{y}{x}\right)$ 

### Q.4 A) Attempt any two of the following.

- 1) State and prove Cauchy fundamental theorem.
- 2) Prove that an analytic function with constant modulus is constant.
- 3) Prove that if f(z) be a function such that for some positive integer m, a value  $\phi(z_0)$  exist with  $\phi(z_0) \neq 0$  such that the function  $\phi(z) = (z z_0)^m f(z)$  is analytic at  $z_0$  Then f has a pole of order m at  $z_0$ .
- B) State and prove Cauchy's Residue Theorem.

### Q.5 Attempt any Two of the following.

- a) State and prove sufficient condition for f(z) to be analytic.
- **b)** Evaluate  $\int_0^{2+i} z^2 dz$  along
  - i) the line x = 2y
  - ii) the lines from 0 to 2 to 2 + i
  - iii) the lines from 0 to i to 2 + i
  - iv) along the parabola  $2y^2 = x$
- c) Prove that if  $\lim_{z \to a} (z a)f(z) = A$ , and if *C* is an arc  $\theta_1 \le \theta \le \theta_2$  of the circle |z a| = r then  $\lim_{r \to 0} \int_C f(z)dz = iA(\theta_2 \theta_1)$

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No.						Set	Ρ
В	.Sc.	(Sen	nester – \ S Prol	/) (New) (CBCS)   TATISTICS (Spec bability Distributi	Exar cial I ions	nination: March/April-2023 Paper - X) (19201529)	
Day & Time:	Date 03:00	: Tues ) PM T	day, 04-07 o 06:00 PM	-2023 1		Max. Marks	: 80
Instru	n <b>structions</b> : 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Draw neat labeled diagrams wherever necessary. 4) Use of log table and calculators is allowed.						
Q.1 a	a)	Selec 1)	For Laplace a) $\beta_1 = 0$ b) $\beta_1 > 0$	<b>correct alternative</b> e distribution ), $\beta_1 = 6$ ), $\beta_1 > 6$	b) d)	$\beta_1 = 0, \beta_1 = 3$ $\beta_1 < 0, \beta_1 = 3$	10
		2)	lf an expon a) Equal c) greate	ential r.v. is truncate to er than 10	d bel b) d)	by 10 then $E_r(X) =$ less than 10 0.1	
		3)	If X is a N( a) $e^x$ c) $\log(X)$	μ, σ <sup>2</sup> ) r.v. then	_ is lo b) d)	ognormal r.v. $e^{-x}$ none of these	
		4)	The support is a) $-\infty$ to c) $-\infty$ to	rt of a r.v. X following $\frac{1}{2}$ 0 $\infty$	l norn b) d)	nal distribution truncated below 0 0 to $\infty$ -1 to 1	
		5)	If X and Y a a) cauch	are two i.i.d. LN(μ,σ² γ	) r.vs b) d)	. then distribution of <sup>x</sup> / <sub>y</sub> is Normal	
		6)	lf X follows a) Expor c) Lapla	W( $\alpha$ , $\beta$ ) then (X/ $\beta$ ) <sup><math>\alpha</math></sup> nential (1) ce ( $\alpha$ , $\beta$ )	follov b) d)	vs Cauchy (0,1) Lognormal	
		7)	If X is Cauc a) 0.25 c) 0.75	chy ( $\mu$ , $\lambda$ ) then $P(\mu -$	λ< b) d)	$x < \mu + \lambda$ ) is 0.50 1	
		8)	lf a r.v. X is a) 2 <i>P</i> (X c) 1	s truncated below k th $< k$ )	nen P b) d)	( X  < k) is P(X > k) 0	
		9)	If $(X, Y) \sim B$ given $X = z$ a) Norma c) Logno	$N(\mu_1,\mu_2,\sigma_1^2,\sigma_2^2,\varrho)$ th x is distribution al permal	en th on. b) d)	e conditional distribution of <i>Y</i> bivariate normal Cauchy	

10) If X follows Logisitc ( $\mu$ ,  $\sigma$ ) then standard logistic distribution is \_\_\_\_\_

a) 
$$\frac{e^{-x}}{(1+e^{-x})^2}$$
  
b)  $\frac{e^x}{(1+e^x)^2}$   
c)  $\frac{e^x}{(1+e^{-x})^2}$   
d) both a & b

### b) Attempt the following.

- 1) Let  $X \sim N$  ( $\mu, \sigma^2$ ) is truncated below 0, what is P(X > 0)?
- 2) Define Cauchy distribution.
- 3) Define Laplace distribution  $L(\mu, \lambda)$ .
- 4) If  $(X, Y) \sim BN$   $(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \varrho)$  write the pdf of (X + Y).
- 5) If  $X \sim \text{lognormal } (\mu, \sigma^2)$  write the expressions for E(X).
- 6) Define Pareto distribution with parameters ( $\alpha$ ,  $\beta$ ).

#### Q.2 Answer any eight of the following.

- a) If a r.v. X has truncated  $P(\lambda = 2)$  distribution, truncated at X = 0 then write its p.d.f.
- **b)** State the C.D.F. of a Cauchy distribution with parameters  $(\mu, \lambda)$
- c) If X is a non-negative r.v. such that  $Y = \log(X)$  is N(0, 1) then write the p.d.f. of X.
- d) State the additive property of Cauchy distribution.
- e) Obtain m.g.f. of Laplace distribution with parameters  $(\mu, \lambda)$ .
- f) Find mean of lognormal distribution with parameters ( $\mu$ ,  $\sigma^2$ ).
- g) Define power series distribution.
- **h)** Find mean of Pareto  $(\alpha, \beta)$  distribution.
- i) Write the joint p.d.f. of bivariate normal distribution.
- **j)** Let (X, Y) be  $BN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \varrho)$  then state mean of distribution of (X | Y = y)

#### Q.3 a) Attempt any two of the following.

- 1) State and prove the relationship between Cauchy and student's distribution.
- 2) If  $X \sim \text{lognormal}(0,1)$  find mean and variance of X.
- 3) If  $X \sim$  binomial (n, p), truncated at X = 0 find mean of X.
- **b)** Define  $BN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \varrho)$  distribution. State the distribution of aX + bY + c **06** where a, b & c are real numbers.

### Q.4 a) Answer any Two of the following.

- 1) Define Weibull distribution with parameters  $(\alpha, \beta)$  and find its mean.
- 2) Show that Poisson distribution is a particular case of power series distribution.
- 3) Find the distribution of ratio of two independent S.N.Vs.
- **b)** Obtain C.D.F. of Weibull distribution with parameters  $(\alpha, \beta)$ .

#### Q.5 Attempt any Two of the following.

- **a)** Let *X* be a Logistic random variable with parameters  $(\mu, \sigma)$  obtain mean of *X*.
- **b)** If *X* is a Laplace  $(\mu, \lambda)$  r.v. the find C.D.F. of *X* and second quartile.
- **c)** Let (X, Y) is BN  $(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \varrho)$  then find the m.g.f. of (X, Y).

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### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 GEOLOGY (Special Paper - X) Hydrogeology (19201535)

Day & Date: Tuesday, 04-07-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Draw neat labeled diagram wherever necessary.

#### Q.1 A) Rewrite the sentence by filling the blanks with the correct answer 10 from the given options. A rock or sediment that both stores and transmits a significant amount 1) of water is called an a) aquifer b) Aquiclude aquitards d) None of these c) 2) The vadose zone of groundwater refers to the saturated zone a) unsaturated zone b) zone in which water is drawn upward from the water table by c) capillary action None of these d) Which of the following deposits will probably provide the best ground-3) water supply? a) Loess b) till d) lake clay c) Alluvium 4) Groundwater that is in direct vertical contact with the atmosphere through open pores of an aquifer is called . b) unconfined a) Confined d) c) Perched artesian The capacity of a rock to transmit water through its pores is called . 5) a) Porosity void ratio b) c) Permeability flow d) Which of the following usually has the highest porosity? 6) a) Gravel b) sand c) Clav d) silt Study of water cycle is part of \_\_\_\_ 7) b) a) Remote sensing Petrology surface runoff. c) Hydrogeology d) Porosity of rock promotes 8) d) b) transpiration a) Infiltration cone of depression c) Precipitation d) Transpiration takes place from \_\_\_\_\_ 9) ground a) Soil b) ice body c) d) vegetation

Max. Marks: 80

Set F

		<ul> <li>10) Primary porosity of is more.</li> <li>a) Sandstone</li> <li>b) limestone</li> <li>c) Basalt</li> <li>d) granite</li> </ul>						
	B)	<ul> <li>Answer the following.</li> <li>1) Define Specific yield?</li> <li>2) Define secondary porosity.</li> <li>3) Define retention capacity.</li> <li>4) Define piezometric surface.</li> <li>5) Define unconfined aquifer.</li> <li>6) Define a confined aquifer.</li> </ul>	06					
Q.2	Writ a) b) c) d) e) f) g) h) i)	te answers to any eight of the following. What is meteoric water? What is hydrogeology? What is a perched aquifer? What is a perched water table? What is Transmissivity? What is an aquifer? What is an overflowing well? What is a recharge zone? What is the water cycle? What is a basin divide?	16					
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe the Gravity Spring. Draw figure?</li> <li>2) Explain the zone of aeration and draw its diagram.</li> <li>3) Describe the perched aquifer. Draw figures.</li> </ul>						
	B)	Describe the significance of linear features in aerial photographs w.r.t. groundwater.						
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Describe the relation of nature of slope for its significance of groundwater.</li> <li>2) Describe the secondary porosity with examples.</li> <li>3) Describe the groundwater significance of shale and sandstone rocks.</li> </ul>	80					
	B)	Describe the relation of nature of bed for its significance of groundwater.	08					
Q.5	Atte a)	empt any Two of the following. Explain the relation of rock textures w.r.t. to groundwater porosity and transmissivity	16					
	b) c)	Define watershed. Explain its types & elements. Draw figures of watershed.						

c) Explain the confined aquifer Draw its diagram.

	B.Sc	:. (S	emest	ter - V) (New) (CBCS) MICROBIOLOGY (S Agricultural Microbio	Exan pecia plogy	nination: March/April-20 Il Paper- X) / (19201540)	23		
ny ne	& Dat : 03:0	e: Tu 00 PN	ıesday, ∕I To 06	04-07-2023 :00 PM		Max. M	arks: 80		
str	uctio	ns: 1	l) All qu 2) Draw 3) Figur 4) Use (	uestions are compulsory. reat labeled diagram whe res to right indicate full mar of log table and calculators	rever ks. is allo	necessary. wed.			
1	A)	Mu 1)	l <b>tiple c</b> The c a) c)	<b>hoice questions.</b> dominant mineral particles Sodium Magnesium	in mos b) d)	st soils are compounds of Potassium Iron	10 		
		2)	Cellu a) c)	lose is degraded to cellobio Cellulase Hexokinase	ose by b) d)	the enzyme Beta-glucosidase Cellulose dehydrogenase			
		3)	Whic a) b) c) d)	h of the following is not inc Crop rotation Chemical fertilizer Green manures Compost and farmyard m	luded ianure	in organic farming s			
		4)	For p a) c)	addy, the best fertilizer is _ Bacillus polymyxa Azolla pinnata	b) d)	Bacillus megaterium Rhizobium meliloti			
		5)	How a) c)	do herbivores and other ar Soil Water	nimals b) d)	obtain phosphorous? Rocks Plants			
		6)	Vanil a) c)	lic acid is the product forme Cellulose Hemicellulose	ed afte b) d)	er the biodegradation of Lignin Hydrocarbons	Ŀ		
		7)	Soft ı a) c)	rot disease is caused by Fungi Bacteria	b) d)	Algae Both A and C			
		8)	The r	noisture level required for v	vermic	composting should be betweer	٦		
			a) c)	Below 30 per cent 70 and 80 per cent	b) d)	40 and 50 per cent Above 90 per cent			
	<ul> <li>c) 70 and 80 per cent</li> <li>d) Above 90 per cent</li> <li>9) Erwinia carotovora causes infection called</li> <li>a) Whip smut of sugarcane</li> <li>b) Oily spot disease on pomegranate</li> <li>c) Soft rot of potato</li> </ul>								

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### Q.

- Soft rot of potato Curling of leaves in mango c) d)

Set P

		<ul> <li>10) In carbon cycle flow of energy is</li> <li>a) Bidirectional</li> <li>b) Linear</li> <li>c) Cyclic</li> <li>d) Irreversible</li> </ul>	
	B)	Give Definition.1)Green manure2)Rhizosphere3)Pesticide4)Nitrification5)Ammonification6)Plant Pathogen	06
Q.2	Sol a) b) c) d) e) f) g) h) j) k)	ve any Eight of the following. What are the sources of Sulphur in atmosphere? What is town compost? What are Biofertilizers. Write common symptoms of whip smut of sugarcane. Enlist two pesticide degrading bacteria. Define term 'Canker'. Give examples of Genetically modified plants. What are Phosphate Solubilizing Bacteria (PSB)? Define Nitrate reduction. Define Ammensalism.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Application of Biotechnology in Agriculture.</li> <li>2) Explain in detail process of vermicomposting.</li> <li>3) Explain Carbon cycle in nature.</li> </ul>	10
	B)	Write a Short note on Nitrogen Cycle.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write a note on biochemistry of cellulose degradation.</li> <li>2) Write in brief soil as an ecosystem.</li> <li>3) Explain various control measures of plant-diseases.</li> </ul>	08
	B)	Describe Azo and Rhizo Biofertilizers.	08
Q.5	Atte a)	empt any Two of the following. Discuss in detail causative agent, symptoms and control of Oily spots of pomegranate.	16
	b)	Write an essay on pesticide degradation.	

c) Bioinsecticides – Bacillus thruriengenesis.

Seat	
No.	

B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 Electronics (Special Paper- X) Fundamentals of Microcontroller (19201549)

Day & Date: Tuesday, 04-07-2023 Time: 03:00 PM To 06:00 PM

Q.1

A)

Instructions: 1) All questions are compulsory.

2) Draw neat labeled diagram wherever necessary. 3) Figures to right indicate full marks. 4) Use of log table and calculators is allowed. Multiple choice questions. If Register Bank-3 is selected then the address of register R5 will be 1) 05 H b) 0DH a) 15 H c) d) 1D H port in microcontroller 8051 can be used as higher order 2) address bus port. PORT-0 b) PORT-1 a) c) PORT-2 d) PORT-3 If a crystal of 1 MHz is connected to  $\mu$ C8051 then the time required to 3) complete one machine cycle will be \_\_\_\_\_ µSec. 6 a) 1 b) c) 12 d) 18 Which one of the following instructions represent register addressing 4) mode? a) MOV A,#49 H b) MOV R2,A c) MOV A.@R0 d) MOV 40 H.65 H 5) Microcontroller uses \_\_\_\_\_ memory architecture. Von Neumann Harvard a) b) RISC d) CISC c) The proper instruction to access internal RAM memory data is . 6) MOV A,@R0 b) MOVX A, @DPTR a) c) MOVC A, @(A+DPTR) d) None of these If CALL instruction is written at address C180 H, then the RETURN 7) address will be . C181 H b) C182 H a) c) C183 H d) C184 H The hardware level control pins to STOP or RUN the Timer / Counter 8) is INTO & INT1 b) T0 & T1 a)  $\overline{RD}\&\overline{WR}$ c) d)  $T_x D \& R_x D$ 

Max. Marks: 80

10

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- 9) \_\_\_\_\_ mode in serial communication is 8-bit UART mode with variable baud rate.
  - a) Mode-0
- b) Mode-1

RI & TI

d)

- c) Mode-2 d) Mode-3
- **10)** The interrupt flags used in serial data communication are \_\_\_\_\_.
  - a) TF0 & TF1 b) CY & Z
  - c) IE0 & IE1

### B) Fill in the blank/Definition/one sentence answer/one word answer.

- The result of ANDing the data B4 H and 7D H will be \_\_\_\_\_
- The result after executing the instruction ADD A,#54 H, where A= 98 H, will be \_\_\_\_\_.
- 3) What is meant by demultiplexing of the buses?
- 4) Write any one Boolean (single bit) instruction and explain its meaning.
- 5) Write any one 3-byte instruction for uC8051.
- 6) Draw the flowchart symbols for Process and Decision-making blocks.

### Q.2 Solve any eight of the following.

- a) Give the significance of PSEN pin.
- **b)** State the function of RS0 and RS1 bits in the flag register of  $\mu$ C 8051.
- c) Write any two arithmetic instructions and explain.
- **d)** Write any four important features of  $\mu$ C8051.
- e) How to configure Timer-1 as a Timer in Mode-1 and Timer-0 as a counter in Mode-2?
- f) Explain the concept of subroutine.
- **g)** How to configure Port-0 as input and Port-1 as output port? Write the proper instructions.
- h) Write the instructions to add data values 55 H and 26 H.
- i) What is the need of Power-On Reset in microcontroller?
- j) Explain in brief the concept of machine-cycle.

### Q.3 A) Attempt any two of the following.

- 1) Give the comparison between microprocessor and microcontroller.
- 2) Explain different data addressing methods with at least one instruction for each.
- 3) Write with proper comments an assembly language program for  $\mu$ C8051 to logically AND the two data values 28 H and FA H. Save the result at internal RAM address 65 H.
- B) Write an ALP to generate a square wave of 1 KHz exactly on port pin P1.5, 06 using timer. Assume a crystal frequency of 12 MHz.

### Q.4 A) Attempt any two of following.

- 1) Write a note on interrupts in  $\mu$ C8051.
- 2) Write a note on Port-0 structure.
- 3) Explain Timer Mode-2.
- B) Write an Assembly Language Program, with proper comments, to transfer ten bytes of data from internal RAM memory block BI (Address 30H to 39H) to another memory block B2(Address 50H to 59H).

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### Q.5 Attempt any two of the following.

- Give the classification of instruction set of  $\mu$ C8051. Explain at least one a)
- instruction from each category with suitable example. Write an Assembly Language Program to serially transmit PORT-0 data at a b) baud rate of 4800. Assume crystal frequency of 11.0592 MHz.
- Explain with suitable block diagram, the architecture of  $\mu$ C 8051. C)

_		(001	COMPUTER SCIEN Core Java	CE (Speci (1920154	al Paper - X) 4)
Day Time	& Dat : 03:0	te: Tu 00 PM	esday, 04-07-2023   To 06:00 PM		Max. Marks: 80
Instr	uctio	o <b>ns:</b> 1 2	) All questions are compuls ) Figures to the right indica	ory. te full marks	
Q.1	A)	<b>Cho</b> 1)	ose correct alternatives. Size of float in Java is a) 32 c) 92	 b) 64 d) All o	10 f these
		2)	invented Java prog a) James Bond c) James Gosling	ramming lar b) Bjari d) Non	iguage. ne Stroustrup e of these
		3)	<ul><li>keyword is used to</li><li>a) super</li><li>c) extends</li></ul>	extend the i b) final d) impl	nterface. ements
		4)	is used to compile, a) JVM c) JDB	debug and e b) JDK d) JRE	execute the java programs?
		5)	In a Java thread can be cr a) extending class c) both a and b	eated b) impl d) none	 ementing interface e of these
		6)	keyword is used to a) extend c) interface	define interf b) impl d) class	ace. ements s
		7)	<ul><li>Which layout used to arran the other?</li><li>a) FlowLayout</li><li>c) GridLayout</li></ul>	nge the com b) Borc d) Grid	ponents in a line one after lerLayout BackLayout
		8)	JVM stands for Java Virtua a) False	al Method. b) True	
		9)	is a feature of a Jav	/a. b) dyna	amic

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023

Seat No.

## **SLR-QA-187**

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- a) arcnitecture natural
- b) dynamic d) All of these c) object oriented

		SLR-QA-1	87
		<ul> <li>10) What is the extension of Java code file.</li> <li>a) .txt</li> <li>b) .java</li> <li>c) .class</li> <li>d) all of these</li> </ul>	
	B)	<ul> <li>Fill in the Blanks.</li> <li>1) JRE stands for</li> <li>2) Keyword is used to prevent extending (deriving) a class.</li> <li>3) blocks can also be executed before main method and constructors.</li> <li>4) In Java Maximum priority of thread is</li> <li>5) is the block in Java Exception Handling to execute whether the exception occurs or not.</li> <li>6) Keyword is used to implement interface in the class.</li> </ul>	06
Q.2	Ans 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	wer the followings. (Any Eight) What is use of this keyword? Write a note on JButton. Write a note on Vector. Write a note Thread synchronization. Define final class? What is Event? What is constructor overloading? List out advantages of collection? What is use of throws? List the byte and character classes.	16
Q.3	A)	<ul> <li>Answer the followings. (Any two)</li> <li>1) What is multithreading? Explain.</li> <li>2) Explain the Object-oriented features of java.</li> <li>3) Write a program to demonstrate that use of 'this' keyword.</li> </ul>	10
Q.4	ь) А)	<ul> <li>Answer the followings. (Any two)</li> <li>1) Explain types of Inheritance?</li> <li>2) List out swing components.</li> <li>3) Explain access specifiers in Java.</li> </ul>	08
	B)	Write a program to demonstrate Abstract class in java.	08
Q.5	Ans a) b)	<b>wer the following. (Any Two)</b> What is extending interface. Explain with example. Write a program to demonstrate thread priority.	16

c) Explain looping control statements in Java.

Seat No.							Set	Ρ
B	S.Sc.	. (Se	mest	ter - V) (New) (CBCS) E PHYSICS (Special Classical Mechanic	xam Pap s (1	hination: March/Ap per – XI) 9201513)	oril-2023	
Day & Time: (	Date 03:00	e: Wee D PM	dnesda To 06	ay, 05-07-2023 :00 PM		I	Max. Mark	s: 80
Instru	ctior	ns: 1) 2) 3) 4)	All qu Draw Figure Use c	estions are compulsory. neat labeled diagram where es to right indicate full marks of log table and calculators is	ever r s. s allo	necessary. wed.		
Q.1	A)	Multi 1)	i <b>ple cl</b> The to a) C b) K c) P d) C	<b>hoice questions.</b> otal energy of a system of co Only kinetic Cinetic energy is always half Partly kinetic and partly poter Only potential	ouple of po ntial	d pendulums is tential energy		10
		2)	A rigio a) o c) th	d body have degree of one onee	f free b) d)	dom. two six		
		3)	Hamil a) d c) d	Iton's principle is prin lifferential lerivative	ciple. b) d)	integral none		
		4)	The d a) n c) tr	deflection of missile is maxim orth pole ropic of Capricorn	num a b) d)	at equator tropic of cancer		
		5)	A non a) E c) V	n-holonomic constrain may b Equality /ector	be ex  b) d)	pressed in the form of Inequality None of these	·	
		6)	The n a) ra c) tr	naximum horizontal distance ange of projectile rajectory of projectile	e cov b) d)	ered by projectile is flight of projectile altitude of projectile	<u> </u> .	
		7)	The n are a) N c) 3	number of independent varia  I N	ble fo b) d)	or a free particle in spa 2N zero	ice	
		8)	The ro a) L c) E	ocket works on principle of o inear momentum Energy	conse b) d)	ervation of Mass Angular momentum		
		9)	The d a) to c) c	lirection of cyclone in southe owards right lockwise	ern he b) d)	emisphere is towards right anticlockwise		

**SLR-QA-188** ~ 

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08

08

- 10) The antisymmetric mode has \_\_\_\_\_ frequency than that of symmetric mode.
  - a) Lower

- b) Higher
- c) Much smaller d) Moderate

# B) Fill in the blank/Definition/One sentence answer/ One word answer/ 06 Give the name/Predict the product etc.

- 1) Give two examples for conservative force fields.
- 2) To and from motion about equilibrium position is called \_\_\_\_\_ motion.
- 3) State the Chasle's theorem on the discussion of Euler's theorem.
- 4) Write the expression for acceleration of Atwood's machine.
- 5) The path of a particle is \_\_\_\_\_ when it is moving under constant conservative force field.
- 6) If the amplitude of oscillations remains the same then the motion is called \_\_\_\_\_.

### Q.2 Solve any Eight of the following.

- 1) What is pseudo force? Give example.
- 2) Give the characteristics of inertial frame of reference.
- 3) Write the importance of Lagrangian formulation over Newtonian formulation.
- 4) A sling carrying a stone in a force free space with an angular velocity 4 rad/s produces centripetal acceleration 144 rad/s<sup>2</sup>. Calculate the radius of the circle intercepted by sling?
- 5) What is the concept of center of mass?
- 6) What are constraints? Give example.
- 7) Explain the formation of cyclones.
- 8) State Euler's theorem.
- 9) What is rigid body? Give example.
- **10)** Define degrees of freedom. How much degree of freedom for four particles moving freely in plane?

### Q.3 A) Attempt any two of the following.

- 1) State and prove conservation theorem for energy of a particle.
- 2) A body is dropped from a height of 100 m from rest at latitude  $\phi = 45^{\circ}$ . Calculate the horizontal eastward deflection of the body. ( $\omega = 7.29 \times 10^{-5}$  rad/s).
- 3) Show that the shortest distance between any two points in a plane is along a straight line passing through them.
- B) Write note on generalized coordinates.

### Q.4 A) Attempt any two of the following.

- 1) Obtain Lagrange's equation from D'Alembert's principle.
- 2) State and explain Hamilton's principle.
- 3) State and prove conservation theorem for angular momentum of system of particles.
- B) A bullet collides to a fixed block as shown in following figure. The interaction time of bullet with the block is 0.2 second. If the velocity of the bullet is 250 m/s after collision, find the resistance of the block to the bullet (in terms of force). (Given, initial velocity of bullet is 500 m/s, mass of the bullet is 200g, and weight of the block is 8 kg)

### Q.5 Attempt any two of the following.

- a) Derive Euler's equations of motion of a rigid body.
- **b)** What are symmetric and antisymmetric mode of oscillations? Obtain equations of motion of two coupled simple pendulums in terms of normal coordinates.
- c) State Hamilton's principle and obtain Euler-Lagrangian equation from it.

	B.Sc. (	Semester - V) (New) (CE) CHEMISTRY Organic Che	BCS) Exa (Special emistry (1	mination: March/April-20 Paper-XI) I9201508)
D Ti	ay & Date: V me: 03:00 P	Vednesday, 05-07-2023 M To 06:00 PM		Max. N
In Q	structions: .1 A) W	<ol> <li>All questions are compulse</li> <li>Draw neat labeled diagrar</li> <li>Figures to right indicate fut</li> <li>Use of log table and calcut</li> </ol> rite the correct alternative for	ory. n and give III marks. Ilators is all <b>or each of</b>	equations wherever necessary lowed. <b>the following</b>
	1)	The M <sup>+</sup> and M+2 peaks wi presence of isotope of a) Br c) C	th same int of the fo b) d)	ensity are observed due to ollowing. Cl H
	2)	type of species are d a) Negatively charged	etected in b)	mass spectrometer. Positively charged

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١,	type of a	province are date	atad in mass	enactromata
		species are dete		spectrometer

a) Negatively charged	b)	Positively charged
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d) Neutral c) Free radicals

The potential energy of cyclohexane is maximum in \_\_\_\_\_ conformation. 3)

- a) Boat Twist boat b) c) Chair d) Half chair
- According to Baeyer, the stability of cycloalkanes \_\_\_\_\_ with increase 4) in rina size.
  - a) Increases b) Decreases
  - c) Does not change d) Anything can happen

The number of fundamental modes of vibrations in Benzene are 5)

- a) 10 b) 12
- c) 6 d) 30
- In NMR spectroscopy \_\_\_\_\_ radiations are used. 6)
  - a) UV b) IR c) Radiofrequency d) Visible
- Which of the following compound has chemical shift value more than 7) 10?
  - a) Alcohol Aldehyde b)
  - c) Carboxylic acids Esters d)
- Diethyl malonate on hydrolysis gives 8)
  - a) Acetic acid b) Succinic acid
  - c) Malonic acid Oxalic acid d)
- When methylene group is \_\_\_\_\_ to two carbonyl groups it is said to be 9) active methylene group.
  - a) Alpha b) Beta
  - c) Gamma d) Delta

**SLR-QA-189** 

Ρ

- Set
- Max. Marks: 80

10

ation: March/April-2023

16

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06

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80

- 10) In Oppenaur oxidation, secondary alcohols are oxidized to \_\_\_\_\_.
  - b) Acid

d)

Ester

a) Aldehyde c) Ketone

### B) Fill in the blanks.

- 1) Addition of groups to opposite faces of the double bond of an alkene is called \_\_\_\_\_.
- The IR spectra is the graph of absorbance or percentage transmittance versus \_\_\_\_\_.
- 3) Dimethyl ether has \_\_\_\_\_ sets of protons.
- 4) Esterification of \_\_\_\_\_ with ethanol yields malonate ester.
- 5) Ring contraction or expansion can be carried out by \_\_\_\_\_ reaction.
- 6) Acid hydrolysis of AAE produces \_\_\_\_\_.

### Q.2 Solve any Eight of the following.

- 1) Define stereoselective and stereospecific reactions.
- 2) Explain in short what is mean by locking of conformation.
- 3) Draw chair and boat conformations of decalin.
- 4) Distinguish the following compounds by IR spectroscopy.
  - 1) H<sub>3</sub>C-CO-CH<sub>3</sub>
  - 2) H<sub>3</sub>C-CH<sub>2</sub>-OH
- 5) An organic compound with molecular formula  $C_2H_4O_2$  shows IR absorption band at 3400 cm<sup>-1</sup> and 1700 cm<sup>-1</sup>. Determine the structure of the compound.
- 6) Define magnetic and non magnetic nuclei with example.
- 7) Explain what is mean by spin- spin splitting.
- 8) What is active methylene group? Write two examples of compound containing active methylene group.
- 9) What is the action of urea in presence of sodium ethoxide on diethyl malonate at 110°C.
- **10)** Predict the product C<sub>6</sub>H<sub>5</sub>CONH<sub>2</sub> <u>NaOBr, Heat</u>

### Q.3 A) Attempt any Two of the following.

- 1) Describe shielding and deshielding effect with example.
- 2) An organic compound with molecular formula C<sub>10</sub>H<sub>13</sub>Cl. It gives following NMR data. Determine the structure of the compound. 1.57  $\delta$  Singlet (6H), 3.07  $\delta$  Singlet (2H), 7.27  $\delta$  Singlet (5H)

?

3) What is Wittig reaction? Explain with mechanism.

### B) Write short note on types of vibrations in IR spectroscopy.

### Q.4 A) Attempt any Two of the following.

- 1) Draw the schematic diagram of mass spectrometer.
- 2) Describe applications of IR spectroscopy.
- 3) Distinguish following pair of compounds by NMR spectroscopy.
  - 1)  $H_3C-CH_2-CHO$  and  $H_3C-CO-CH_3$
  - 2) H<sub>3</sub>C-CH<sub>2</sub>-COOH and H<sub>3</sub>C-CH<sub>2</sub>-CH<sub>2</sub>-OH

### B) Explain the following.

Use of mass spectroscopy in

- 1) determination of molecular formula
- 2) determination of structure of the compound.

### Q.5 Attempt any Two of the following.

- 1) Explain Baeyer's strain theory and its limitations.
- 2) Starting from ethyl acetoacetate how will you synthesize
  - 1) 2- methyl EAA
  - 2) n- Butyric acid
  - 3) Succinic acid
  - 4) Glutaric acid
- 3) An organic compound A [C<sub>3</sub>H<sub>6</sub>O] which is a ketone reacts with another compound B [C<sub>4</sub>H<sub>7</sub>O<sub>2</sub>Br] and metallic zinc and dry ether to give the compound C[C<sub>7</sub>H<sub>13</sub>O<sub>3</sub>ZnBr], Compound C on hydrolysis with HCI gives a  $\beta$  hydroxy ester D[C<sub>7</sub>H<sub>14</sub>O<sub>3</sub>]. Compound D on further hydrolysis gives E [C<sub>5</sub>H<sub>10</sub>O<sub>3</sub>] which is readily dehydrated on heating to form  $\alpha$ ,  $\beta$  unsaturated acid. What are A, B, C, D and E? Write reactions and name of the reaction.

					SLR-QA-190
Seat No.					Set P
E	3.So	c. (Se	mester - V) (New) (CBCS) BOTANY (Speci Molecular Biolog	) Exa ial Pa gy (19	mination: March/April-2023 per - XI) 9201503)
Day & Time:	Dat 03:0	te: We 00 PM	ednesday, 05-07-2023 I To 06:00 PM	37 (-	Max. Marks: 80
Instru	ictio	o <b>ns</b> : 1) 2 3 4	) All questions are compulsory. ) Draw neat labeled diagram. ) Figures to right indicate full ma ) Use of log table and calculator	ırks. s is all	owed.
Q.1	A)	Mult 1)	tiple choice questions. In lac operon, lac-Z gene is res	sponsi	<b>10</b> ble for synthesis of
		ŗ	enzyme. a) Permease c) Beta galactosidase	b) d)	Transacetylase Amylase
		2)	In lac operon, lac-A gene is res enzyme.	sponsi	ble for synthesis of
			a) Permease c) Beta galactosidase	b) d)	Transacetylase Amylase
		3)	In lac operon, i gene is respons a) Inducer c) Repressor	sible fo b) d)	or synthesis of protein. Promoter Inhibitor
		4)	Prokaryotes have transo a) Polycistronic c) Polymorphic	criptior b) d)	n. Monocistronic None of these
		5)	During translation, first amino a a) Arginine c) Tyrosine	acid ao b) d)	dded is Proline Methionine
		6)	B-form of DNA has ty a) Right handed c) Half left handed	rpe of b) d)	helix sense. Left handed Half right handed
		7)	Nucleic acid is polymer or biom carbon sugars and phosphate a) 6	nolecu group: b)	le which is made up of s. 5
		0)	c) 8	d)	9
		8)	Nucleotides are monomers ma a) 5 Carbon Sugar c) Nitrogen base	de up b) d)	of components. Phosphate groups all of these
		9)	When the nitrogen base combi as	ne wit	h sugar molecule, it is known
			a) nucleosides c) nucleus	b) d)	Nucleotides Biomolecule

SLR-C	QA-190
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				100
	10) A nucleotide is derived from nucleosic a) amino b) c) nucleic d)	de by addition of Phosphoric Thymic	_ acid.	
B)	<ul> <li>Fill in the blanks.</li> <li>1) discovered purine and pyrimid</li> <li>2) DNA &amp; RNA both are made up of</li> <li>3) The nucleotides are bonded to form a made up of primary nucleobase</li> <li>4) Adenine combine with Thymine by</li> <li>5) At low temperature DNA is reconstruct as</li> <li>6) The chromosomal DNA replication or cell cycle.</li> </ul>	ine bases in nucleic ac helical backbone struc s. hydrogen bonds. cted, this phenomenon curs only once during	ids. cture is known of	06
Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	<ul> <li>Define Translation.</li> <li>Define Transcription.</li> <li>Enlist the types of DNA.</li> <li>Enlist the types of RNA.</li> <li>Enlist the enzymes involved in DNA replica</li> <li>Draw a neat labelled diagram structure of I</li> <li>Define Prokaryotes.</li> <li>Define Eukaryotes.</li> <li>What are the heat shock proteins?</li> <li>What is renaturation of DNA?</li> </ul>	ition. DNA (Watson and Cricl	k model).	16
A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Comment up on structure of RNA.</li> <li>2) Comment up on types of DNA.</li> <li>3) Comment up on steroids and peptide</li> </ul>	hormones of Eukaryot	es.	10
B)	Short note. Explain in brief Synthesis of DNA (Kornber	g's discovery).		06
A)	<ul> <li>Attempt any Two of the following.</li> <li>1) What are transcription factors in Euka</li> <li>2) Explain in brief structure of Ribosome</li> <li>3) Explain in brief Watson and Crick mo</li> </ul>	aryotes? del of DNA.		08
B)	Explain DNA as the carrier of genetic inform experiment.	nation with the help of	Griffith's	08
Atte a) b) c)	t <b>tempt any Two of the following.</b> Explain regulation of lactose metabolism in Explain the post-translational modifications Explain replication of DNA in prokaryotes a	<i>E. coli.</i> of proteins ind eukaryotes.		16

Q.2

Q.3

Q.4

Q.5

Set

Max. Marks: 80

Seat	
No.	

### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 ZOOLOGY (Special Paper XI) Endocrinology (19201522)

Day & Date: Wednesday, 05-07-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labeled diagram.
- 3) Figures to right indicate full marks.

# Q.1 A) Rewrite the following sentences choosing correct answer from given 10 alternatives.

- 1) Deficiency of insulin causes a disease called\_\_\_\_\_
  - a) Diabetics mellitusb) Goiterc) Cretinismd) Addison
  - Adronaling hormong is appreted by
- 2) Adrenaline hormone is secreted by \_\_\_\_\_ gland.
  - a) Parathyroid b) Adrenal c) Thyroid d) Pineal

) The thyroid gland is situated in the region of bo

The thyroid gland is situated in the \_\_\_\_\_ region of body.
 a) Neck
 b) Oral

a) Neck b) Oral c) Abdominal d) Thorax

4) In man, dietary requirement of iodine is approximately \_\_\_\_\_ mg/week.
a) 1 b) 2
c) 1.5 d) 0

- 5) The synthesis and release of thyroxin hormone is under the control of \_\_\_\_\_ hormone from pituitary gland.
  - a) ACTH b) FSH
  - c) MSH d) TSH
- 6) \_\_\_\_\_ disease is caused by over secretion of thyroid gland.
  - a) Diabetics mellitus b) Exothermic goiter
  - c) Conn's d) Idiots

7) \_\_\_\_\_ endocrine gland is situated on the thyroid gland.

- a) Parathyroid b) Adrenal
- c) Thyroid d) Thymus
- 8) Ovulation is chiefly performed by \_\_\_\_\_.
  - a) ADH b) LH
  - c) Estrogen d) Relaxin

9) Hormone secreting cells of a testis are \_\_\_\_\_

- a) Follicular cellsb) Spermatocytesc) Leydig cellsd) Cells of tunica albuginea
- 10) Corpus luteum is found in \_\_\_\_\_.
  - a) Kidney b) Testis
  - c) Ovary d) Pituitary
|     | B)  | <b>Give</b><br>1)<br>2)<br>3)<br>4)<br>5)<br>6)  | the answer in one sentence.<br>TSH is secreted by<br>What is the function of Thyroxin hormone?<br>The blood calcium level is lowered by deficiency of which hormone.<br>Islets of Langerhans produces<br>Hormones are chemical messengers secreted by<br>Sertoli cells are present in | 06 |
|-----|---|--|---|----|
| Q.2 | Solv<br>1)<br>2)<br>3)<br>4)<br>5)<br>6)<br>7)<br>8)<br>9)<br>10) | e any<br>Testi<br>Hypo<br>Feec<br>GnR<br>Neur<br>Polyo<br>Acro<br>Func<br>Endo<br>Islets | <b>reight of the following.</b><br>icular torsion<br>bgonadism<br>black mechanism<br>H<br>rosecretions<br>cystic ovarian syndrome<br>megaly<br>ctions of MSH<br>bcrine glands<br>s of Langerhans  | 16 |
| Q.3 | A)  | <b>Atte</b><br>1)<br>2)<br>3)  | <b>mpt any Two of the following.</b><br>Describe the hormonal control of testicular activity.<br>Describe the hormones of anterior lobe of pituitary gland.<br>Give in brief the neurohormones and neurosecretions.   | 10 |
|     | B)  | <b>Sho</b> i<br>Give<br>funct  | <b>rt note.</b><br>brief account of structure of pituitary gland its hormones and<br>tions.   | 06 |
| Q.4 | A)  | Atter<br>1)<br>2)<br>3)  | <b>mpt any Two of the following.</b><br>Describe the mechanism of hormonal action at cellular level and its<br>regulation.<br>Write an account on female sex hormone and its regulation.<br>Describe location, structure of pineal gland and its functions.                           | 08 |
|     | B)  | Expl   | ain what is placenta and placental disorders.   | 08 |
| Q.5 | Atter<br>a)   | mpt a<br>Desc  | ribe the hormones of neurohypophysis.   | 16 |

- b) Describe classification of hormone with reference to their chemical nature.
- c) Describe the Ovarian cancer.

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## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Special Paper - XI) Real Analysis (19201526)

Day & Date: Wednesday, 05-07-2023 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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**Instructions:** 1) All questions are compulsory.

2) Figures to right indicate full marks.



- The series  $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \cdots$  is \_\_\_\_\_. a) Convergent b) Di c) Oscillates d) Al 9)
  - Divergent
    - c) Oscillates Alternating series
- 10) If  $\sum a_n$  is convergent series then  $\lim_{n \to \infty} a_n$  is equal to \_\_\_\_\_. a) 1 b) 0

  - d) c) -1

#### B) Fill in the blanks.

If  $f: A \to B$  and  $X \subset A$  define  $g: X \to B$  then  $g(x) = f(x), \forall x \in \chi$  then g 1) is called

 $\infty$ 

- Let  $f(x) = \log(x), 0 < x < \infty$  and A = [0,1], B = [1,3] then 2)  $f^{-1}(A \cup B) =$
- All the subsequences of convergent sequence of real number 3) converges to limit.
- 4) a monotonic decreasing sequence which is \_\_\_\_\_ diverges to  $-\infty$
- 5) The series  $\sum a_n$  is said to converges to *S* if \_\_\_\_\_
- The series  $1 + r + r^2 + r^3 + \cdots$  is oscillatory if \_\_\_\_\_. 6)

#### Q.2 Solve any Eight of the following.

- If  $f(x) = \tan x$ ,  $\frac{-\pi}{2} < x < \frac{\pi}{2}$  and if  $A = \left[\frac{-\pi}{2}, \frac{-\pi}{4}\right]$ ,  $B = \left[\frac{\pi}{4}, \frac{\pi}{2}\right]$  then verify 1)  $f(A \cap B) = f(A) \cap f(B)$
- 2) Define characteristic function  $\chi$  and show that  $\chi_{\phi} = 0$
- 3) Prove that the set  $\{1,4,9,16,25,\ldots\}$  is countable.
- If  $\lim_{n \to \infty} S_n = L$  and  $\lim_{n \to \infty} t_n = M$  then prove that  $\lim_{n \to \infty} (S_n + t_n) = L + M$ 4)
- Let  $S_n$  be a sequence defined by  $S_1 = 1, S_2 = 1, S_{n+1} = S_n + S_{n-1}$  then find  $S_6$ 5)

6) Find 
$$\lim_{n \to \infty} S_n$$
 where  $\{S_n\}_{n=1}^{\infty} = \left\{\frac{2n}{n+4n^{\frac{1}{2}}}\right\}_{n=1}^{\infty}$ 

- 7) Define oscillatory sequence with example.
- $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$  Converges. Prove that the series. 8)
- 9) Define absolute convergence and conditional convergence of series.
- 10) State the Ratio test for absolute converges of series.

#### Q.3 A) Attempt any Two of the following.

- If  $A_1, A_2, A_3 \dots$  are countable sets then prove that  $\bigcup A_n$  is countable. 1)

10

- Prove that the sequence  $\{S_n\}$  where  $S_n = \left(1 + \frac{1}{n}\right)^n$  is convergent and 2) that limit  $\left(1+\frac{1}{n}\right)^n$  lies between 2 and 3
- If  $\sum a_n$  is divergent series of positive numbers then prove that 3) there is a sequence  $\{E_n\}$  of positive numbers converges to zero for which  $\sum_{n=1}^{\infty} E_n a_n$  still diverges.
- State and prove Nested intervals theorem. B)

16

#### Q.4 A) Attempt any Two of the following. 80 If $f: A \to B$ and $X \subset B, Y \subset B$ then prove that 1) $f^{-1}(X \cap Y) = f^{-1}(X) \cap f^{-1}(Y)$ If $\{S_n\}$ and $\{t_n\}$ are bounded sequences of real numbers then prove 2) $\lim_{n \to \infty} \inf(S_n + t_n) \ge \lim_{n \to \infty} \inf S_n + \lim_{n \to \infty} \inf t_n$ Prove that if $\sum a_n$ converges absolutely, then the series $\sum a_n$ 3) convergent but not conversely. B) State and prove Demorgan's Laws. 80 Attempt any Two of the following. Q.5 16 Define countable set and show that the set of all rational number is a) countable. Also show that the set of rational number in [0,1] is countable. Prove that a sequence $\{S_n\}$ of real number is convergent if and only if it is b) Cauchy sequence.

c) Define alternating series and show that if  $\{a_n\}_{n=1}^{\infty}$  is sequence of positive numbers which is non-increasing and  $\lim_{n\to\infty} a_n = 0$  then the alternating series

$$\sum_{n=1}^{\infty} (-1)^{n+1} a_n \quad \text{is convergent.}$$

Page **3** of **3** 

# **SLR-QA-193** Set

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No.	

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **STATISTICS (Special Paper - XI)** Sampling Techniques (19201530)

Day & Date: Wednesday, 05-07-2023 Time: 03:00 PM To 6:00 PM

c)

c)

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Use of log table and calculators is allowed.

#### Q.1 A) Choose the correct alternative.

- Sampling frame is a term used for . 1)
  - a list of random numbers a)
  - b) a list of voters
  - c) a list of sampling units of a population
  - none of the above d)
- 2) The discrepancy between estimate and population parameter is known as \_\_\_\_\_.

a)	human error	b)	sampling error	
c)	non-sampling error	d)	none of these	

non-sampling error d) none of these

#### Under proportional allocation the size of the sample from each 3) stratum depends on

Total sample size a)

Population size

- b) Size of the stratum d) All the above
- 4) The total number of possible samples of size n, drawn from population size N by SRSWOR is \_
  - a) Ν n b)
  - c) NCn Nn d)

5) In presence of linear trend \_\_\_\_\_ method is more efficient.

- Stratified b) Systematic a) SRSWR
- SRSWOR d) c)

### Systematic sampling means \_\_\_\_\_. a) Selection of n contiguous units 6)

- Selection of n units situated at equal distances b)
- Selection of n largest units c)
- Selection of n middle units in a sequence d)

#### Probability of selection of varies at each subsequent draw in \_\_\_\_\_. 7) a)

- SRSWOR b) SRSWR
- both (a) and (b) d) neither (a) nor (b) c)
- How many types of allocation are in common use? 8) a) One
  - b) Two
  - Three d) Four
- Circular systematic sampling is used when 9)
  - N is a multiple of n a) N is not divisible by n c)
- b) N is a whole number d) None of the above

Max. Marks: 80

		10)	<ul> <li>Sampling errors can be reduced by</li> <li>a) choosing a proper probability sampling</li> <li>b) selecting a sample of adequate size</li> <li>c) using a suitable formula for estimation</li> <li>d) all the above</li> </ul>	
	B)	Defir 1) 2) 3) 4) 5) 6)	ne the following. Sample Population Sampling unit Sampling frame Random sampling Auxiliary variable	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	ve any Defin Give State Defin What Give State Defin	<ul> <li>r Eight of the following.</li> <li>a sampling error.</li> <li>a real-life situation where stratified sampling is used.</li> <li>characteristics of a good questionnaire.</li> <li>a real-life situation where cluster sampling is used.</li> <li>a non-random sampling.</li> <li>t is meant by Neyman allocation.</li> <li>a real-life situation where systematic sampling is used.</li> <li>t the advantages of sampling method over census method.</li> <li>a the objectives of a sample survey.</li> <li>a census method.</li> </ul>	16
Q.3	A)	Atten 1) 2) 3)	<b>npt any Two of the following.</b> Explain sampling for proportion, Obtain its unbiased estimator for population proportion. Describe, in brief the cluster sampling. Find under what condition ratio estimate is more efficient than SRS.	10
	B)	Write	a short note on a stratified random sampling.	06
Q.4	A)	Atten 1) 2) 3)	<b>npt any Two of the following.</b> Explain regression estimators of population mean. Describe systematic sampling procedure. Show that ratio estimator is biased.	08
	B)	Desc	ribe the idea of two-stage and multistage sampling in details.	08
Q.5	Atte a) b)	<b>mpt a</b> Discu In pre SRSV	<b>Iny Two of the following.</b> Uss in details about the determination of the sample size. Evence of linear trend of the form $Yi = a + bi$ ; $i = 1, 2,, N$ , compare WOR, Stratified random sampling and systematic sampling.	16

c) With usual notations prove that Neyman's allocation has better precision than proportional allocation; and also prove that proportional allocation has better precision than SRS.

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B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **GEOLOGY (Special Paper - XI)** Applied Geology – Engineering Geology (19201536)

Day & Date: Wednesday, 05-07-2023 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Q.1 A) Fill in the blanks.

- Which of the following has definite surface of failure? 1)
  - a) Flowage b) Subsidence
  - d) All of these c) Sliding

#### 2) Rock types and geological structures can be studied using .

- a) electrical resistivity
- b) rock core drilling c) geophysical survey d) field mapping
- 3) A subsurface rock body of light density gives gravity anomaly.
  - a) High/positive b) low/negative
  - c) neutral d) none of these
- Geophones are used \_\_\_\_\_ in geophysical exploration method. 4)
  - b) Magnetic survey a) Gravity survey
  - c) Seismic survey
- d) Electrical resistivity survey
- At the construction stage what type of task is undertaken by the 5) engineering geologist?
  - a) The geologist plots topographic, geological features and geologically weaknesses at the site
  - b) The geologists perform core logging
  - c) The geologists perform geophysical surveys
  - d) The geologists prepare regional geological and structural maps

#### What is the maximum compressive force expressed per unit area, 6) which a stone can withstand without rupturing?

- a) Shear strength
- b) Tensile strength
- c) crushing strength
- d) Bending strength
- Pick the rock which is objectionable for use in moist conditions. 7)
  - Marble a) Granite b)
  - c) Gabbro d) Limestone
- Gradation of soil occurs in \_\_\_\_\_ soils. 8)
  - a) residual

- b) Transported
- c) both (a) and (b) d) neither (a) nor (b)

06

16

- 9) Type of dam where the forces acting on the dam are transmitted onto the abutment rocks is \_\_\_\_\_.
  - a) Gravity dam
  - c) Geotechnical dam
- b) Arch damd) Embankment dam
- 10) Lithology does not effects on which parameter?
  - a) Type of tunnel b) Method of tunneling
  - c) Strength and extent of lining d) Cost of the project

## B) Answer the following questions in one sentence.

- 1) At which stage of the civil engineering project, a special purpose (Thematic) geological maps are prepared?
- 2) What is subsidence?
- 3) What is the type of soil found in Indo-Gangetic plains?
- 4) In which type of survey Current electrodes and potentiometer are used.
- 5) Which type of geological structure can be rectified by grouting for tunneling?
- 6) "Schistosity dipping towards downstream of the river". Is this condition being favorable for dam construction?

## Q.2 Solve any Eight of the following.

- 1) Name the types and sub types of flowages in landslides.
- 2) What are the characteristics of glacial soil?
- 3) What is modulus of elasticity?
- 4) What is invertin tunnel?
- 5) What is the use of gallery of the dam?
- 6) What is reservoir of the dam?
- 7) Which soil occurs at deep sea?
- 8) What are the two types of clay structure?
- 9) What is geophone?
- 10) What is the agent of mass movement?

#### Q.3 A) Attempt any Two of the following. 10 1) Give various methods to control landslides? 2) Describe masonry dam? Write a note on "Engineering geological work at construction stage." 3) Write a note on selection of site for tunnel construction in folded region. B) 06 Q.4 A) Attempt any Two of the following. 08 Explain sliding in mass movement. 1) 2) Describe 1:1 and 2:1 layer in clays with appropriate figures. Describe magnetic survey method for site investigation? 3)

**B)** Explain uniaxial compressive strength.

## Q.5 Attempt any Two of the following.

- a) Earthen and rock-fill dams.
- **b)** What types of precautionary measures one should take during the construction of tunnels in hard and soft rocks?
- c) Engineering classification of soil.

08

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Max. Marks: 80

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Q.1

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **MICROBIOLOGY (Special Paper - XI)** Immunology (19201541)

Day & Date: Wednesday, 05-07-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory. 2) Figures to right indicate full marks. 3) Draw neat diagrams and give equations wherever necessary. 4) Use of log-tables and calculator is allowed. Multiple choice questions. **A**) Complement component  $C_3$  in classical pathway is cleaved by . 1) a) C₃b b) C<sub>3</sub>bBb c) Factor B d) CBBbb 2) Humoral immunity is mediated by b) Macrophages a) B cells c) Dendritic cells d) Cytotoxic T cells 3) a) Burnet b) Landsteiner c) Kohler and Milstein d) Jenner 4) Universal donor is person having \_\_\_\_\_ blood group. b) A negative a) O Negative c) B positive AB positive d) 5) Mysthenia gravis is an example of \_\_\_\_\_ disease. a) Transitory autoimmune b) Organ specific autoimmune c) Non organ specific autoimmune d) Complement deficiency MHC II is present on \_\_\_\_\_. 6) a) Macrophages b) B cells c) Dendritic cell d) All of these Histamine is released in \_\_\_\_\_ type of hypersensitivity. 7) a) Anaphylaxis b) Serum sickness d) Arthus reaction c) Haemolytic anaemia 8) a) Positive selection b) negative selection Suppression c) autoimmunity d) 9) is used as fusion promoting agent while getting hybridoma cells. a) Surfactants b) Polyphenol alcohol c) Polyethylene glycol (PEG) d) Hydrocarbon

10

- Hybridoma technique for monoclonal antibodies was developed by .

The failure to reject or inactivate self reactive antigens results in .

		10)	HLA complex of man is located on short arm of chromosome numbera) 6b) 2c) 22d) 20	
	B)	Fill ii 1)	<b>n the blanks.</b> The MHC in mouse called H2 gene complex is located on chromosome	06
		2)	Activated B lymphocytes after antigenic stimulus get differentiated into	
		3) 4)	In an autoimmune disease idiopathic thrombocytopic purpura autoantibodies are produced against is secondary lymphoid organ.	
		5) 6)	The chemical nature of complement is ABO blood group was discovered by	
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	e any Defin Defin Enlis Defin Enlis Defin Enlis Draw Enlis	y Eight of the following. The Xenograft. The Hybridoma. Set the cells involved in cell mediated immunity. The Complement. Set the secondary mediators of the anaphylaxis. The Bombay Phenotype. The Immediate Hypersensitivity. Set the properties of cytokines. The figure of Lymph node and label it correctly. Set the two differences between plasma cell and memory cell.	16
Q.3	A)	<b>Atter</b> 1) 2) 3)	<b>mpt any Two of the following.</b> Describe in short about primary and secondary immune response. Describe in short about mechanism of humoral immunity. Describe in short about Anaphylaxis.	10
	B)	Shor Desc comp	<b>rt note.</b> cribe in short about function, properties and components of the plement.	06
Q.4	A)	<b>Atter</b> 1) 2)	<b>mpt any Two of the following.</b> HLA Typing Describe in short about Arthus reaction and Serum sickness and its mechanism.	08
	B)	3) <b>Desc</b> Desc	Describe in shot about the properties of cytokines. cribe / Explain / Solve. cribe in detail about ABO blood group system.	08
Q.5	Attei a)	mpt a Desc	any Two of the following. cribe in detail about classes, structure and organization of MHC genes	16
	b) c)	Desc	cribe in detail about blood transfusion reaction and its complications. cribe in detail about production and any two applications of monoclonal	

c) Describe in detail about production and any two applications of monoclonal antibodies.

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Q.1

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **ELECTRONICS (Special Paper - XI)** Sensors and Transducers (19201550)

Day & Date: Wednesday, 05-07-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

3) Draw neat diagrams and give equations wherever necessary. 4) Use of log-tables and calculator is allowed. Multiple choice questions. The degree of closeness of a measurement compared to the expected 1) value is called . b) a) Accuracy Resolution c) Precision d) Error 2) Which of these transducers is an active transducer? a) Strain gauge Piezoelectric b) c) Thermistor d) LDR 3) Which one of these is not a measurement system? a) pH meter Multimeter b) c) signal generator d) weighing machine The load cell used in electronic weighing system consists of \_\_\_\_\_ 4) transducer. a) Potentiometer b) RTD c) Thermistor d) Strain gauge The transducer used to measure angular displacements is . 5) a) RVDT LVDT b) c) variable reluctance All of these d) In capacitive transducer, the capacitance basically depends upon . 6) a) Area of cross section of the plates b) distance between the plates c) dielectric constant d) all of these The temperature transducer having largest temperature measurement 7) range is a) Thermistor b) Thermocouple c) RTD mercury thermometer d) sensor is used for motion detection. 8) a) LM-35 N-26 b) c) PIR d) photovoltaic cell Which one of these is not an actuator? 9) a) Relay b) Solenoid c) Optocoupler d) Pyrometer

2) Figures to right indicate full marks.

A)

Max. Marks: 80

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		<ul> <li>Hall effect transducer is used in the measurement of</li> <li>a) magnetic field</li> <li>b) IR radiations</li> <li>c) Vibrations</li> <li>d) light intensity</li> </ul>
	B)	<ul> <li>Answer in one sentence/fill in the blanks/definitions/one word answer.</li> <li>What is active transducer?</li> <li>Give the full-form of RVDT.</li> <li>Name any two light sensitive transducers.</li> <li>What is optocoupler?</li> <li>Give the principle of transduction.</li> <li>What is precision?</li> </ul>
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	any Eight of the following.16Explain the basic need of measurement.Define sensor and transducer. Give basic difference between them.Explain the principle of operation of resistive transducer.What is hall effect? Explain in short.Bive the principle of operation of capacitive transducer.Explain the need of system calibration.Explain the principle of operation of inductive transducer.What is meant by static and dynamic characteristics of the sensors.Bive the construction of solenoid.What is smart sensor? Give any one example of smart sensor.
Q.3	A)	Attempt any Two of the following.10)Discuss the selection criterion for transducers.2)Explain piezoelectric transducer.3)Explain the construction and operation of electromagnetic relay.
	B)	Vrite a note on LVDT. 06
Q.4	A)	Attempt any Two of the following.08)Write a short note on carbon microphone.2)Give classification of transducers with example.3)What is RTD? Explain.
	B)	Discuss the static and dynamic characteristics of a measurement system. <b>08</b>
Q.5	Atter a) b)	<b>pt any Two of the following.</b> Draw the block diagram of a measurement system and explain each block. Explain thermocouple transducer in detail.

c) Discuss variable area and variable permittivity type capacitive transducer.

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Instr	uctio	2 2 <b>ons</b>	) All ) Fig	questions are compulsor jures to right indicate full	y. marks.	
Q.1	A)	Muli 1)	tiple The pro	e <b>choice questions.</b> e operating system where ocess is	e fixed tin	ne slot is allocated to each activ
			a) c)	real time O.S. batch O.S.	b) d)	multiprogramming O.S. time-sharing O.S.
		2)	Ар а) с)	program in execution is ca Process Procedure	alled b) d)	 Instruction Function
		3)	Inte	erval between the time of	submiss	ion and completion of the job is
			a) c)	Waiting time Throughput	b) d)	turn-around time response time
		4)	FIF a) c)	O scheduling is Preemptive scheduling Deadlock scheduling	b) d)	Non- preemptive scheduling None of these
		5)	"Th a) b) c) d)	nroughput" of a system is Number of programs pro Number of times the pro Number of requests ma None of the above	 ocessed ogram is de to a p	by it per unit time invoked by the system rogram by the system
		6)	Vir a) b) c) d)	tual memory is simple to implement used in all major commo less efficient in utilizatio useful when fast I/O dev	ercial ope n of men vices are	erating systems nory not available
		7)	Pro a)	ocess is called as a passi True	ve entity b)	 False
		8)	The am a) c)	ere is a guarantee that th ount of time. That is calle Hard Real time systems Real time systems	e critical ed as s b) d)	tasks are completed in given  soft real time system None of the above
		9)	Vir	tual memory can be imple	emented	with

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B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **Computer Science (Special Paper XI)** Operating System (19201545)

- ٦
- - a) Segmentation c) Both a and b
- Paging b)
- None of the above d)

Max. Marks: 80

10

Set Ρ

		<ul> <li>10) is a technique of temporarily removing inactive programs from the memory of computer system.</li> <li>a) Swapping</li> <li>b) Spooling</li> <li>c) Semaphore</li> <li>d) Scheduler</li> </ul>	
	В)	<ul> <li>Fill in the blank.</li> <li>1) The priority scheduling algorithm suffers by</li> <li>2) The FIFO algorithm</li> <li>3) The degree of Multiprogramming is controlled by</li> <li>4) The banker's algorithm is used for deadlock</li> <li>5) Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called</li> <li>6) A system is in a safe state only if there exists a:</li> </ul>	06
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	ve any Eight of the following. Define Operating systems? What is meant by Multiprogramming? What is meant by Real time system? What is meant by Context Switching? Define Mutual Exclusion. What is meant by Co-operating process? What is meant by Race Condition? Define Semaphores? What is meant by CPU Scheduler? Define demand paging?	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) List out different types of operating system? Explain Time Sharing and Distributed operating system.</li> <li>2) Explain concept of process with process state.</li> <li>3) Explain FCFS scheduling algorithm with Example.</li> </ul>	10
	B)	<ul><li>Short note on</li><li>1) Swapping</li><li>2) Boot block</li></ul>	06
Q.4	A)	<ol> <li>Attempt any two of the following.</li> <li>1) Explain the different Services provided by Operating System.</li> <li>2) Explain the different Scheduling criteria in detail</li> <li>3) Define the term file. Explain different types of file.</li> </ol>	08
	B)	Write and Explain different component of operating system.	08
Q.5	Atte a) b) c)	<b>Explain Dinning Philosopher problem in Process Synchronization</b> . Explain Bankers Algorithm with example. What is page replacement? Write the working of FIFO page replacement algorithm.	16

Seat No.						Set	Ρ
E	B.Sc.	(Ser	nester - V	/) (New) (CBCS)   PHYSICS (Specia Nuclear Physics	Exan al Pa (192	nination: March/April-2023 per - XII) 201514)	
Day & Time:	Day & Date: Thursday, 06-07-2023 Max. Marks: 80 Time: 03:00 PM To 06:00 PM						80
Instru	ction	s: 1) / 2) 3) 4)	All question Figures to tl Draw neat l Use of log t	s are compulsory. he right indicate full r abelled diagrams wh able and calculators	narks ereve is allo	r necessary. wed.	
Q.1	a)	Multi 1)	ple choice Energy equ a) 931 e c) 931 N	<b>questions.</b> uivalent of 1 a.m.u. is V IeV	; b) d)	 931 KeV 931 BeV	10
		2)	Negative p a) greate c) mode	acking fraction indica er stability rate stability	ates _ b) d)	less stability no stability	
		3)	Packing fra a) positi c) zero	action for C-12 is ve	b) d)	negative -1	
		4)	The bomba a) target c) produ	arding particle in nucl : :ct	lear re b) d)	eaction is called projectile striker	
		5)	Q value of a) energ b) differe c) both ( d) zero	a nuclear reaction is y balance ence between the kin (a) and (b)	etic e	 nergies of products and projectile	
		6)	1 barn is e a) 10 <sup>-28</sup> c) 10 <sup>-28</sup>	qual to cm Angstrom	b) d)	10 <sup>-28</sup> meter 10 <sup>-28</sup> m <sup>2</sup>	
		7)	Nuclear fis a) Einste c) Fermi	sion was discovered ein	by b) d)	 Rutherford Chadwick	
		8)	The energy a) 200 e c) 200 M	y released per fissior V IeV	ı of U- b) d)	-235 is about 200 KeV 200 ergs	
		9)	In chain re a) arithn	action the number of netic progression	neutr b)	ons goes on multiplying in geometric progression	•

c) harmonic progression d) cumulative progression

06

16

10

80

10)	Neutrino hypothesis was p	postulated by	
	a) J.J. Thomson	b) Rutherfor	d

- a) J.J. Thomson
- c) Pauli

#### b) Fill in the blanks.

- Betatron works on the principle of 1)
- The disadvantage of relativistic increase of mass is observed in 2) type of accelerator.

d)

Fermi

- 3) Photomultiplier is used in counter.
- type of elementary particles. 4) Leptons are
- Positron is antiparticle of 5)
- The liquid drop model of nucleus was developed by . 6)

#### Q.2 Solve any eight of the following.

- Draw neat diagram of scintillation counter. a)
- Define binding energy of nucleus with binding energy curve. b)
- What is accelerator? What is its need? C)
- Define the cross-section of a nuclear reaction? Give its unit. d)
- Define Alpha-disintegration energy. e)
- What is a quark? f)
- Write a note on photons. g)
- Explain stripping reactions. h)
- Explain quenching of discharge in GM Counter. i)
- j) Explain Beta-decay.

#### Q.3 a) Attempt any two of the following.

- Describe Beta-ray spectrometer to determine kinetic energy of Beta-1) particle.
- 2) What is the Q-value of a nuclear reaction? What are exothermic and Endothermic reactions?
- Explain principle, construction and working of Wilson Cloud Chamber. 3)
- Explain the construction and working of GM Counter along with GM plateau 06 b) region.

#### Answer any Two of the following. Q.4 a)

- Explain the construction and working of Cyclotron. Derive an 1) expression for the maximum energy gained by an ion.
- 2) Explain liquid drop model of nucleus. What are its advantages and disadvantages?
- What is a nuclear reaction? Explain the general scheme of 3) representation of a nuclear reaction. Give one example each of  $(\alpha, p)(p, \alpha)$  and (D, p) type of nuclear reactions.
- b) Derive the semi-empirical binding energy formula for a nucleus based on 08 the liquid drop model.

#### Q.5 Attempt any two of the following.

- Explain the principle, construction and working of Scintillation counter. a)
- What are elementary particles? Explain the classification of elementary b) particles. What are quarks? Explain the types of quarks.
- Discuss magnetic alpha-ray spectrometer. Explain fine structure of alpha-C) line spectra and long-range alpha particle spectrum.

Set

Max. Marks: 80

Seat	
No.	

## B.Sc. (Semester – V) (New) (CBCS) Examination: March/April-2023 **CHEMISTRY (Special Paper - XII)** Analytical and Industrial Physical Chemistry (19201509)

Day & Date: Thursday, 06-07-2023

Time: 03:00 PM To 06:00 PM

**Instructions**: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.
- 4) Use of log table and calculators is allowed.

#### Q.1 Choose the most correct alternative of the following and rewrite the 10 a) sentences.

- The equation, It = Io  $e^{-\epsilon ct}$  represents the mathematical expression 1) for Beer's law
  - a) Lambert's law b)
  - c) Grotthuss-draper law d) None of these

#### is the logarithm of reciprocal of transmission. 2)

- a) Optical density c) Extinction coefficient
  - d) Intensity

#### 3) According to latest convention, the emf of a cell may be expressed as

b)

Opacity

- a) E<sub>Cell</sub> = E<sub>Right</sub> + E<sub>Left</sub> E<sub>Cell</sub> = E<sub>Left</sub> + E<sub>Right</sub> b)
- c)  $E_{Cell} = E_{Right} / E_{Left}$ d) E<sub>Cell</sub> = E<sub>Right</sub> - E<sub>Left</sub>

#### 4) The formula C<sub>6</sub>H<sub>4</sub>(OH)<sub>2</sub> represents

- a) hydroquinone quinhydrone b)
- c) quinine d) quinoline
- In chromium plating \_\_\_\_\_is preferred as an anode. 5)
  - a) zinc chromium b)
  - c) lead d) copper

The process of pickling means cleaning of the article in . 6)

- a) base b) acid
- c) water d) benzene
- 7) In flame photometer the temperature of the flame is controlled by factor/s.
  - a) fuel-oxidant ratio c) type of fuel and oxidant
    - type of solvent b) All of these d)
- 8) The flame photometry is concerned with the measurement of of emitted light.
  - a) frequency b) intensity
  - c) wavelength wavelength and intensity d)
- Which of the following electrolyte will give the same value of molar 9) conductance and equivalent conductance
  - a) Na<sub>2</sub>SO<sub>4</sub> H<sub>2</sub>SO<sub>4</sub> b) NaCl
    - c) MgCl<sub>2</sub> d)

06

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- 10) In conductivity cell \_\_\_\_\_ plates are used as electrodes.
  - a) platinum b) copper
  - c) zinc d) silver

## b) Fill in the blanks.

- 1) In photovoltaic cell, selenium layer is covered with a transparent layer of
- 2) For standardization of potentiometer, a standard cell having potential \_\_\_\_\_\_ is used.
- 3) Boltzmann distribution equation for the fraction of free atoms that are thermally excited is given as  $N^*/N^0 =$ \_\_\_\_\_.
- In electroplating process the article to be plated is generally made as \_\_\_\_\_.
- 5) In case of uni-univalent electrolytes the values of equivalent conductance and molecular conductance are \_\_\_\_\_.
- 6) The equivalence conductance ( $\lambda$ ) of the solution is given by the relation,  $\lambda =$

## Q.2 Solve any eight of the following.

- a) State Lambert's law.
- **b)** Represent the nature of graph for the determination of end points by analytical method.
- c) Give the advantages of potentiometric titrations.
- d) State the Faraday's first law of electrolysis.
- e) What do you mean by cathode efficiency?
- f) Explain the term electroforming.
- g) Name the components used in flame photometer.
- h) Draw block diagram of flame photometer.
- i) Mention different types of conductometric titrations.
- **j)** Represent the nature of curve obtained in conductometric titration of weak acid against strong alkali.

# Q.3 a) Attempt any two of the following. 10

- Discuss single cell photoelectric colorimeter.
   Discuss redox titration potentiometrically.
- Discuss redux infation potentiometrically.
   Discuss briefly the leminar flow burner. Cive its
- 3) Discuss briefly the laminar-flow burner. Give its advantages.

<li>b) Explain briefly the second sec</li>	ne process of anodising.	Give its applications.
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## Q.4 a) Attempt any Two of the following.

- 1) Explain the causes of deviations from Beer's law.
- 2) Write note on photovoltaic cell.
- 3) Draw and explain the basic circuit diagram of D.C. Wheatstone bridge.
- b) Give the construction and working of glass electrode. How it is used in the determination of pH of a solution?

### Q.5 Attempt any two of the following.

- a) Describe electroplating of nickel.
- **b)** Explain the general principles of flame photometry.
- c) Give principle of conductometric titrations. Discuss in detail conductometric titrations of strong acid against strong base.

B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **BOTANY (Special Paper - XII)** Plant Breeding (19201504) Day & Date: Thursday, 06-07-2023 Instructions: 1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary. 3) Figures to the right indicate full marks.

4) Use of log table and calculators is allowed.

#### Q.1 A) **Multiple Choice Questions.**

Time: 03:00 PM To 6:00 PM

- The Plant Breeding Institute was an agricultural research organization 1) in
  - Cambridge b) Malaysia a)
  - Indonesia c) Shrilanka d)

#### 2) The first International Research Institute was established on rice in in Philippines.

- 1963 1962 a) b)
- c) 1961 d) 1960

#### Intellectual Property Rights can play a critical role in protecting the 3) integrity.

a)	physiological	b)	Virological

- Genetical **Mycological** c) d)
- Plant Variety Protection Act was passed in 4)
  - 1969 b) 1970 a)
  - c) 1971 d) 1972
- Polyploidy reduces the \_\_\_\_\_ in plants. 5)
  - a) Fertility b) Sterility
  - c) both a and d) none of these

### 6) Muller in \_\_\_\_\_ and Stadler in 1928 started mutation breeding in the first time.

a)	1927	b)	1928
c)	1929	d)	1926

Single Cross initially proposed by Shull in 7)

- 1908 b) 1909 a) 1910 d) 1911
- c)

Achievement of back cross method crops are 8)

- Sorghum a) b) Rice
- c) Bajara d) all the above

9) In Mexico the wheat production increased by about time. a) 10 b) 11

	c) 12		
10)	Maize is a	crop	

- crop.
  - Rabi a) both a and b c)
- b) Kharif

13

d)

d) none of these Max. Marks: 80

**SLR-QA-201** Set

Seat No.



		SLR-QA-20	1
	B)	<ul> <li>Give the one sentence answer of the following.</li> <li>1) Which year mendelian law rediscover.</li> <li>2) Give the one name of old world centre of origin.</li> <li>3) Write the one name of new world centre of origin.</li> <li>4) Who coin the term mutation in 1900.</li> <li>5) Write the long form of IPR.</li> <li>6) Which year first Agriculture University established in India.</li> </ul>	06
Q.2	Sol' a) b) c) d) e) f) g) h) i)	<i>ve</i> any eight of the following. Define plant breeding. What is mean by crop improvement? Define the domestication of plant. What is natural selection? Define the clonal selection Give definition of hybridization. What is mutation? Define polyploidy. What is IPR? Give the two name of national institute of India.	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain the state agricultural universities of India.</li> <li>2) Describe the international agricultural institutes studied by you.</li> <li>3) Write the advantages and disadvantages of IPR.</li> </ul>	10
	B)	<ul> <li>Write short notes any two of the following</li> <li>1) Forms of IPR</li> <li>2) Plant Variety Protection Act</li> <li>3) Role of polyploidy</li> </ul>	06
Q.4	A)	Attempt any two of the following.1)Write the application of mutation in plant breeding.2)Explain the hybrid vigor studied by you.3)Describe the synthetic cross.	08
	B)	<ul> <li>Attempt any one of the following.</li> <li>1) Explain the multiple cross method studied by you.</li> <li>2) Describe the hybridization method with their achievements of crops.</li> </ul>	08
Q.5	Atte a) b)	<b>mpt any two of the following.</b> Write the pure line selection method with their achievements of crops. Explain the plant genetic resources studied by you.	16

c) Describe the aims and objective of plant breeding.

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No.						Set	Ρ
B	8.Sc. (S	emester - \	/) (New) (CBCS) BOTANY (Specia Economic Botar	Exam al Pap ny (192	nination: March/A per - XII) 201505)	April-2023	
Day & Time:	Date: Th 03:00 PN	ursday, 06-0 / To 06:00 Pl	7-2023 M			Max. Marks	: 80
Instru	ctions: 1	) All questior 2) Draw neat 3) Figures to 1) Use of log	ns are compulsory. labelled diagrams w the right indicate full table and calculators	hereve marks s is allo	r necessary. wed.		
Q.1	A) Mul 1)	t <b>iple Choice</b> The leaves a) trifoli c) bipin	Questions. of Sesbania are ate nately	cor b) d)	npound. paripinnately none of these		10
	2)	Gram is the a) <i>Med</i> c) Arac	e common name of _ icago sativa his hypogea	b) d)	Cajanus cajan Cicer arietinum		
	3)	Pigeon pea a) <i>Med</i> c) Arac	i is the common nan icago sativa his hypogea	ne of b) d)	Cajanus cajan Cicer arietinum		
	4)	<i>Medicago</i> s a) prote c) mine	s <i>ativa</i> is very rich in <sub>.</sub> eins erals	b) d)	Vitamins all of these		
	5)	The origin ( a) Braz c) Peru	of groundnut is il	 b) d)	West Indies India		
	6)	In India a) Mad c) Gujra	is the largest pro hya Pradesh at	oducers b) d)	(80%) of soybean. Maharashtra Uttar Pradesh		
	7)	Coir is obta a) mese c) endo	ined from the ocarp ocarp	_ of coc b) d)	onut fruit. epicarp none of these		
	8)	Ginger pro a) fibro c) tapro	duces types o us pot	of roots b) d)	Fleshy both a and b		
	9)	The source a) root c) fruit	of drug of <i>Withania</i>	is b) d)	 Flower both a and b		
	10)	Rubber is c a) Tapp c) pres	obtained by p bing sing	rocess. b) d)	Pulling Beating		

	В)	<ul> <li>Give the one sentence answer of the following.</li> <li>1) Write one morphological character of legume.</li> <li>2) Give one use fiber.</li> <li>3) Give the one example of oil yielding plant.</li> <li>4) Write one use of Kutch.</li> <li>5) Give one example of pesticides.</li> <li>6) Write one use of dyes palas.</li> </ul>	06
Q.2	Solv a) b) c) d) e) f) g) h) i) j)	<ul> <li>ve any eight of the following.</li> <li>Write two uses of Sesbania.</li> <li>Give the two morphological character of Chickpea.</li> <li>Write the scientific name of Red gram and Lucerne.</li> <li>Explain the two uses of Cotton.</li> <li>Give the two morphological character of Coir.</li> <li>Write the scientific name of Groundnut and Soyabean.</li> <li>Explain the two uses of Rhizome.</li> <li>Give the scientific name of clove and Ginger.</li> <li>Define Rubber.</li> <li>Write source of Oak and Teak.</li> </ul>	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain the morphology, source and economic importance of Chickpea.</li> <li>2) Give the morphology, source and economic importance of Lucerne.</li> <li>3) Describe the morphology, source and economic importance of Cotton.</li> </ul>	10
	B)	<ol> <li>Solve any two of the following.</li> <li>1) Explain the botanical name and morphology of Groundnut.</li> <li>2) Write scientific name and uses of Gulvel.</li> <li>3) Describe the source and economic importance of Neem.</li> </ol>	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain the morphology and uses of Adulsa.</li> <li>2) Give the morphology and uses of <i>Withania somnifera</i>.</li> <li>3) Describe the properties of Rubber.</li> </ul>	08
	B)	<ul> <li>Attempt any one of the following.</li> <li>1) Describe the scientific name, source, morphology, chemical constituent and uses of clove.</li> <li>2) Explain the botanical name, source, morphology and economic importance of Red gram.</li> </ul>	08
Q.5	Atte a) b) c)	<b>mpt any two of the following.</b> Give the botanical name, source, morphology, extraction method and uses of Rubber. Explain the botanical name, source, morphology and importance of Tobacco. Describe the botanical name, source and economic importance of Manjista and Turmeric.	16

## Seat No.

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **ZOOLOGY (Special Paper - XII)** Wildlife Conservation & Management (19201523)

Day & Date: Thursday, 06-07-2023 Time: 03:00 PM To 6:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of log table and calculators is allowed.

#### Q.1 A) **Multiple Choice Questions.**

c)

- The scientific name of Great Indian Bustard is 1)
  - Ardeotis arabs b) Ardeotis australis a)
  - c) Ardeotis nigriceps d) Ardeotis indica
- is an *in-situ* method used to preserve genetic diversity for long-2) term conservation.
  - Maintaining breeds and varieties in natural habitat a)
  - Gene Banks b)
  - Seed Banks c)

Logging

- Cryopreservation of germ plasm d)
- 3) management practice is routinely used to reduce forest fires and restore ecosystem functions.
  - Monoculture plantation a)
    - b) Horticulture plantation d) Overgrazing
- method is good for the estimation of population of rabbits and 4) deers.
  - Pugmarks a) c)
- b) Vocalization frequency Trap d) Fecal pellet group count
- 5) is used to track migrating wild animals, their physiology, energetic and orientation.
  - a) Biosensor b) Biotelemetry
  - **Bioinformatics** c) **Bio-geo-informatics** d)
- national park was the first one in India. 6)
  - a) Kaziranga b) Jim Corbet Manas c)
    - d) Great Himalayan
- state has initiated the 'conservation breeding' program for 7) Great Indian Bustards.
  - Maharashtra b) a) Gujrat
  - c) Karnataka d) Rajasthan
- country is home to 70% of wild tigers in the world. 8)
  - China India a) b)
  - c) Russia d) America
- 9) In year 'Project Tiger' was launched in India.
  - 1999 a) b) 1973 1993
  - 1983 c) d)

Max. Marks: 80

Set

- **10)** Evaluation wildlife habitat, relationship with environmental variable and animal distribution at the global level is carried out with the help of
  - Camera Trap a)
- **Remote Sensing** b)
- c) Drones
- **Robotics** d)
- B) Fill in the blank/Definition/One sentence answer/One word answer/ 06 Give the name/Predict product/match the following
  - Define ecotourism. 1)
  - 2) Define habitat fragmentation.
  - 3) Define conservation ethics.
  - 4) is an international treaty to prevent international trade of plant & animal specimens.
  - The name of bustard sanctuary in Solapur is 5)
  - national park has highest population of Great Indian Bustards 6) in India.

#### Q.2 Solve any eight of the following.

- Define invasive species with example. a)
- Define climax persistence. b)
- Write about plaster of Paris & its use in wildlife study. C)
- Define biosphere reserve with one example. d)
- Define biotelemetry and one of its uses. e)
- Define guarantine with suitable example. f)
- Define setting back of succession and its significance. g)
- Define remote sensing and its use in habitat and wildlife evaluation. h)
- i) Mention any two importance of wildlife conservation
- State role of CITES. j)

#### Q.3 A) Attempt any two of the following.

- 1) Give an account on wildlife tourism as a management tool with example.
- 2) Explain the concept of diversity indices with Shannon's and Simpson's Index.
- Discuss common diseases of wild animals with example. 3)

#### B) Short note/solve.

Describe Great Indian Bustard Sanctuaries and their management challenges in India.

#### Attempt any two of the following. Q.4 A)

- What is wildlife census? Explain' methods population estimation for 1) herbivores and carnivores with examples
- Give a brief account on grazing, logging and mechanical treatment as 2) habitat management practices.
- What is ecological restoration? Write a note on restoration of degraded 3) habitats.

#### B) Describe/Explain/Solve-

Explain the status of tiger reserves and their management challenges in India.

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## Q.5 Attempt any two of the following.

- a) Give a detailed account on national parks, sanctuaries and community reserves in India with their features.
- **b)** Discuss various physical and biological parameters used in the evaluation and management of wildlife habitat.
- c) Explain positive and negative values of wildlife and add a note of causes of depletion of wildlife.

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B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 MATHEMATICS (Special Paper XII) Partial Differential Equations (19201527-A)

Day & Date: Thursday, 06-07-2023 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

Set

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**Instructions**: 1) All questions are compulsory.

2) Figures to the right indicate full marks

### Q.1 A) Select the correct alternative for each of the following. 10 1) In a first order partial differential education f(x, y, z, p, q) = 0 is linear in p and q then the equation is known as \_\_\_\_\_ a) Linear equation b) Semi Linear equation

- c) Quasi-Linear equation d) Non Linear equation
- 2) The equation  $\frac{\partial^2 z}{\partial x^2} 2\left(\frac{\partial^2 z}{\partial x \partial y}\right) + \left(\frac{\partial z}{\partial y}\right)^2 = 0$  is of order \_\_\_\_\_ a) 1 b) 2
  - c) 3 d) 4

## 3) When the number of arbitrary constant less than the number of independent variables then by eliminating arbitrary constant we get \_\_\_\_\_.

- a) more than one p.d.e. of order one
- b) unique p.d.e. of order one
- c) p.d.e. of order greater than one
- d) unique p.d.e. of order greater one

4) The general solution of 
$$p \tan x + q \tan y = \tan z$$
 is \_\_\_\_\_

a) 
$$\phi\left(\frac{\sin x}{\sin y}, \frac{\sin y}{\sin z}\right) = 0$$
  
b)  $\phi\left(\frac{\sin y}{\sin x}, \frac{\sin y}{\sin z}\right) = 0$   
c)  $\phi\left(\frac{\cos x}{\cos y}, \frac{\cos y}{\cos z}\right) = 0$   
d)  $\phi\left(\frac{\cos y}{\cos x}, \frac{\cos y}{\cos z}\right) = 0$ 

5) The integral which does not contains an arbitrary constant is called \_\_\_\_\_.

- a) Complete integral b) Singular integral
- c) General integral d) Particular integral

6) The complete integral of  $p^2 + q^2 = 1$  is \_\_\_\_\_.

a)  $Z = ax - y\sqrt{1 + a^2} + c$  b)  $Z = ax + y\sqrt{1 - a^2} + c$ c)  $Z = ax + y(1 - a^2) + c$  d)  $Z = ax - y\sqrt{1 - a^2} + c$ 

7) The standard form IV of non linear p.d.e. of order 1 is \_\_\_\_\_.

a) 
$$f_1(x,p) = f_2(y,q)$$
  
b)  $f_1(y,p) = f_2(x,q)$   
c)  $f_1(x,y) = f_2(p,q)$   
d) All of these

8) The particular integral of 
$$\frac{1}{D-mD'} f(x, y)$$
 is \_\_\_\_\_.

a) 
$$\int f(x, c + mx)dx$$
  
b)  $\int f(y, c - mx)dx$   
c)  $\int f(x, c - mx)dx$   
d)  $\int f(y, c + mx)dx$ 

9) The P.I. of 
$$(D^2 - 2DD' + D'^2) z = e^{x+2y} + x^3$$
 is  
a)  $e^{x+2y} + \frac{x^2}{20}$  b)  $e^{x+2y} + \frac{x^3}{20}$   
c)  $e^{x+2y} + \frac{x^4}{20}$  d)  $e^{x+2y} + \frac{x^5}{20}$ 

10) The C.F. of 
$$(D^2 - D^1)2 = xe^{x+y}$$
 is \_\_\_\_\_\_  
a)  $\sum_{Ae^{hx+h^2y}} Ae^{hx+h^2y}$  b)  $\sum_{Ae^{-hx+h^2y}} Ae^{-hx+h^2y}$   
c)  $\sum_{Ae^{hx-h^2y}} Ae^{hx-h^2y}$  d)  $\sum_{Ae^{-hx-h^2y}} Ae^{-hx-h^2y}$ 

### B) Fill in the blanks

- 1) The first order Partial differential equation p = P(x, y), q = Q(x, y) are compatible if and only if \_\_\_\_\_.
- 2) The Lagrange's auxiliary equation of partial differential equation Pp + Qq = R are \_\_\_\_\_.

3) The singular integral of 
$$z = px + qy + \log(pq)$$
 is \_\_\_\_\_.

- 4) The complete integral  $\sqrt{p} + \sqrt{q} = 1$  is \_\_\_\_\_.
- 5) The general solution of  $(D^2 + {D'}^2)z = 30(2x + y)$  is \_\_\_\_\_.
- 6) The Auxiliary equation of  $r 2s + t = \sin(2x + 3y)$  is \_\_\_\_\_.

## Q.2 Solve any eight of the following:

- a) Form a partial differential equation by eliminating *h* and *k* from the equation  $(x k)^2 + (y h)^2 + z^2 = \lambda^2$
- **b)** If  $z = f(x + ay) + \phi(x ay)$  then prove that  $\frac{\partial^2 z}{\partial y^2} = a^2 \frac{\partial^2 z}{\partial x^2}$
- **c)** Solve  $x^2p + y^2q = z^2$
- d) Define singular integral.
- e) Define complete integral.
- **f)** Solve  $z = px + qy + 2\sqrt{pq}$
- **g)** Find the complete integral of  $p^2 = zq$
- **h)** Solve  $(D^2 a^2 D'^2)z = 0$
- i) Solve  $(D^4 + {D'}^2 + 2D^2{D'}^2)z = 0$
- **j**) Solve  $(D^2 {D'}^2 + D D^1)z = 0$

### Q.3 A) Attempt any two of the following:

- 1) Solve  $(mz ny)p + (nx \ell z)q = (\ell y mx)$
- 2) Solve  $3p^2 2q^2 = 4pq$
- 3) Solve  $(D^2 2DD^1 + {D'}^2)z = e^{x+2y}$

B) Find the integral surface of the linear PDE 
$$x (y^2 + 2)p - y(x^2 + z)q = (x^2 - y^2)z$$

### Q.4 A) Attempt any two of the following:

- 1) Solve  $(x^2 + y^2)p + 2xyq = z(x + y)$
- 2) Solve  $p^3 + q^3 = 3pqz$
- 3) Solve  $(D^2 2DD' + D'^2)z = 12xy$

## **B)** Explain Charpit's method for solving the partial differential equation f(x, y, z, p, q) = 0 where x and y are independent variables and $p = \frac{\partial z}{\partial x}, q = \frac{\partial z}{\partial y}$

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## Q.5 Attempt any two of the following.

- a) Explain Lagrange's method of solving Pp + Qq = R when P, Q, R are function x, y, z.
- **b)** Solve by using Charpit's method px + qy + pq = 0
- c) If F(DD') is homogeneous function of D and D' of degree n and F(a,b) = 0 ie (bD aD') is factor of F(DD') then, show that  $\frac{1}{(bD-aD')} \phi(ax + by) = \frac{x^n}{b^n n!} \phi(ax + by)$

Set

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## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 Mathematics (Special Paper XII) Mathematical Analysis (19201527-B)

Day & Date: Thursday, 06-07-2023 Time: 03:00 PM To 06:00 PM

2)



3) Figures to right indicate full marks.

## Q.1 A) Select the correct alternative for each of the following.

- **1)** A function *f* is said to tend to a limit *l* as *x* tends to *c* from the right if for each  $\in > o$ , there exist  $\delta > o$  such that \_\_\_\_\_.
  - a)  $|f(x) l| \le$  when  $c \le x \le c + \delta$
  - b)  $|f(x) l| \le$ when  $c \delta \le x \le c$
  - c)  $|f(x) l| \le$  when  $c \delta \le x \le c + \delta$
  - d)  $|f(x) l| \le when c \le x \le c + \delta$
  - If  $f(x) = 2^{\frac{1}{(x-1)}}$  then which of the following is correct?
    - a)  $\lim_{x \to 1^-} f(x)$  and  $\lim_{x \to 1^+} f(x)$  exist but they are not equal
    - b)  $\lim_{x \to 1^-} f(x) = \lim_{x \to 1^+} f(x) = 0$
    - c)  $\lim_{x \to 0} f(x)$  exists
    - d)  $\lim_{x \to 1} f(x)$  does not exist
- **3)** Which of the following is not uniformity continuous on the indicated Interval?
  - a)  $f(x) = x^2$  on [-1,1] b)  $f(x) = \tan^{-1} x$  on  $\mathbb{R}$ 
    - c)  $f(x) = x^3$  on  $[0, \infty)$  d) All of these
- **4)** Consider the following statement for  $f(x) = \bar{e}^{|x|}$ 
  - I) The function *f* is continuous at x = 0
  - II) The function f is differentiable at x = 0
  - a) Only I) is true b) Only II) is true
  - c) Both I) and II) are true d) Both I) and II) are false

5) How many points *c* are there in the interval [-2,2] which satisfies Rolle's theorem for the function  $f(x) = x^3 - 4x$ ?

- a) Zero b) One
- c) Two d) Three

6) By Lagrange's MVT the value of  $c = _____$  if  $f(x) = x(x-1) (x-2) \text{ on } \left[0, \frac{1}{2}\right]$ a) 6 b)  $6 - \sqrt{21}$ c)  $(6 - \sqrt{21})$  d)  $6 - \sqrt{21}$ 

The Maclaurin's infinite expansion  $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots \forall x \in \mathbb{R}$  is 7) equal to a) b) cos x  $\log x$ c) d)  $\log(1+x)$ sin x  $\sum_{n=1}^{\infty} \frac{1}{n!}$  Converges to a number lies between. The series 8) a) 0 and 1 b) 1 and 2 d) -1 and 0 c) 2 and 3 9) By logarithmic function (to the base e)  $L[E(x)] = \_$ ,  $x \in \mathbb{R}$ . a) 1 b) х x Ε c) d) L If *f* is of banded variation on [*a*, *b*] then  $V_f \pm f$  is \_\_\_\_\_. 10) a) Monotone increasing function on [a, b]b) Monotone decreasing function on [a, b]Monotone increasing function on (a, b)c) d) Monotone decreasing function on (a, b)B) Fill in the blanks. 06 A function f is said to have a Discontinuity of the first kind at x = c1) if A function which is continuous on interval is also uniformly 2) continuous on that interval. The function *f* is said to be monotonic function if \_\_\_\_\_. 3) The term  $Rn = \frac{h^n}{n!} f^n(a + \theta h)$  is called \_\_\_\_\_ form of remainder. 4) The geometric series  $\sum_{n=1}^{\infty} x^n$  is convergent for \_\_\_\_ and divergent for \_\_\_\_. 5) S(x) > 0 when \_\_\_\_\_ 6) Q.2 Attempt any Eight of the following. 16 Examine the existence of  $\lim_{x \to o} \frac{e^{yx}}{e^{yx+1}}$ a) b) If f and g are two functions continuous at a point c then prove that f + g is also continuous at c. Examine the continuity at x = 1 for the function C)  $f(x) = \begin{cases} 2x & \text{when } 0 \le x < 1\\ 3 & \text{when } x = 1\\ 4x & \text{when } 1 < x \le 2 \end{cases}$ d) Define Uniform Continuity. Prove that a function which is derivable at a point is necessarily continuous e) at that point.

- **f)** Show that  $\frac{\sin \alpha \sin \beta}{\cos \beta \cos \alpha} = \cot \theta$  where  $0 < \alpha < \theta < \beta < \frac{\pi}{2}$
- **g)** Verify the Rolle's theorem for the function  $f(x) = (x a)^m (x b)^n$  where *m* and *n* are positive integers on [a, b].

- **h)** Define total variation of a function f on interval [a, b].
- i) Show that the function  $f(x) = x^2 \sin\left(\frac{1}{x}\right)$ , if  $x \neq 0$  and f(0) = 0 is of bounded variation on [0,1].
- **j)** Prove that  $E(x_1 + x_2) = E(x_1).E(x_2)$

## Q.3 A) Attempt any two of the following.

- 1) Define Dirichlet's function on R and show that it is discontinuous at every point.
- 2) State and prove Lagrange's mean value theorem.
- 3) Show that the function  $f(x) = \begin{cases} x \sin \frac{\pi}{x} & \text{when } 0 < x < 1 \\ 0 & \text{when } x = 0 \end{cases}$  is not a function of bounded variation.
- B) State and prove Jordan's theorem.

## Q.4 A) Attempt any two of the following.

- 1) Show that a function which is uniformly continuous on interval is continuous on that interval.
- 2) If *f* is derivable at *c* and  $f(c) \neq 0$  then prove that  $\frac{1}{f}$  is also derivable at

$$c \operatorname{and}\left(\frac{1}{f}\right)(c) = \frac{-f(c)}{[f(c)]^2}$$

- 3) Show that a function of bounded variation is necessarily bounded.
- B) State and prove Taylor's theorem.

## Q.5 Attempt any two of the following.

a) A function f is defined on  $\mathbb{R}$  by

$$f(x) = \begin{cases} -x^2 & if \quad x \le 0\\ 5x - 4 & if \quad 0 < x \le 1\\ 4x^2 - 3x & if \quad 1 < x \le 2\\ 3x + 4 & if \quad x > 2 \end{cases}$$

Examine the continuity of f at x = 0, 1, 2. Also discuss the kind of discontinuity if any.

- **b)** Show that  $\frac{\tan x}{x} > \frac{x}{\sin x}$ , for  $0 < x < \frac{\pi}{2}$
- c) Prove that the variation function of a function f of bounded variation is continuous if and only if f is continuous function.

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the ay a) b) c) d)	tes are connected by a strain The resources are limited i The objective function is a The constraints are linear of All of the above	ght lii n sup lineai equat	ne because ply <sup>-</sup> function ions or inequalities
Every a squ to	basic feasible solution of a are pay-off matrix of order, ۱	gene n sho	ral assignment problem, having uld have assignments equal
a)	2n + 1	b)	2n - 1
c)	m + n – 1	d)	m + n
Whicł feasib a) c)	n of the following method is ble solution to transportation Hungarian Simplex	metho Prob b) d)	od of obtaining initial basic lem? North- West Newton Raphson
The n a) c)	ninimum expected opportun Equal to EVPI Equal to EMV	ity los b) d)	s (EOL) is Minimum regret both a) and b)
A dec a) c)	ision alternative in decision Strategy Payoff	maki b) d)	ng problem is known as States of Nature None of these
Monte a) b) c) d)	e Carlo is a technique for modeling a book a technique for Simulation None of these		

4 variables d) 2 variables c)

While plotting constraints on a graph paper, terminal points on both 3) the

- a)
- b)
- c)
- d)
- 4) Eve 1 a s

### Wł 5) fea

- a)
  - c)
- 6) Th
  - a) c)
- 7) Ac
  - a) c)

8)

- 5 Variables 3 variables a) b)
- c) all of the above

3) Figures to the right indicate full marks. 4) Use of log table and calculators is allowed.

## balancing limitations and requirements

STATISTICS (Special Paper – XII) **Operations Research (19201531)** 

d)

## limitations requirements

b)

Constraints in an LP model represents \_\_\_\_\_.

2) Draw neat labelled diagrams wherever necessary.

**Multiple Choice questions.** 

Day & Date: Thursday, 06-07-2023

a)

Instructions: 1) All questions are compulsory.

Time: 03:00 PM To 6:00 PM

1)

Seat

No.

Q.1

A)

### Graphical method is applicable for solving LPP which has only \_\_\_\_\_. 2)

# **SLR-QA-206**

B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023

Set

Max. Marks: 80

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**08** 

- 9) A type of decision-making Environment is \_\_\_\_\_.
  - a) Certainty

Risk

- b) Uncertaintyd) All of these
- **10)** The difference between the expected profit under conditions of risk and the expected profit with perfect information is called
  - a) Expected value of perfect information
  - b) Expected marginal loss
  - c) Expected opportunity loss
  - d) None of the above

## B) Fill in the Blanks.

c)

- Convert ≤ type constraints into equality type by adding \_\_\_\_\_ variables.
- 2) The method used for solving an assignment problem is \_\_\_\_\_
- 3) A given Transportation problem is said to be \_\_\_\_\_ if the total supply is not equal to the total demand.
- 4) The consequence resulting from a specific combination of a decision alternative and a state of nature is \_\_\_\_\_.
- 5) The value at least one basic variable is zero then a basic feasible solution is called \_\_\_\_\_.
- 6) Monte Carlo is technique for \_\_\_\_\_.

## Q.2 Solve any Eight of the following. (Two marks each)

- a) Define Feasible Solution.
- **b)** Define Unbounded Solution.
- c) How to balance Unbalanced T. P.?
- d) Give the Mathematical form of Assignment Problem.
- e) What is Sequencing Problem?
- f) Give a standard form of LPP.
- **g)** Define Dummy activity.
- **h**) What is an opportunity loss in decision making Problem?
- i) Define an Artificial Variable.
- j) Define Slack Variable.

## Q.3 A) Attempt any Two of the following.

- 1) Write the procedure of processing n jobs on two machines.
- 2) Write the steps involved in the Procedure of Monte Carlo Simulation.
- 3) Explain EVPI in decision making.

B) Write the procedure of North- West Corner Method.	
--	--

## Q.4 A) Attempt any Two of the following.

- 1) What is a Decision Making under Risk?
- 2) Explain the procedure of generating random number from Binomial distribution.
- 3) Give the steps involved in Minimax regret criterion.

## B) Solve Following LPP

Minimize  $Z = x_1 - 3x_2 + 2x_3$ Subject to the constraints,  $3x_1 + x_2 + 2x_3 \le 7$  $-2x_1 + 4x_2 \le 12$  $-4x_1 + 3x_2 + 8x_3 \le 30$  $x_1, x_2, x_3 \ge 0$ 

16

## Q.5 Attempt any Two of the following.

a) Find the Initial Basic Feasible Solution to the following Transportation problem by using Matrix Minima method,

		Destination				
		D1	D2	D3	D4	Supply
Se	<b>S</b> 1	6	5	8	5	30
nu	<b>S</b> <sub>2</sub>	5	11	9	7	40
S	S <sub>3</sub>	8	9	7	13	50
	Demand	35	28	32	25	

**b)** Suggest the best strategy using the EMV criteria for the following decisionmaking problem:

States				
of Nature	A1	A2	Аз	P(Ei)
E1	25	-10	-125	0.4
E2	400	440	400	0.2
E3	650	740	750	0.4

c) Find the optimal sequence in performing the following five jobs on two machines. Processing times (in hours) are given in the following table:

Job	1	2	3	4	5
Machine M1	30	120	50	20	90
Machine M2	80	100	90	60	30

Also find total elapsed time and idle times for both machines.

## Seat No.

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **STATISTICS (Special Paper - XII) Regression Analysis (19201532)**

Day & Date: Thursday, 06-07-2023 Time: 03:00 PM To 6:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labeled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of log table and calculators is allowed.

#### Q.1 A) Choose the correct alternative.

c)

- In simple linear regression model  $Y = \beta_0 + \beta_1 X + \varepsilon$ ,  $\beta_0$  and  $\beta_1$  and are 1) respectively
  - slope and intercept a) error and slope
- b) intercept and slope d) intercept and error
- The difference between the observed value  $Y_i$  and corresponding 2) fitted value  $\widehat{Y}_i$  is called \_\_\_\_\_.
  - intercept a) b) error residual c)
    - d) none of these
- In a simple linear model  $Y = \beta_0 + \beta_1 X + \varepsilon$ , the change in Y for one 3) unit increase in X
  - will always be the same amount  $\beta_0$ a)
  - b) will always be the same amount  $\beta_1$
  - c) will depend on error term
  - will depend on level of Xd)
- If coefficient of determination is equal to 1, then the correlation 4) coefficient
  - must also equal to 1 a)
  - b) can be either -1 or +1
  - can be any value between -1 and +1 c)
  - d) must be - 1

a)

- A linear regression model is called 'linear' in the sense that it is a 5) linear function of the \_\_\_\_\_.
  - response b) regressors
  - parameters d) predicators c)
- Forward selection procedure starts with the \_\_\_\_\_ predictor variables 6) in the model.
  - a) without b) some
  - c) All d) none of these
- To test significance of an individual regression coefficient in multiple 7) linear regression model \_\_\_\_\_ is used.
  - a) F test b) t test
    - d)  $\chi^2$  test c) Z test

Max. Marks: 80

06

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- 8) If the coefficient of determination  $(R^2)$  is near to one, then it leads to the conclusion that \_\_\_\_\_.
  - a) a good linear relation exists
  - b) there is a lack of linear relationship
  - c) there is curvilinear relation
  - d) none of these
- 9) In a binary logistic regression \_\_\_\_
  - a) the dependent variable is continuous.
  - b) the dependent variable is divided into two equal subcategories.
  - c) the dependent variable consists of two categories.
  - d) there is no dependent variable.

a) 
$$In\left(\frac{\pi(x)}{1-\pi(x)}\right)$$
  
b)  $In(1-\pi(x))$   
c)  $In(\pi(x))$   
d)  $In\left(\frac{1-\pi(x)}{\pi(x)}\right)$ 

## B) Fill in the blanks.

- 1) In a simple linear regression model, the distribution of response variable is \_\_\_\_\_.
- 2) In the regression equation,  $Y = 75.65 + 0.50X + \varepsilon$ , the intercept is \_\_\_\_\_
- 3) In a logistic regression model with single covariate, the odd ratio  $\overline{\psi}$  is related to the regression coefficient  $\beta_1$  by \_\_\_\_\_.
- 4) Deviance statistic can be shown to follow
- 5) To test significance of an individual regression coefficient in multiple linear regression model \_\_\_\_\_ is used.
- **6)** If  $e_i$  is the  $i^{th}$  ordinary residual then  $E(e_i)$  is \_\_\_\_\_.

## Q.2 Solve any Eight of the following.

- a) Define studentized residuals and mention its use.
- **b)** In a multiple linear regression model, show that the hat matrix is symmetric.
- c) Explain the multiple linear regression model with illustration.
- **d)** With usual notations, show that  $Var(\hat{Y}) = H\sigma^2$ .
- e) Define Coefficient of determination  $\hat{R}^2$ .
- f) Explain the concept of simple logistic regression model.
- g) State assumptions of error vector in multiple regression model.
- **h)** Obtain the confidence interval for  $\beta_0$  in simple linear regression model.
- i) Describe Pearson's residual in the context of logistic regression.
- j) Discuss the logit transformation in the context of logistic regression model.

## Q.3 A) Attempt any Two of the following.

- 1) Describe backward elimination methods of variable selection in linear regression.
- 2) In a simple linear regression model describe the test procedure for testing  $H_0: \beta_1 = 0$  against  $H_1: \beta_1 \neq 0$ .
- 3) Obtain MLE of the regression parameters of the logistic regression model with single covariate.
- **B)** Define residual and derive the relation between residual and error.
#### Q.4 A) Attempt any Two of the following.

- 1) Define standardized and studentized residuals. Briefly mention their uses.
- 2) What is logistic regression model? Give two situations where such model is appropriate.
- 3) In a multiple linear regression model, obtain the variance-covariance matrix of residuals.
- **B)** For a multiple linear regression model define residual and residual sum of squares (RSS). Show that RSS = Y'(I H)Y.

#### Q.5 Attempt any Two of the following.

- a) Obtain the confidence intervals for the regression coefficients  $\beta_0$  and  $\beta_1$  in the context of simple linear regression model.
- **b)** Describe a multiple linear regression model. Find the least squares estimators of regression coefficients.
- c) Derive the likelihood ratio test with reference to single covariate logistic regression model.

16

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## Seat No.

B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 GEOLOGY (Special Paper - XII)

Applied Geology - Prospecting and Mining Geology (19201537)

Day & Date: Thursday, 06-07-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of log table and calculators is allowed.

#### Q.1 A) Multiple choice questions.

c)

c)

c)

c)

- 1) Which of the following geological criteria is used for Kimberlites?
  - a) Magma gene criteria
     b) Climatic criteria
     c) Structural criteria
     d) All of the above
- 2) The \_\_\_\_\_ criteria are associated with the chemical composition and behaviour of elements in the earth's crust.
  - a) Geological

Geochemical

- b) Geophysical
- d) None of the above
- **3)** In resistivity survey, \_\_\_\_\_ method of exploration is termed as constant depth traversing.
  - a) Profiling c) VES
- b) Depth soundingd) None of the above
- 4) \_\_\_\_\_ elements/minerals provide good clues in the search for hidden ore bodies because they generally form large haloes.
  - a) Primary b) Pathfinder
    - Indicator d) None of the above
- 5) When minerals are located too deep in the ground, the method used for mining is

b)

- a) open pit mining
  - surface mining d) sub-surface mining
- 6) In the seismic refraction method, the waves sent along the ground surface is picked by \_\_\_\_\_.
  - a) Geo satellite instrument
    - b) Geophone

quarries

- Wave detector d) All of the mentioned
- 7) Which of the following is Environmental Impacts of Mining?
  - a) pollute air and drinking water
  - b) harm wildlife and habitat
  - c) permanently scar natural landscapes
  - d) All of the above
- 8) Bouger anomaly correction is carried out to detect \_\_\_\_\_ survey.
  - a) Seismic b) Magnetic
  - c) Electrical d) Gravity

Max. Marks: 80

Set

#### 9) The most sensitive instrument for magnetic survey is \_\_\_\_\_.

- a) magnetic field balance
  - b) fluxgate magnetometer
  - c) proton precession magnetometer
  - d) optically pumped magnetometer
- **10)** Sampling is defined as \_\_\_\_\_ fraction of the bulk.
  - Recoverable b) Representative
  - Resource d) Reserve

#### B) Answer the following.

a)

c)

- 1) What is the name of solid waste that was produced during mining?
- 2) What is Lateral exploration?
- 3) What is Background value?
- 4) Give any one example of stratigraphic criteria.
- **5)** Name the survey for prospecting based on geological maps with scale of 1:50,000.
- 6) What is dispersion halo?

#### Q.2 Solve any Eight of the following.

- a) Name the ore deposits confined to definite stratigraphic division.
- **b)** Write types of electrical configuration methods.
- c) Give two methods of reclamation in mining area.
- d) Name the instruments used for magnetic geophysical method.
- e) Give examples of magma genic criteria.
- f) Define pathfinders.
- g) What is normal and reversed magnetism.
- **h)** Write the different passive methods of geophysical survey.
- i) Write the equipment's used in geological sampling.
- **j)** Name instrument used for gravity method.

#### Q.3 A) Attempt any Two of the following.

- 1) Write the note on difference between Werner and Schlumberger electrical method.
- 2) Explain in brief the sampling methods.
- 3) Discuss the environmental effects of mining.

B)	Write a short note of Self potential electrical method.	
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#### Q.4 A) Attempt any Two of the following.

- 1) Explain the climatic and stratigraphic criteria of geological prospecting.
- 2) Write the applications of Magnetic geophysical method.
- 3) Describe with suitable diagram the primary and secondary dispersion halos.
- B) Explain in brief the principle, field procedure, interpretation and application 08 of seismic method of geophysical survey.

#### Q.5 Attempt any Two of the following.

- a) Describe the methods of underground mining with suitable diagram.
- **b)** Explain the principle and field procedure of gravity method of geophysical survey.
- c) Define prospecting. Discuss in short, the stages of mine.

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SLR-QA-2	09
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#### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 MICROBIOLOGY (Special Paper - XII) Industrial Microbiology (19201542)

Day & Date: Thursday, 06-07-2023 Time: 03:00 PM To 6:00 PM

Max. Marks: 80

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.

Q.1	A)	Rew	rite th n alte	e following sentences by	sele	cting correct answers from 1	0
		1)	ii uito	causes food poisoning			
		-,	a) c)	Salmonella Vibrio	b) d)	Proteus Clostridium	
		2)	By cr a) c)	ushing of grapes juice ready Scud Must	y for f b) d)	fermentation is called Broth Fluid	
		3)	Distil a) c)	lation is used for recovery o Ethanol Penicillin	f b) d)	 Amylase Vitamin B12	
		4)	Insuli a) c)	in producing gene for rDNA E. coli Liver cells	techr b) d)	nology is obtained from Beta cells of pancreas Yeast cells	
		5)	Malt a) c)	used for Beer fermentation i Molasses Pea nut	s pre b) d)	pared from Ground nut Barley	
		6)	a) c)	_ is also known as Cobalam L-Lysine Vitamin B12	nin. b) d)	Streptomycin Insulin	
		7)	a) c)	_ are preserved by osmotic Meat Sugar	press b) d)	sure. Pickles Grains	
		8)	Prelir a) c)	ninary or Sham test is used Toxicity Allergy	for _ b) d)	testing of product. Carcinogenicity Pyrogenicity	
		9)	Strep a) c)	otomycin fermentation occur 2 4	s in _ b) d)	phases. 3 5	
		10)	Serra meat	atia marcescens causes	CO	ploured surface pigmentation in	
			a) c)	Red Green	b) d)	White Black	

	B)	<ul> <li>Fill in the blanks.</li> <li>1) The aW value for pure water is</li> <li>2) medium is used for production of Streptomycin.</li> <li>3) Bruce Ames test is used for testing.</li> <li>4) Cheddar cheese is an example of cheese.</li> <li>5) Insulin is used for treating</li> <li>6) is also called cold sterilization.</li> </ul>	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	ve any eight of the following. Which organism is used for Vitamin B12 production? Give the two examples of chemical food preservative. What is Food infection? Give the types of Beers. Give the use of Streptomycin. On which animal allergy testing is done? Define Desert wines. Which organism is responsible for ropiness in milk? Give two principles of food preservation. Which method is used for recovery of Ethanol?	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Spoilage of meat and poultry</li> <li>2) Pyrogenicity testing</li> <li>3) Recovery by solvent extraction</li> </ul>	10
	B)	Give in detail beer production.	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Describe in detail Idli production.</li> <li>2) Describe in Brief Toxicity testing.</li> <li>3) Explain the L-Lysine fermentation.</li> </ul>	08
	B)	Describe in detail Food borne diseases.	08
Q.5	Atte a) b)	empt any two of the following. Discuss in detail Wine production. Describe in detail Streptomycin fermentation	16

b) Describe in detail Streptomycin fermentation.c) Describe in detail manufacture of Cheese.

Seat No.					Set	Ρ		
B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 ELECTRONICS (Special Paper - XII) Electronics Communication (19201552)								
Day & Time:	Date: Th 03:00 PN	nursday, 06-0 // To 6:00 PM	7-2023		Max. Mark	s: 80		
Instru	ctions: 2	1) All questior 2) Draw neat 3) Figures to 4) Use of log	ns are compulsory. labelled diagrams whe the right indicate full m table and calculators is	ereve harks s allo	r necessary. wed.			
Q.1	A) Mu 1)	l <b>tiple choice</b> Two Way c a) Simp c) Multi	<b>questions.</b> communication is calle blex Communication iplex Communication	d as a b) d)	a Duplex Communication None of these	10		
	2)	The three r a) Tran b) Tran c) Sign d) Tran	nain elements of com smitter, Receiver, Sig smitter, Receiver, Cha al, Receiver, Noise smitter, Signal, Noise	munio nal annel	ation system are			
	3)	Frequency a) W <sub>m</sub> - c) W <sub>c</sub> -	of LSB in AM is ⊦ Wc Wm	 b) d)	W <sub>m</sub> - W <sub>c</sub> None of these			
	4)	Number of a) Two c) Infini	frequency spectrum ir ite	n AM b) d)	wave are Four None of these			
	5)	lf in AM sig amplitude t a) 10 V c) 20 V	nal m <sub>a</sub> =1 and amplitud ransmitted by side bai	de of nd sig b) d)	carrier signal 10 volt then mal is 5 V None of these			
	6)	Which is no a) Ring c) Hybr	ot internal unit telepho er id	ne ha b) d)	nd set Local Loop Transmitter and Receiver			
	7)	Detection is a) Tran c) Both	s used in smitter a and b	b) d)	Receiver None of these			
	8)	A long form a) Digit b) Dial- c) Digit d) All o	n of DTMF. al timer multiple freque tone multi frequency al tone multiple freque f the above	ency ency				
	9)	Number of a) 1	tones in telephone are	e	2			

		10)	Busy a) c)	Tone frequency i 500 Hz 300 Hz	n telephon	e is _ b) d)	40 20	 0 Hz 0 Hz			
	B)	Fill i 1) 2) 3) 4) 5) 6)	n the In DT The v The s The r Duct Durin	blanks. MF Dialler number vertical frequency signal to noise rat ninimum value no propagation is po g day time, the ne	er of keys i in interlace io is the rat bise factor i ssible in _ umber of la	n key e sca tio of is ayers	/ pa nnir  in ic	d are ng of TV s 	 ystem is	·	06
Q.2	Solv a) b) c) d) e) f) g) h) i) j)	ve any Why Defin Defin State Defin Draw State Defin List d	<b>Eigh</b> modul e mod e skip e skip the pi e simp gener the di e ante ifferer	t of the following ation is essential lulation index and distance and virt ect ratio and view rinciple of super h blex communication ral block diagram ifferent types of ra- enna. And state dia t tones used in te	g. percentag ual height. ing distanc eterodyne on system. of electron adio waves fferent type elephone co	ie mo rece lic co prop es of	iver. mm aga ante	ation in Al unication tion. enna. ation.	И. system.		16
Q.3	A)	Atten 1) 2) 3)	n <b>pt ar</b> Expla Expla Expla	<b>ay Two of the fol</b> ain ratio detector. ain principle of an ain DTMF Dialer.	<b>lowing.</b> tenna.						10
	B)	Write	note	on Interlace scan	ning pheno	men	a in	TV.			06
Q.4	A)	Atten 1) 2) 3)	n <b>pt ar</b> Expla Expla Expla	<b>ny Two of the fol</b> ain television trans ain propagation of ain need of teleph	<b>lowing.</b> smitter with radio wave one excha	n nec es by nge i	essa <sup>,</sup> sky n tel	ary block ( v waves. lephone s	diagram. ystem.		08
	B)	<b>Desc</b> Expla	<b>ribe/E</b> iin sup	<b>xplain/Solve.</b> ber heterodyne re	ceiver of ra	adio r	ecei	ver with b	lock dia	gram.	08
Q.5	Atte a) b)	empt a Expla Expla modu	iny Tw in colo in AM ilated	<b>vo of the followin</b> or television recei modulation with wave.	<b>ıg.</b> ver with ne necessary	ecess math	ary iema	block dia atical exp	gram. ression c	of AM	16
	C)	Expla	in tele	phone handset w	vith necess	ary b	lock	diagram.			

			Pyth	on (1920	)154	.6)	,
Dat 03:0	e: Thu 00 PM	ırsday To 6:(	, 06-07-2023 00 PM				Max. M
ctio	<b>ns:</b> 1) 2) 3)	All qu Draw ) Figur	lestions are comp neat labelled diag res to the right ind	ulsory. grams whe icate full m	ereve harks	r necessary.	
A)	Mult 1)	iple cl PVM a) c)	hoice questions. is often called Python compiler Python interprete	 er	b) d)	Python volatile ma Portable virtual ma	chine achine
	2)	Whic errors a) c)	h of the following s? except block finally block	blocks allo	bws yo b) d)	ou to test the code l try block None of these	olocks for
	3)	Study Class Pri Stude Stude obj = how r a) c)	y the following pro s Student: nt("Students of Se ent() ent() Subject() many objects are 4 2	gram: ection A") there for th	ne giv b) d)	ven program? 3 1	
	4)	Whic a) b) c) d)	h of the following = mytuple[123] = ( mytuple = ("2" * mytuple = ("appl None of the thes	statements "apple, "ba ("apple", "t e", "banan se	s wou anana banar a", "c	Ild create a tuple in a", "cherry") na", "cherry")) herry")	python?
	5)	Study >>> s >>> s >>> s >>> s What a) c)	y the following sta str1= "POONAM" str2 = ":" str3 = "YASHASHI str1[-1:] will be the output m POONAM	tements: REE" : of this sta	teme b) d)	nt? M YASHASHREE	
	6)	What >>> r	is the output whe names = ['Meera',	n following 'Radha', 'S	g cod Saras	e is executed? wati', 'Laxmi']	

b)

d)

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# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 COMPUTER SCIENCE (Special Paper – XII)

Day & Time:

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>>> print(names[-3][-3])

d

Error

a)

c)

#### Q.1 /

**SLR-QA-212** 

#### Set Ρ

Marks: 80

- 7) In Regex, s stands for?
  - a) Returns a match where the string DOES NOT contain digits
  - b) Returns a match where the string DOES NOT contain a white space character
  - c) Returns a match where the string contains a white space character
  - d) Returns a match if the specified character are at the end of the string.
- 8) \_\_\_\_\_ function returns a randomly selected element from a non-empty sequence.
  - a) random.random() b) random.randint()
  - c) random.choice() d) random()
- 9) The python \_\_\_\_\_ takes source code as input and returns a code object which can later be executed by exec() function.
  - a) callable() Function b) bytes() Function
  - c) compile() function d) exec() Function
- What will be the output of below python code? Employee = {"Name": "Prem", "Age": 23, "salary":50000, "Company":"GOOGLE","Address":"Bangalore"} for x in Employee: print(x)
  - a) Name Age salary company address
  - b) Prem 23 50000 GOOGLE Bangalore
  - c) Prem 23 50000 GOOGLE
  - d) Name Age salary company

#### B) Fill in the blanks.

06

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- 1) Python Keywords are special reserved words that convey a special meaning to the \_\_\_\_\_.
- 2) The Python \_\_\_\_\_ allows a part of the code to be executed until the given condition returns false.
- **3)** A \_\_\_\_\_ can be written as the collection of comma-separated (,) values enclosed with the small () brackets.
- 4) The python \_\_\_\_\_ function is used to return the binary representation of a specified integer.
- 5) The Python \_\_\_\_\_ is defined as a container that is used to store collections of data, for example list, dict, set, and tuple etc.
- 6) The \_\_\_\_\_ can be defined as the sequence of characters which are used to search for a pattern in a string.

#### Q.2 Solve any Eight of the following.

- a) Define String literals.
- b) Define Pass statement.
- c) Characteristics of Lists.
- d) What is set?
- e) Explain abs() Function with example.
- f) How to get the current time?
- g) Explain the import statement.
- h) Explain any four Common Exceptions.
- i) Explain Python Multi-Level inheritance.
- **j)** Explain Python pow() Function with example.

Q.3	A)	Atter 1) 2) 3)	<b>npt any Two of the following.</b> Explain local and global variable in python with example. What is loop? Explain different types of loops used in python. Explain math module with example.	10
	B)	<b>Shor</b> 1) 2)	<b>t note/Solve</b> What is inheritance? Explain all types of inheritance. What is difference between tuple and list?	06
Q.4	A)	Atter 1) 2) 3)	<b>npt any Two of the following.</b> What is exception? Explain various keywords to handle exception. Explain any five methods of Dictionary with suitable example. Explain the characteristic of python.	80
	B)	Expla with 1) 2) 3) 4)	ain following File Handling operations & Access mode in python example. Open a file Read or write – Performing operation Close the file File Access mode	08
Q.5	Atte a) b)	<b>mpt a</b> How What	to reverse a number in Python. Write a program algorithm with example. is module? What are the advantages of module? Write a program for	16

c) Information formation and an analysis of mediator formation importing multiple modules.c) Define Regular Expressions. Explain Regex Functions with example.

# **SLR-QA-213** Set

Seat No.

#### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 **Certificate Course in Testing and Repairs of Electric Appliances** (19201515)

Dav & Date: Friday, 07-07-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of log table and calculator is allowed.

#### Q.1 A) Choose correct alternatives.

- 1) Reciprocal of hertz (Hz) is
  - a) admittance
  - c) conductance d) second
- 2) Which of the following quantities has the same unit?
  - a) power and impedance b) voltage and resistance
  - c) impedance and reactance d) resistance and susceptance
- 3) The electric power, P =\_\_\_\_\_.
  - a) mV b) VI c) I/V d) IR
- 4) Which of the following statement is wrong?
  - a) A torgue produces pure motion of rotation.
  - b) Joule's heating effect is reversible.
  - c) Joule's heating effect is not reversible.
  - d) Mica is good thermal conductor while it is bad conductor of electricity.

b) susceptance

- 5) An automatic iron converts \_\_\_\_\_ into thermal energy.
  - a) electric b) automatic
  - d) mechanical c) combustion
- 6) Two resistances of  $100 \Omega$  and  $200 \Omega$  are connected in series. Their resultant resistance is  $\Omega$ .
  - a) Less than  $100 \Omega$ b) 100 Ω
- c) 150 Ω d) 300 Ω
- 7) Which of the following equipment do not use Joule's heating effect of electric current for its working?
  - a) automatic iron b) oven
  - c) water heater d) cabin fan
- 8) Which of the following domestic appliance uses an electromagnet?
  - a) doorbell b) electric iron c) automatic iron d) water heater
- What are the components of home thermal appliances are made up of?
  - a) eureka

c) silver

- b) tungsten
  - d) nichrome

Max. Marks: 80

- 10) A fluorescent tube converts electric energy into \_\_\_\_\_ energy.a) rotary mechanicalb) solar
  - a) rotary mechanical c) light
    - d) heat

# Q.1 B) Fill in the blanks/ Definition/ One sentence answer/ One-word answer/ 06 Give the name/ predict the product etc.

- 1) Mention any two electrical quantities which has same unit?
- 2) An automatic iron converts electric energy into \_\_\_\_\_ energy.
- 3) The value of a resistance is determined using \_\_\_\_\_ code.
- 4) In an electric doorbell hammer strikes on \_\_\_\_\_.
- 5) Which one of these viz,
  - i) Generator
  - ii) Main compressor
  - iii) Cooling fan and
  - iv) Heat exchanger, is not a component of a simple air- cooling system?
- 6) Which gas among Hydrogen (H<sub>2</sub>), Carbon dioxide (CO<sub>2</sub>), Argon (Ar) and Methane (CH<sub>4</sub>) is sometimes used in filament lamps?

#### Q.2 Solve any Eight of the following.

- a) Maximum value of a. c. cycle is 50 V, then calculate Average value the voltage.
- b) Maximum value of a. c. cycle is 200 V, then calculate R.M.S. value the voltage.
- c) Two resistances of  $100 \Omega$  resistance each are connected in parallel. Calculate their resultant resistance.
- d) How resistances of a resistor is calculate using colour code?
- e) What is a magnet?
- f) Differentiate between a magnet and electromagnet.
- g) Discuss points of difference between a ceiling fan and table fan.
- h) How a tungsten filament works?
- i) Mention different part is of tungsten lamp.
- j) What is an inductor?

Q.3	A)	<ol> <li>Attempt any Two of the following.</li> <li>Discuss different safety rules of electricity.</li> <li>With neat diagram explain working of ceiling fans.</li> <li>Draws neat diagram of tube light and its circuit.</li> </ol>	10	
	B)	Discuss different parts of mixer.	06	
Q.4	A)	<ol> <li>Attempt any two of the following.</li> <li>Discuss the detail different types of connecting wires and their capacity.</li> <li>With neat diagram explain working f table fans.</li> <li>Discuss different parts of air cooler.</li> </ol>	08	
	B)	With neat diagram explain working of electric iron.	08	
Q.5	<ul> <li>Attempt any two of the following.</li> <li>a) What is need of Earthing?</li> <li>b) Draw diagram of geyser and explain its working.</li> <li>c) Draw post diagrams of heir drag and explain its principle of working.</li> </ul>			

c) Draw neat diagrams of hair dryer and explain its principle of working.

### Seat No.

### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 Thin Film Deposition and Characterization Techniques (19201516)

Day & Date: Friday, 07-07-2023 Time: 03:00 PM To 06:00 PM

2)

Instructions: 1) All questions are compulsory.

- Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of log table and calculator is allowed.

#### Q.1 Multiple choice questions. A) 1)

- The full of FTO is
  - a) Fixed Tin Oxide

a) Electrodeposition

- c) Fixed Titanium Oxide
- Cluster beam evaporation

b) Fluorine doped Tin Oxide

d) Fluorine doped Titanium Oxide

b) d) CBD

method do require high vacuum and can be carried out at high

- CNT is 3)
  - a) insulator

c) SILAR

temperature.

c) conductor

- b) semiconductor d) impure metal
- can be used for regenerating the portable instrument. 4)
  - a) Solar batteries
  - c) Solar cooker
- The gel is a \_\_\_\_\_ mass. 5)
  - a) light molecule
  - c) heavy molecule
- 6) 1 meter = \_\_\_\_ nm.
  - 10<sup>-9</sup> b) a) c)
    - **10**<sup>-10</sup> 10<sup>10</sup> d)
- Select the wavelength range corresponding to UV-Vis region. 7)
  - a) 200-800 nm b) 500-900- nm c) 25-2.5 µm d) 2.5 µm - 1 mm
- The measurement range of scanning electron microscopy is around 8)
  - a) 1cm b) 2 mm 5 to 10 nm d) 5 to 10 cm c)
- is the number of moles of solute in 250 mL, of a 0.4 solution. 9)
  - 0.1 b) 0.01 a) c) 1.0 d) 10.0
- The surface of water in contact with the glass substrate is . 10) a) Convex
  - b) Concave
  - c) Plane d) Both a) and b)

Set

Max. Marks: 80

10

- Solar pv cell b)
- d) Solar panels
- b) semi-rigid

#### d) rigid

10<sup>9</sup>

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#### B) Attempt all the following.

- 1) What does 'E' stand for in SEM?
- 2) Write the range of him film.
- 3) What is the full form XRD?
- 4) Compute the resistivity of give material whose resistance is  $2.5\Omega$ ; area of cross-section and length are 25 and 10 cm respectively.
- 5) Water loving material surface means
- 6) Mention the materials used in substrate cleaning process.

#### Q.2 Attempt any EIGHT of the following.

- a) Mentions the applications of thin film.
- b) Write done the names four physical methods.
- c) State the advantages of chemical methods over physical methods.
- d) What do you mean by optical band gap?
- e) Sketch the labelled diagrams that showing superhydrophilicity and super hydrophobicity.
- f) State the Beer-Lambert's law for absorption spectroscopy.
- g) Write down the applications of XRD.
- h) Mention any four examples of conductive substrates.
- i) What are general deposition parameters for chemical deposition method?
- j) There is a family of planes 0.252 nm of spacing in a NaCl crystal. If the 1<sup>st</sup> order maximum is observed at an incident angle of 18.1<sup>0</sup> then what is wavelength of the X-ray scattering from the NaCl crystal?

#### Q.3 A) Attempt any Two of the following.

- 1) Write a short note on top-down and bottom-up approach for thin film deposition.
- 2) Explain cyclic process involved in SILAR method with labelled diagram.
- 3) Explain important factors for material selection process.
- B) Explain demerits of chemical deposition method over physical deposition
   06 method.

#### Q.4 A) Attempt any two of the following.

- 1) Explain substrate cleaning process of thin film deposition method.
- 2) Draw a block diagram Uv-V is spectrophotometer; state its principal, advantages.
- 3) If saltwater contains 40gm of sodium chloride per 500 ml, then find the morality of a solution if moral mass is 58.443 g mol<sup>-1</sup>.
- **B)** Draw the labelled diagram of SEM and explain.

#### 80

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#### Q.5 Attempt any two of the following.

- a) Describe sol-gel method in detail.
- **b)** Draw the neat labelled diagram of spray pyrolysis deposition method and explain the function each part of the instrumentations.
- c) Explain an experimental procedure for finding the XRD patterns. What information does the XRD pattern of a crystal provide?

Sc	B.So ienti	c. (Se fic R	mester - V) (New) (CBCS) Examination: March/April-2023 esearch Substrate Cleaning Paper Writing and Publications (19201517)	;
Day Time	& Dat : 03:0	e: Fric 00 PM	Jay, 07-07-2023 Max. Marks: 8 To 06:00 PM	30
Instr	uctio	ns: 1) 2) 3) 4)	All questions are compulsory. ) Draw neat labelled diagrams wherever necessary. ) Figures to the right indicate full marks. ) Use of log table and calculators is allowed.	
Q.1	A)	Multi 1)	ple choice questions.Scientific method is committed toa) Objectivityb) Ethicsc) Propositiond) Neutrality	10
		2)	Formulas in Excel start witha) /b) $f$ c) -d) =	
		3)	Appendix to the report includes:a) Questionnairesb) Sample informationc) Mathematical derivationsd) All of the above	
		4)	In Microsoft Excel spreadsheets, rows are labeled as a) 1, 2, 3, c) A1, B1, C1, d) I, II, III,	
		5)	Every research actin has a quest of knowledge which is known as <u>a)</u> Purpose of research c) Result of research d) None of the above	
		6)	is "systematically conceptual structure of inter related elements in some schematic form" a) Concept b) Variable c) Model d) Facts	
		7)	is the first step of research process. a) Formulation of a problem b) Collection of data c) Editing and Coding d) Selection of a problem	
		8)	The research journal must have to be considered as standardjournal.a) Large volumeb) Free accessibilityc) Attractive cover paged) Peer review process	
		9)	Columns in Origin can be added withshortcut key.a) Ctrl+Db) Ctrl+Ac) Ctrl+Vd) Ctrl+C	
		10)	Narrative Literature Review method is also known asa) Advanced Methodb) Scientific Methodc) Traditional Methodd) Systematic Method	

Seat

No.

# SLR-QA-215

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16

# SLR-QA-215

# B) Fill in the blank/ Definition/One sentence answer/One word answer/Give the name/Predict the product etc. 1) The \_\_\_\_\_ file can be imported for data into Origin software. 2) Good Research is always \_\_\_\_\_.

- 3) JRF stands for
- 4) The intersection of a column and a row in MS Excel worksheet is known as \_\_\_\_\_.
- 5) The Origin software is specifically a \_\_\_\_\_ software.
- 6) can be used as a keyboard shortcut key to check spelling in MS Excel.

#### Q.2 Solve any Eight of the following.

- a) What is research?
- **b)** Name any four types of reports.
- c) What is referencing in the research paper? Where the references are mentioned?
- d) How do you add pictures and formula in the technical report writing?
- e) How the table of two rows and two columns are inserted in the research paper?
- f) Name the chart elements in MS Excel.
- **g**) What is worksheet in MS Excel.
- **h**) Name any two journals.
- i) Where do you save the power point presentation in computer?
- j) How many types of journals are there? Name any two types of journals.

#### Q.3 A) Attempt any Two of the following.

- 1) What is peer review in research publication? Write the detailed steps for it.
- 2) List the content of the research paper. Briefly explain each section.
- 3) Select any scientific topic and write a scientific writing for the daily newspaper.
- B) Explain the steps involved in preparing technical report writing. 06

#### Q.4 A) Attempt any Two of the following.

- 1) A technical topic with proper technical writing is expected.
- 2) A group of 10 people have health benefits by exercise in gym, skipping, yoga, running, walking, dieting practices every day. They scored points from 1 to 50. Prepare a table using MS excel and prepare a pie chart using the scores mentioned in your excel sheet.
- 3) Prepare an origin graph for the characteristics curves of any device by selecting minimum 10 rows and 2 columns.
- **B)** Explain in detail the procedure of preparing a manuscript for publishing in a **08** standard international level journal.

#### Q.5 Attempt any Two of the following.

- a) What is the need of scientific words in scientific writing? Explain with minimum eight examples.
- **b)** Write a steps involved in preparing power point presentation of a research paper in a national level conference. In detail explain the preparation of first slide of the presentation.
- c) What is a project? Explain in detail the procedure to prepare project report.

#### 06

# 16

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Page	1	of	2

#### No. B.Sc. (Semester - V) (New) (CBCS) Examination- March/April - 2023 Medical Physics (19201518) Day & Date: Friday, 07-07-2023 Time: 03:00 PM To 06:00 PM

Seat

**Instructions:** 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of log table and calculator is allowed.

#### Q.1 A) Choose correct alternatives.

- Which of the following number system is known as bas-10 system? 1)
  - Binary Number System b) Hexadecimal Number System a) c)
    - Octal Number System d) **Decimal Number System**
- Which two number from the binary number system? 2)
  - 1 and 2 a) 0 and 2 b) c)
    - 0 and 1 1 and 3 d)

#### 3) In how many generations a computer can be classified?

- a) 3 b) 4
- 5 6 c) d)

#### 4) What is the difference between soft and hard X-rays?

- Velocity Intensity a) b)
- Polarization Frequency d) c)
- In a normal X-Ray machine, X-ray are produced by 5)
  - Bombardment of cathode rays on a radioactive material a)
  - b) Nuclear fission
  - Nuclear fusion c)

c)

- Super heating f an element d)
- Dental X-Ray is also known as 6)
  - Orthopedics b) Orthopentology a) c) Orthology d)
  - Orthopantomography
- What properties of sound wave acts like the principle of ultrasound? 7) a)
  - Reflection and Refraction b) Reflection only
  - d) Refraction only Propagation
- When an abdominal ultrasound is done, why is it advised to have a 8) full bladder?
  - To have a good acoustic window a)
  - To increase the water content b)
  - To lower impedance c)
  - To allow for better propagation of wave d)
- For which of these areas can the ultrasound be taken for an infant but 9) not for an adult? a)
  - Cranium b) Chest
  - c) Arms d) Legs

Set

Max. Marks: 80

- 10) What is the full form of LASER?
  - a) Light Absorbent and Stimulated Emission of Radiations
  - b) Light Absorbing Solar Energy Resource
  - c) Light Amplification of Stimulated Emission of Radiations
  - d) Light Amplification of Singular Emission of Radiations

B)	Fill in the blanks/ Definition/ One sentence answer/ One-word answer/	06
	Give the name/ predict the product/ Write true/ false.	

- Optic fibers are used in endoscopy.
   a) True
   b) False
- 2) T<sub>1</sub> increase with magnetic field.a) Trueb) False
- 3) Laser energy is used t break up kidney or gallstones in process called?
- 4) What does MRI Stand for?
- 5) Normally Geiger Muller counter uses potential difference of \_\_\_\_\_.
- 6) Flame emission detector is a type of radiation detector.
  - a) True
  - b) False

#### Q.2 Solve any Eight of the following.

- a) Define electromagnetic wave.
- b) Define Doppler Shift.
- c) What is contact CT Scan?
- d) What are the features of advantages of PET and X-Ray?
- e) What is electrocardiogram?
- f) Define visible and IR radiations.
- g) What is the input and output Bus?
- h) Define sound wave?
- i) Define damping block.
- j) What is the magnetic resonance?

Q.3	A)	Attempt any Two of the following.	
		4) Eventain the function of ODU	

- 1) Explain the function of CPU.
- 2) Explain the application of Laser in medical field.
- 3) What is the magnetization?

B)	Write short notes on sonography.	
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#### Q.4 A) Attempt any two of the following.

- 1) Explain the computer networking.
- 2) Describe ultrasonic waves from piezoelectric materials.
- 3) What are the types of optical radiation? Explain any one of them.
- B) Describe about GM tube and its working with the help of diagram. 08

#### Q.5 Attempt any two of the following.

- a) Describe about the x-ray tube and its working with the help of diagram.
- b) Explain the five types of lumineense.
- c) What do you mean by medical diagnostic and therapeutic radiation?

16

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No.		
	B.Sc. (Semester - V E	) (New) (CBCS) Examination: March/April-2023 nergy Resources (19201519)
Day o Time	& Date Friday, 07-07-202 :: 03:00 PM To 06:00 PM	3 Max. Mar

Seat

Instructions: 1) All questions are compulsory.

- Draw neat labelled diagrams wherever necessary.
- 3) Figures to right indicate full marks.

#### Q.1 A) Multiple choice questions.

a) Hydrometer b) Manometer d) Wind Vane c) Anemometer

The wind speed is measured using an instrument called \_\_\_\_\_.

#### 2) The process of producing energy by utilizing heat trapped inside the earth surface is called b) Geo - Thermal energy

- a) Hydrothermal energy
- c) Solar energy d) Wave energy
- The base of power generating system is 3)
  - a) Biomass gasification
  - c) Solar energy
- 4) Which of the following energy has the greatest potential among all the sources of renewable energy?
  - a) Wind energy
  - c) Thermal energy
- b) Solar energy

d) Wind energy

b) Coal gasification

- d) Hydrothermal energy
- 5) The scattered solar radiation is called b) Beam
  - a) Direct radiation
  - c) Diffuse radiation
- d) IR Radiation
- 6) PV effect in solar cell converts solar energy into
  - a) Electrical energy Mechanical energy b) d) Thermal energy

b)

- c) Chemical energy
- 7) Which of the following does not serve as a source of biomass? Trap grease
  - a) Hybrid poplar
  - c) Willow algae Iron nails d)

The ocean thermal energy conversion (OTEC) is uses 8)

- a) Energy difference
- b) Potential difference d) Kinetic difference
- c) Temperature difference
- is used in thermal power plants. 9)
  - a) Uranium b) Thorium c) Air
    - d) Fossil Fuels
- 10) After complete decomposition in biogas plant the gases like \_\_\_\_\_ are generated.
  - a) Methane
  - c)  $H_2S$

- b)  $CO_2$
- d) All of these

Max. Marks: 80

Set

06

		<ol> <li>Petroleum, coal and are fossil fuels.</li> <li>Forests and coal are natural resources.</li> <li>Natural gas is a resource</li> <li>All sources of energy are non - renewable.</li> <li>Biodiesel is produced by transesterification of and animal fats.</li> <li>Nuclear energy is a form of energy released from the</li> </ol>	
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9) 10)	e any Eight of the following. What is geothermal power? Discuss the advantages of geothermal plant. Give the advantage of tidal power plant. Mention some organic materials used in biomass plant. Write any two items used as biomass fuels. Differentiate tide and wave. Classify the geothermal sources What are the constituents of biogas? Mention any two advantage of wind energy. Write any two renewable energy resources.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Discuss advantages of renewable energy resources.</li> <li>2) Explain Solar Flat Plate collector.</li> <li>3) Brief describe biomass energy.</li> </ul>	10
Q.3	A) B)	<ul> <li>Attempt any Two of the following.</li> <li>1) Discuss advantages of renewable energy resources.</li> <li>2) Explain Solar Flat Plate collector.</li> <li>3) Brief describe biomass energy.</li> <li>Write a short note on renewable energy resources.</li> </ul>	10 06
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any Two of the following. <ol> <li>Discuss advantages of renewable energy resources.</li> <li>Explain Solar Flat Plate collector.</li> <li>Brief describe biomass energy.</li> </ol> </li> <li>Write a short note on renewable energy resources.</li> <li>Attempt any Two of the following. <ol> <li>Briefly describe energies from the ocean.</li> <li>What are the problems associated with OTEC?</li> <li>Differentiate pyrolysis and gasification?</li> </ol> </li> </ul>	10 06 08
Q.3 Q.4	A) B) A)	<ul> <li>Attempt any Two of the following. <ol> <li>Discuss advantages of renewable energy resources.</li> <li>Explain Solar Flat Plate collector.</li> <li>Brief describe biomass energy.</li> </ol> </li> <li>Write a short note on renewable energy resources.</li> <li>Attempt any Two of the following. <ol> <li>Briefly describe energies from the ocean.</li> <li>What are the problems associated with OTEC?</li> <li>Differentiate pyrolysis and gasification?</li> </ol> </li> <li>Describe briefly about PV system.</li> </ul>	10 06 08 08
Q.3 Q.4 Q.5	A) B) A) B) Atte a)	<ul> <li>Attempt any Two of the following. <ol> <li>Discuss advantages of renewable energy resources.</li> <li>Explain Solar Flat Plate collector.</li> <li>Brief describe biomass energy.</li> </ol> </li> <li>Write a short note on renewable energy resources.</li> <li>Attempt any Two of the following. <ol> <li>Briefly describe energies from the ocean.</li> <li>What are the problems associated with OTEC?</li> <li>Differentiate pyrolysis and gasification?</li> </ol> </li> <li>Describe briefly about PV system.</li> </ul> mpt any Two of the following. What are the main types of OTEC power plants? Describe their working in brief.	10 06 08 08 16

c) Discuss the construction and working of wind turbine and Give applications of wind energy.

#### B) Fill in the blank.

	SLR-QA-21	8
Seat No.	Set	Ρ
B.Se	c. (Semester - V) (New) (CBCS) Examination: March/April-2023 Geoinformatics (19201538)	
Day & Dat Time: 03:0	te: Friday, 07-07-2023 Max. Marks: 00 PM To 06:00 PM	40
Instructio	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.	
Q.1 A)	<ul> <li>Fill in blanks.</li> <li>1) A trend of fault line can be represented by in GIS structural mappin a) point b) line</li> <li>c) polygon d) none of these</li> <li>2) Sand along river bank show tone in the aerial photograph.</li> <li>a) black b) light</li> <li>c) moderate d) bright</li> <li>3) In the high oblique aerial photographs, tilt angle of the axis is</li> <li>a) 20<sup>0</sup>-30<sup>0</sup> b) 30<sup>0</sup>-40<sup>0</sup></li> <li>c) 40<sup>0</sup>-60<sup>0</sup> d) 60<sup>0</sup>-90<sup>0</sup></li> <li>4) In visible region, the blue light is having a wave length range of</li> <li>a) 0.42-0.52 µm b) 0.42-0.52 µm</li> <li>c) 0.42-0.92 µm d) 0.22-0.32 µm</li> <li>5) A pocket stereoscope is used to view</li> <li>a) Digital satellite data b) microscopic minerals</li> <li>c) fine grained minerals in the field.</li> </ul>	<b>05</b> ıg.
B) Q.2 Ans a) b)	<ul> <li>d) hard copy of aerial data</li> <li>Answer the following questions in one sentence.</li> <li>1) What point will you get by joining fiducial marks situated on opposite sides of aerial photographs?</li> <li>2) What is the name of point when two or more vector lines intersect?</li> <li>3) What is a point on the ground called which is directly in line of axis of the aerial photograph or camera axis?</li> <li>Swer any four of the following.</li> <li>What is the term used for surveying and mapping using aerial photographs. Name the two infrared (IR) bands in LANDSAT?</li> </ul>	03 08
C) d) e) Q.3 A) B)	<ul> <li>Identify the structure when beds dipping away from a common linear axis. What is mosaic?</li> <li>What is the colour of water bodies in IR colour image?</li> <li>Attempt any One of the following.</li> <li>1) What is Atmospheric window?</li> <li>2) Describe various error in flying.</li> <li>Explain trellis drainage pattern with their significance.</li> </ul>	05 03

#### Q.4 Attempt any two of the following.

- a) Explain in detail overlap? What are their types? Why overlap is required?
- b) Describe various platforms of remote sensing.
- c) What is spectral reflectance curve?

#### Q.5 Attempt any One of the following.

- a) Define remote sensing and describe any two components of remote sensing.
- **b)** Describe any three uses of aerial photographs in Geology.
- c) Describe tone and texture with examples and uses in identification of features.

08

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#### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023 LINUX (19201547)

Day & Date: Friday, 07-07-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks
- 4) Use of log tables and calculator is allowed.

#### Q.1 A) Multiple choice questions. 1) "chmod 761 letter" com

- "chmod 761 letter" command is equivalent to \_\_\_\_\_.
  - a) chmod u=7, g=6, o=1 letter
  - b) chmod a=761 letter
  - c) chmod u+rwx, g+rw, o+x letter
  - d) chmod ugo=761 letter
- 2) Which command is used in LINUX for description of any command?
  - a) Help b) Man
  - c) Detail d) Desc
- 3) Which of the following commands can be used to mount /mnt/cdrom file system from the /dev/cdrom?
  - a) mount /mnt/cdrom: /dev/
  - b) mount /dev/cdrom /mnt/cdrom
  - c) monunt /dev/ /mnt/cdrom
  - d) umount /dev/cdrom /mnt/cdrom
- 4) If two files on same partition point to the same inode number they are called\_\_\_\_.
  - a) Soft links b) Hard links
  - c) Copy links d) Similar link

5) Printer in the file structure can be found in\_\_\_\_\_ directories.

- a) /etc b) /html c) /proc d) /dev
- 6) Which command is used in vi editor, to copy the current line of the file?
  - a) ys b) yc c) yy d) yw
  - C) yy C) yw
- 7) Which of the following command is used to see the content of "backup.tar" file without extracting it?
  - a) tar-xvf backup.tar
  - c) tar-tvf backup.tar d) tar-dvf backup.tar

b)

tar -svf backup.tar

- 8) Which of the following is the main Apache configuration file?
  - a) /etc/apache.conf b) /etc/httpd/config
  - c) /etc/httpd/conf/httpd.conf d) /etc/srm.conf

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Max. Marks: 80

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- 9) Which of the following command is used to copy files across systems?
  - a) SSH b) Telnet
  - c) RSH d) FTP
- 10) How would you search a string 'class' at the end of the line in a 'exam' file?
  - a) grep' class #' exam b) grep 'class!' exam
  - c) grep 'class\$' exam d) grep 'class^' exam

#### B) Fill in the blanks.

- 1) \_\_\_\_\_ symbol used for comments in bash shell scripting.
- 2) \_\_\_\_\_ command is used for check if the connection to a host is good.
- 3) command is use to show one page of output at a time.
- 4) command is used to extract a column from a text file.
- 5) The shell metacharacter \$# represents
- 6) The file system information is stored in

#### Q.2 Solve any eight of the following:

- a) What are the roles of administrator?
- **b)** Why pipe operator used?
- c) What are the file types?
- d) What is kernel?
- e) What is pwd command with example?
- f) Define Super Block.
- **g**) What are characteristics of file system?
- **h**) List all saving and quitting commands in vi editor.
- i) Differentiate between > and >> operator.
- j) What are the file attributes?

Q.3	A)	Attempt any two of the following:	
-----	----	-----------------------------------	--

- 1) What is the difference between foreground process and background process? Explain with an example.
- 2) How to change permission of a file? Explain.
- 3) Explain listing Command in details.
- B) Write a shell script to check entered number is Prime or not.

#### Q.4 A) Attempt any two of the following:

- 1) Explain FTP.
- 2) Explain NFS.
- 3) Explain Configuration Apache.

#### Q.4 B) Write a menu driven shell Script.

- 1) To create symbolic link file Bsc to Msc file
- 2) To Remove the Execute & Read permission of a bsc file
- 3) Make a new directory
- 4) To rename a directory
- 5) To append data at end of bsc file

#### Q.5 Attempt any two of the following.

- a) Explain Find Command in details with example.
- **b)** Explain grep Command in details with example.
- c) Explain Security Enhanced Linux.

Day a Time	& Date : 03:0	e: Frida 0 PM <sup>-</sup>	ay, 07-0 o 06:00	7-2023 ) PM			Max. Mark	s: 80
Instr	uctior	ns: 1) / 2) [ 3) F 4) (	All ques Draw ne Figures t Jse of lo	tions are compo at labelled diag to the right indic og tables and ca	ulsory. rams whe cate full m alculator is	erever arks s allov	necessary. ved.	
Q.1	A)	Choo 1)	ese the Excel d a) W c) W	<b>correct alterna</b> locuments are s orkgroups orksheets	a <b>tive.</b> stored as <sup>-</sup>	files d b) d)	called Worktables Workforce	10
		2)	What re a) Ri c) Co	efers to the hori bbon olumns	izontal cel	lls wh b) d)	ich can contain information? Rows Horizontal scrollbar	
		3)	Which a) Fi c) Pi	term is used to Iter vot	join the s	electe b) d)	ed cells in one cell? Wrap Merge	
		4)	A formu a) Eo c) Co	ula in Excel alw qual sign omma	ays begin	s with b) d)	n an Colon Space	
		5)	The res a) Lo c) Al	sult is a va ogical gorithm	alue eithei	r TRU b) d)	IE or FALSE. Arithmetic Logarithm	
		6)	Press _ a) Sł c) Sł	to bring up nift+F3 nift+ F5	o search b	box. b) d)	Shift+ F4 None of these	
		7)	To min a) Ct c) Ct	imize the curren trl + F11 trl + F9	ntly select	ed wi b) d)	ndow, press Ctrl + F12 Ctrl + F10	
		8)	a) Ce c) Ce	is the intersecti ell olumn	on of a ro	w witl b) d)	n a column. Row All of these	
		9)	To disp selecte a) Al c) Es	plays the Find a d press t + F sc + F	nd Replac	ce dia b) d)	log box, with the Find tab Tab + F ctrl +F	
		10)	In a) Fo c) St	_ tab you will fin ormatting tab andard tab	id AutoSu	ý m bu b) d)	tton. Formula tab Clipboard tab	

MS-EXCEL (19201533)

# **SLR-QA-220**

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B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2023

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#### B) Fill in the blanks.

- 1) Press\_\_\_\_\_ to save the active file with its current file name, location, and file format.
- 2) \_\_\_\_\_ are equations that perform calculations on values in your worksheet.
- 3) \_\_\_\_\_ function is used to add the values in the function argument.
- 4) Press\_\_\_\_\_ to undo in MS-EXCEL.
- 5) \_\_\_\_\_ of the worksheet appears vertically and are identified by letters at the top of the worksheet window.
- 6) Press \_\_\_\_\_ to select all rows and columns in the worksheet.

#### Q.2 Solve any eight of the following:

- a) Which function is used to calculate sum of numbers?
- b) Which function is used to find maximum of numbers?
- c) Write the name of file formats that are used to save a MS-EXCEL file.
- d) How can you add cells, rows or columns in Excel?
- e) What is the use of the IF function in Excel?
- **f)** Write the function for calculating p. m. f. of binomial distribution with n=10 and p=0.8.
- g) Which function is used to calculate mean of numbers?
- **h**) Write different charts in MS-Excel.
- i) Explain what is a spreadsheet?
- j) Which function is used to generate random numbers?

## Q.3 A) Attempt any two of the following:

- How will you write the formula for the following?
   Multiply the value in cell A1 by 20, add 10 in the result, and divide it by 4
- 2) How do you find averages in MS- excel?
- 3) Explain MS Excel in brief.
- B) Explain SUM and SUMIF functions.

#### Q.4 A) Attempt any two of the following:

- 1) What is difference between a function and a formula in Excel?
- 2) How can you draw 20 random numbers from 0 to 1?
- 3) What is difference between a function and a formula in Excel?

#### **B)** Write short notes on 'Data' tab in Excel.

- Q.5 Attempt any two of the following.
  - a) Explain different charts in MS-Excel.
  - b) What are the different types of COUNTIF functions in Excel?
  - c) Explain RAND and RANDBETWEEN functions with examples.

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#### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 ENGLISH (Compulsory) Literary Mindscapes – I (19201600)

Day & Date: Monday, 19-06-2023 Time: 03:00 PM To 05:00 PM

**Instructions:**1) All questions are compulsory.

- 2) All questions carry equal marks.
  - 3) Figures to the right indicate full marks.
- Q.1 Choose the correct word /Phrase from the given options and complete the **08** sentence. Aksionov lived as a convict in Siberian prison for \_\_\_\_\_ years. 1) twenty six twenty two a) b) c) twenty d) thirty two 2) Mrs. Quick was associated with the \_\_\_\_\_. a) Welfare Committee b) Old age Home Orphanage **Rotary Club** c) d) 3) is not a dream says John Keats in the poem 'Ode to Blindness'. illusions ambition a) b) life d) goal c) 'My Last Duchess' is based on historical events involving the \_\_\_\_\_. 4) a) Duke of Ferrara Duke of Syberia b) Ezra Pound c) Robert Browning d) was found by Robert which was left by his wife. 5) a) money b) note ticket d) wallet c)
  - 6) The \_\_\_\_\_ of nature helps in strengthening the bond between nature and human beings.
    - a) cruelty b) greenery
    - c) beauty d) ugliness

#### 7) The little lamb followed Mary everywhere. (Choose the type of adverb)

- a) adverb of time b) adverb of manner
- c) adverb of place d) adverb of frequency
- 8) He said to her, "What a Cold day!"
  - a) He told her that it was a Cold day.
  - b) He exclaimed that it was a Cold day.
  - c) He exclaimed Sorrfully that it was a Cold day.
  - d) He claimed that it was a very Cold day.

#### Q.2 Write answers in short (Any Four)

- 1) What did Robert Quick expect from his daughter's after returning from the business trip?
- 2) What did Makar Semyonich want from Aksionov?
- 3) Why the mother feels sad while narrating the story of Sita?

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Max. Marks: 40

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- 4) What are the things of beauty mentioned in the poem?5) What is the poem 'My Last Duchess' about?6) How does Charlotte Bronte ask her readers to look towards life?

#### Q.3 Answer any One of the following Questions.

- 1) How can technology literacy Skills help learners in the future?
- 2) What life skills are needed to become a good leader?

Q.4	As a Sensitive human being, what measures do you to take to conserve the	10
	environment and how will you educate people about the importance of	
	environment?	

	D.00		nes	PHYS	ICS (Pap	er -	XIV)	
				Electrod	ynamics	(192	201619)	
Day Time	& Date : 03:0	e: Tue 0 PM	sday To 06	, 20-06-2023 5:00 PM			Max. Marks	s: 80
Instr	ructio	ns: 1) 2) 3) 4) <sup>[</sup>	All qu Drav Figu Use d	uestions are comp v neat labelled diag res to the right ind of log tables and c	ulsory. grams whe icate full m alculator is	ereve larks allov	r necessary. wed.	
Q.1	A)	<b>Choo</b> 1)	<b>ose c</b> The a) c)	correct alternative Poisson's equation $\nabla^2 \phi = 0$ $\nabla^2 \phi = E$	es from th on is	<b>e op</b> b) d)	tions. $ abla^2 \phi = D$ $ abla^2 \phi = \rho/\epsilon_0 $	10
		2)	Lap a) b) c) d)	lace's equation is charge free region region with certa constant charges moving charges	applicable on in charge c S	to distrik	 Dution	
		3)	Self a)	inductance of a s $\frac{\mu_0}{8\pi}$	traight con	ducto b) d)	for due to flux inside is $\frac{8\pi}{\mu_0}$	
		4)	Ger a) c)	bnµ <sub>0</sub> neration of motiona battery photovoltaic cell	al emf is th	e prir b) d)	nciple of generator electrostatics	
		5)	The per a) c)	mutual inductanc unit length over a $\mu_0 \frac{n1n2}{A}$ $\mu_0 n_1 n_2 A$	e per unit o frame of c	of two ross : b)	b windings with n <sub>1</sub> and n <sub>2</sub> turns sectional area A is $\mu_0 \frac{A}{n1n2}$ 1	
		6)	The Max a) c)	statement 'magnet well's equation $\overline{\nabla}.\overline{D} = \rho$ $\overline{\nabla} \times \overline{H} = \frac{\partial \overline{D}}{\partial t}$	etic free po 	a) oles d b) d)	$\overline{\mu_0 \ n1 \ n2 \ A}$ lo not exist' is justified by $\overline{\nabla}. \overline{B} = 0$ $\overline{\nabla}. \overline{E} = 0$	
		7)	The a) c)	nature of electror transverse stationary	nagnetic w	ave i b) d)	s longitudinal square	
		8)	Whe ther a) c)	en a wave gets ref re occurs a phase 0° 90°	lected fron change of	n the  b) d)	surface of a denser medium,  45° 180°	

Seat No.

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023

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SLR-QA-222

Set

Ρ

- 9) An oscillating charge \_\_\_\_\_.
  - a) radiates
  - c) nothing can be said
- 10) Radiation reaction force acting on the radiating dipole is \_\_\_\_\_.

b)

d)

b)

does not radiated

none of the above

a self force

- a) a reaction force
- c) an accelerating force d) no force

#### B) Answer the following questions.

- 1) The trajectory of a particle entering an electric field in a direction perpendicular to  $\overline{E}$  is \_\_\_\_\_.
- 2) The equation of continuity is in accordance with the law of conservation of \_\_\_\_\_.
- 3) The plane electromagnetic waves are attenuated exponentially in \_\_\_\_\_.
- The tangential component of electric filed at the interface is \_\_\_\_\_.
- 5) Define electric dipole.
- 6) Define self inductance.

#### Q.2 Solve any eight of the following:

- a) State transformer ratio.
- **b)** What is the dipole moment for a dipole having equal charges -3 C and 3 C separated with a distance of 0.05 m?
- c) Draw graphical representation of plane electromagnetic waves.
- d) Define surface current density K.
- e) Determine the electrostatic force between the two charges of magnitude 2 C and 1 C separated by a distance 1 m in air. [Given  $k = 9 \times 10^9$  N m<sup>2</sup> / C<sup>2</sup>].
- f) Define transmission coefficient of EM wave.
- g) State Biot-Savarts law.
- h) Define electromotive force.
- i) Define retarded time.
- **j)** State Ampere's law.

#### Q.3 A) Attempt any two of the following:

- 1) Give an account of total internal reflection.
- 2) Obtain an expression for total power radiated by an electric dipole.
- 3) Estimate the value of permittivity of free space from the knowledge of velocity of electromagnetic waves in free space. (Given  $\mu = 4\pi \times 10^{-7} \text{H m}^{-1}$  Velocity of light  $C = 2 \times 10^8 \text{ m}$  /cl

[Given  $\mu_0 = 4\pi \times 10^{-7}$ H m<sup>-1</sup>, Velocity of light C = 3 × 10<sup>8</sup> m/s].

#### B) Write a short note on following.

- 1) Faraday's law and
- 2) Lenz's law.

### Q.4 A) Attempt any two of the following:

- 1) Derive an expression for potential at a point between plates of spherical capacitor.
- 2) Explain Maxwell's corrections to Ampere's circuital law.
- 3) Derive integral and differential form of Faradays laws of induction.

B)	Obtain the boundary conditions for electromagnetic field vectors	80	
	$(\overline{D}, \overline{E}, \overline{B} \& \overline{H})$ at the interface of two media.		

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## Q.5 Attempt any two of the following.

- a) Explain the motion of charged particle in crossed, uniform and constant Electric  $\overline{E}$  and magnetic  $\overline{B}$  fields.
- **b)** State Maxwell's equations in vacuum medium and explain the physical significance.
- c) Establish the law of conservation of energy for electric field and explain meaning of Poynting vector.

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E	3.Sc.	(Ser	nester - \ Cł P	/I) (New) (CB0 HEMISTRY (S Physical Chen	CS) Exan pecial Pa nistrv (19	nination: Mar per - XIII) 201610)	ch/April-2023	
Day 8 Time:	& Date 03:00	: Tue: ) PM <sup>-</sup>	sday, 20-06 To 06:00 PI	5-2023 M		,	Max. Marks	: 80
Instru	uction	ns: 1) / 2) 3) 4) (	All question Draw neat Figures to t Jse of log ta	is are compulsor labelled diagram the right indicate ables and calcula	y. s wherever full marks ator is allow	<sup>-</sup> necessary. ved.		
Q.1	A)	<b>Choo</b> 1)	ose the cor Rotational a) micro c) radio	rrect alternative spectra are obso wave wave	<b>s from the</b> erved in b) d)	options. region. IR none of these		10
		2)	a) electr c) vibrat	ransition requires ronic tional	s nignest ei b) d)	nergy. rotational none of these		
		3)	Rate of rea a) rema c) increa	action v ins constant ases	vith increas b) d)	se in temperatur decreases none of these	e.	
		4)	Reactions the origina a) chain c) rever	in which the pro Il reactants are k sible	ducts of ch nown as b) d)	emical change, reaction parallel none of these	react to form s.	
		5)	Homogeno a) solve c) soluti	ous mixture of tw nt on	o or more b) d)	component is ca solute all of these	alled as	
		6)	Critical sol a) 66.5 c) 55.2	ution temperatur	e of pheno b) d)	l water system i 65.5 76.5	s0C.	
		7)	The solution a) minin c) medio	on having low va num um	por pressu b) d)	re has high none of these	boiling point.	
		8)	The term f a) press c) volun	ugacity has dime sure ne	ensions of <sub>_</sub> b) d)	temperature all of these		
		9)	For sponta a) positi c) zero	aneous process, ve	change in t b) d)	free energy is _ negative all of these	·	
		10)	In a reaction a) 1 c) 4	on $2A + B \rightarrow C +$	D, molecu b) d)	larity is 2 3	_·	

	В)	<ul> <li>Fill in the blank/Definition/One sentence answer/ One word answer/</li> <li>Give the name/Predict the product etc.</li> <li>1) For vibrational spectroscopy, selection rule is</li> <li>2) Define ideal solution.</li> <li>3) Define activation energy.</li> <li>4) Give statement of law of mass action.</li> <li>5) Give equation for Gibb's free energy.</li> <li>6) Define Rayleigh line.</li> </ul>	06			
Q.2	Solv a) b) c) d) e) f) g) h) i) j)	Ve any eight of the following:Give two applications of rotational spectra.Define wave number and wave length.Give statement of Raoult's law.Define boiling point of liquid.Define zeotropic mixture.Give one application of Clapeyron-Clausius equation.Derive relation between G and A.Define consecutive reaction.Give two examples of opposing reaction.Define temperature coefficient.				
Q.3	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Sketch and explain molecular energy level diagram.</li> <li>2) Write short note on fractional distillation.</li> <li>3) Derive Gibb's Helmholtz equation.</li> </ul>	10			
	B)	Give the characteristics of third order reaction.	06			
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Derive equation for rotational energy.</li> <li>2) Discuss nicotine water system.</li> <li>3) Explain collision theory.</li> </ul>	08			
	B)	The yellow light has wavelength 5.8 x $10^{-7}$ m. calculate frequency, energy and wave number of light. (h = 6.626 x $10^{-34}$ J.s)	08			
Q.5	Atte a) b)	<b>mpt any two of the following.</b> Explain the system of miscible liquid pair having minimum boiling point. Derive equation for rate constant of third order reaction.	16			

c) Derive thermodynamically van't Hoff reaction isotherm.

2) Draw neat labelled diagrams wherever necessary. 3) Figures to the right indicate full marks 4) Use of log tables and calculator is allowed. Q.1 Choose correct alternatives from the options. 10 A) Establishment of pathogen in the plant tissue after penetration is 1) called a) Infection b) Isolation c) Incubation d) Inoculation 2) The relative capacity of pathogen to cause the disease is called . a) Immunity b) Hypersensitivity c) Pathogenicity Susceptibility d) 3) An ability of plant to resist the effect of pathogen is called . a) Susceptibility Hypersensitivity b) c) Immunity Pathogenicity d) Little leaf of Brinjal is \_\_\_\_\_ disease. 4) a) Fungal Bacterial b) c) Viral d) Phytoplasma Spacelotheca sorghi causes \_\_\_\_\_ disease of jowar. 5) b) a) Head smut Grain smut c) Rust stem d) Rot 6) The separation of pathogen from its host and its culture on a nutrient medium is called a) Reproduction b) Isolation c) Inoculation d) Incubation 7) Plant diseases are classified on the basis of a) symptoms spread b) c) severity of infection all of these d) Citrus canker is disease. 8) a) Viral Bacterial b) c) Fungal d) Mycoplasma 9) Brown spot of Maize is caused by a) Cercospora personata

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **BOTANY (Special Paper - XIII)** Plant Pathology (19201601)

Day & Date: Tuesday, 20-06-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

Max. Marks: 80

Seat No.

# **SLR-QA-224**

Set

		10)	Late blight of Potato is caused by a) Erysiphae cichoracearumis b) Xanthomonas citri c) Phytophthora infestans d) Alternaria alternata	
	B)	Answ 1) 2) 3) 4) 5) 6)	ver the following. Define symptoms. What is immunity? Name the causal organisms of white trust crusifer. Wilt of Pigeon pea occurs on which plant? Define hypertrophy. Name the host plants white rust of crucifer.	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	e any Define Name Write Define Name What What Write Write	eight of the following: e disease. any two bacterial diseases. the symptoms of grain smut of Jowar. the control measures of little leaf of brinjal. e host and pathogen. any two seed born diseases. is necrosis? is aerobiology? the symptoms of red rot of sugarcane. the names of any two viral diseases.	16
Q.3	A)	Atten 1) 2) 3)	<b>npt any two of the following:</b> Write causal organisms and symptoms of Fruit rot disease of Cucurbits. Describe the disease Brown rust of Wheat w.r.t. causal organism and symptoms. Name the causal organisms and write control measures of Oily spot of Pomegranate.	10
	B)	Write	note on - Seed born pathogens.	06
Q.4	A)	Atten 1) 2) 3)	npt any two of the following: Describe the causes of disease. Write the causal organisms and control measures of Downy mildew of grapes. Write the causal organism and symptoms of Tikka disease of groundnut	80
	B)	Expla	in the importance of plant diseases.	08
Q.5	Atte a)	<b>mpt a</b> State Cank	<b>ny two of the following.</b> causal organism and write symptoms and control measures of <i>Citrus</i> er.	16
	b) c)	Desci Desci	ribe the scope and importance of aerobiology. ribe the classification of plant diseases based on necrotic symptoms.	

Sea No.	t						Set	Ρ
B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 ZOOLOGY (Special Paper - XIII) Animal Physiology: Life Sustaining Systems (19201627)								
Day Time	Day & Date: Tuesday, 20-06-2023 Max. Marks: 80 Time: 03:00 PM To 06:00 PM							
Instr	ructior	ns: 1) 2) 3) 4)	All question Draw neat l Figures to t Use of log ta	s are compuls abelled diagra he right indica ables and calc	ory. Ims wherevents te full marks ulator is allo	er necessary. s owed.		
Q.1	A)	<b>Cho</b> 1)	ose the cor Hamburge a) Phos c) Chlor	<b>rect alternati</b> r r phenomenor ohate ide	ve from the n is called _ b) d)	e options. shift. Nitrate Carbonate		10
		2)	The break a) Diges c) Excre	down of comp tion tion	lex food ma b) d)	terial in to simple form is Nutrition Emulsification	called	·
		3)	Which one a) Oxyto c) Adrer	of the followir ocin naline	ng is also kr b) d)	nown as antidiuretic horm Vasopressin Calcitonin	ione?	
		4)	Middle par a) Corte c) Hyllus	t of kidney is o x s	called b) d)	 Medulla Calyx		
		5)	The emuls a) Intest c) Gastr	ification of fat inal juice ic juice	is carried o b) d)	ut by Bile juice Pancreatic juice		
		6)	Sphygmon a) Hb c) Pulse	nanometer ins rate	trument is u b) d)	ised for measurement of BP Sugar	·	
		7)	Excretion r metabolic a) Elimir c) Delet	nay be define wastes from th nation ion	d as the sep ne body. b) d)	paration and of n Absorption Secretion	itrogenous	i
		8)	Right auric a) Oxyge c) Mixeo	le received enated I	type ( b) d)	of blood. Oxyhaemoglobin Deoxygenated		
		9)	Initiation of a) Mouth c) Small	f protein diges า intestine	tion start in b) d)	the part of digestive sys Stomach Large intestine	tem	'
		10)	One cardia a) 0.4 se c) 0.3 se	ac cycle requir ec ec	edb) d)	time. 0.2 sec 0.8 sec		
	В)	<ul> <li>Fill in the blank/Definition/One sentence answer/ One word answer/</li> <li>Give the name/Predict the product etc.</li> <li>1) Blood pressure in healthy person is mmHg.</li> <li>2) Which instrument is used when kidney function failed?</li> <li>3) Which respiratory pigment is present in mammalian blood?</li> <li>4) Middle part of kidney is called</li> <li>5) The origin of heart beat from SA node which is also known as</li> <li>6) Give the name of scientist who first discovered blood groups in rhesus monkey.</li> </ul>	6					
-----	--	---	---					
Q.2	Solv a) b) c) d) e) f) g) h) i)	e any eight of the following: 1 Emulsification of fat Heamerythrin Acidic Chyme Tidal volume Erythoblastosis foetalis Diagram of ECG Composition of blood Bowman's capsule Role of ADH hormone during urine formation. Cardiac cycle	6					
Q.3	A)	Attempt any two of the following:11)Describe the physiology of gastric digestion.2)Describe Bohr's effect.3)Describe in brief haematopoiesis.	0					
	B)	Write short notes on- Describe ultrastructure of nephron.0	6					
Q.4	A)	Attempt any two of the following:01)Describe the chemical and nervous control of respiration.2)Describe the phenomenon of blood clotting.3)Describe with neat labeled diagram, the origin and conduction of heart beat.	8					
	B)	Write short notes on- Describe the mechanism of urine formation.0	8					
Q.5	Atte a) b)	mpt any two of the following.1Describe the physiology of digestion in small intestine.1What are blood groups? Describe types of blood groups in human.1	6					

c) Describe the process of transport of Co2.

				MATHEMATICS (Spe Metric Spaces	ecial I (1920	Paper - XIII) 1635)
Day & Time: (	Date 03:00	e: Tues 0 PM 1	sday, Fo 06	20-06-2023 :00 PM		Max. Marks:
Instruc	ctior	ns: 1) / 2)	All qu Figur	estions are compulsory. es to the right indicate full	marks	
Q.1 /	<b>A</b> )	Choc 1)	<b>ose c</b> Whie a)	orrect alternatives for each of the following sequence $\left\{\frac{1}{\log n}\right\}_{n=2}^{\infty}$	i <b>chof t</b> l ce is no b)	he following. bt in $\ell^2$ ? $\left\{\frac{1}{e^n}\right\}_{n=1}^{\infty}$
			c)	$\left\{\frac{1}{\sqrt{n}}\right\}_{n=1}^{\infty}$	d)	$\left\{\frac{1}{n}\right\}_{n=1}^{\infty}$
		2)	The then a) c)	mapping $\varrho : \mathbb{R} \times \mathbb{R} \to \mathbb{R}$ def $\varrho$ is called Discrete metric Pseudo metric	fined b <u>y</u> b) d)	y $\varrho(x, y) =  x - y  \forall x, y \in \mathbb{R}$ Absolute value metric Euclidean metric
		3)	Let ; if <i>f</i> a) c)	f be non-decreasing functi is bounded below on $(a, b)$ $\lim_{x \to b^{-}} f(x) exist$ $\lim_{x \to a^{-}} f(x) exist$	on on f ) then b) d)	the bounded open interval $(a, b)$ , $\lim_{x \to b^+} f(x) exist$ $\lim_{x \to a^+} f(x) exist$
		4)	With then a) c)	usual meaning if X is cha $\lim_{x \to a} X(x) \text{ for any } a \in R \text{ is } \\ 0$ Any rational number	b) d)	stic function of national numbers - <sup>.</sup> 1 Does not exist
		5)	Whie a) b) c) d)	ch of the following stateme The union of infinite numb The intersection of infinite The union of infinite numb All of these	ent is co per of c e numb per of c	orrect? open sets is open set er of open sets is open set closed sets is closed
		6)	lf [0, a) c)	1] is metric space with abs $\begin{bmatrix} 0, \frac{3}{4} \end{bmatrix}$ $\begin{pmatrix} 0, \frac{3}{4} \end{bmatrix}$	b) d)	value metric then $B[\frac{1}{4}, \frac{1}{2}]$ is $\left[0, \frac{3}{4}\right)$ $\left(0, \frac{3}{4}\right)$

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023

Page 1 of 3

80

- SLR-QA-226 Set Ρ

- 7) Let  $(M_1, \varrho_1), (M_2, \varrho_2)$  and  $(M_3, \varrho_3)$  be the metric spaces and let  $f: M_1 \to M_2, g: M_2 \to M_3$  then *gof* is countinuous at  $a \in M_1$ , if *f* is continuous at  $a \in M_1$ , and *g* is continuous at \_\_\_\_\_
  - a)  $a \in M_1$ b)  $f(a) \in M_2$ c)  $a \in M_2$ d)  $f(a) \in M_3$
- 8) If  $f(x) = x^3$ ,  $(-1 \le x \le 1)$  then *f* attains minimum and maximum value at \_\_\_\_\_ respectively. a) 0,1 b) -1,0
  - c) -1,1 d)
- All of these
- 9) Every compact metric space is \_
  - a) Complete and not bounded
  - b) Complete and totally bounded
  - c) Complete and not totally bounded
  - d) Not complete and bounded
- 10) Let  $(M, \varrho)$  be a metric space and *T* be contraction on *M* then exactly one of the following holds.

$$\varrho(Tx,Ty) \le \frac{5}{4} \varrho(x,y) \qquad b) \qquad \varrho(Tx,Ty) \le \frac{4}{3} \varrho(x,y)$$
$$\varrho(Tx,Ty) \le \frac{1}{2} \varrho(x,y) \qquad d) \qquad \varrho(Tx,Ty) \le \frac{22}{7} \varrho(x,y)$$

### B) Attempt the following questions.

- 1) Define norm is  $\ell^2$  space.
- 2) Define equivalent metrics.
- 3) Define open ball in metric space.
- 4) Define limit point of subset of metric space.
- 5) Define bounded set in metric space.
- 6) Define complete metric space.

### Q.2 Solve any eight of the following:

a)

c)

- **a)** State the properties of norm for the sequence in  $\ell^2$  space.
- b) Let  $(M, \varrho)$  be a metric space then show that every convergent sequence converges to unique limit.
- **c)** If  $\varrho$  and  $\sigma$  are metrices on *M* and if there exist constant k > 1 such that  $\frac{1}{k}\sigma(x,y) \le \varrho(x,y) \le k.\sigma(x,y) \forall x, y \in M$  then prove that  $\varrho$  and  $\sigma$  are equivalent.
- d) Prove that every subset of Rd where d is discrete metric on R is open.
- e) Prove that if f is continuous at  $a \in R$  then |f| is also continuous at  $a \in R$ .
- f) Prove that any singleton set in *M* is closed.
- **g)** If the real valued functions f and g are continuous at  $a \in \mathbb{R}$  and  $g(a \neq 0)$  then prove that  $\frac{f}{g}$  is continuous at  $a \in \mathbb{R}$ .
- **h)** If  $T: M \to M$  is defined as  $Tx = x^2$  where  $x \in \left(0, \frac{1}{3}\right)$  then prove that *T* is contraction on  $\left[0, \frac{1}{3}\right]$ .
- i) If  $(M, \varrho)$  is complete metric space and *A* is closed subset of *M* then prove that  $(A, \varrho)$  is complete.
- **j)** Define Heine Borel property in metric space.

06

Q.3	A)	Atter 1)	npt any two of the following: If $x = (x_1, x_2)$ , $y = (y_1, y_2)$ are any two points in $\mathbb{R}^2$ Define $\varrho(x, y) = max\{ x_1 - y_1     x_2 - y_2 \}$ then show that $(\mathbb{R}^2, \alpha)$ is metric space	10			
		2)	Define closed subset of metric space $M$ and if $E$ is any subset of metric space $M$ then prove that $\overline{E}$ is closed.				
	3) If <i>M</i> has Heine - Borel property then prove that M is compact.						
	B)	State	and prove Schwarz inequality.	06			
Q.4	A)	Atter 1)	<b>npt any two of the following:</b> Prove that in any metric space every convergent sequence is a	08			
		2)	If $G_1$ and $G_2$ are open in metric space M then prove that $G_1 \cap G_2$ is also open in M.				
		3)	If $f$ is continuous function from compact metric space $M_1$ in to the metric space $M_2$ then prove that $f(M_1)$ is also compact.				
	B)	State	and prove that Picard's fixed point theorem.	08			
Q.5	Atte a)	<b>mpt a</b> Defin real r	<b>ny two of the following.</b> e metric space and if $\ell^{\infty}$ denote the set of all bounded sequences of numbers and $x = \{x_n\}_{n=1}^{\infty}, y = \{y_n\}_{n=1}^{\infty}$ are in $\ell^{\infty}$ then prove that	16			
		<i>ϱ(x,y</i>	$(x) = \ell$ . $u$ . $b$ . $ x_n - y_n $ is metric for $\ell^{\infty}$ . $1 \le n \le \infty$				
	<b>հ</b> \	Drove	that f is continuous at $c \in \mathbb{D}$ if and only if				

**b)** Prove that 
$$f$$
 is continuous at  $a \in \mathbb{R}$  if and only if

$$\lim_{n \to \infty} x_n = a \Longrightarrow \lim_{n \to \infty} f(x_n) = f(a)$$

c) Prove that, the metric space *M* is compact if and only if whenever  $\mathcal{F}$  is family of closed subsets of *M* with finite intersection property then  $\bigcap_{F \in \mathcal{F}} F \neq \phi$ 

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 STATISTICS (Special Paper - XIII) Statistical Inference - II (19201643)

Day & Date: Tuesday, 20-06-2023 Time: 03:00 PM To 06:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks
- 4) Use of log tables and calculator is allowed.

### Q.1 A) Choose correct alternatives from the option.

1) Pivotal quantity used for constructing confidence interval for parameter  $\sigma^2$  in case of N( $\mu$ ,  $\sigma^2$ )( $\mu$  known) follows \_\_\_\_\_ distribution.

a)	$\chi^2_{(n-1)}$	b)	t
c)	$\chi^2(n)$	d)	F

2) If  $X_1, X_2, ..., X_n$  is a r.s. from  $N(\mu, \sigma^2)(\sigma^2$  is known) then,  $100(1 - \alpha)\%$  confidence interval for  $\mu$  will be \_\_\_\_\_.

a) 
$$\left(\overline{X} - Z_{\alpha/2}\frac{\sigma}{\sqrt{n}}, \overline{X} + Z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\right)$$
  
b)  $\left(\overline{X} - Z_{\alpha/2}\frac{S}{\sqrt{n}}, \overline{X} + Z_{\alpha/2}\frac{S}{\sqrt{n}}\right)$   
c)  $\left(\overline{X} - Z_{\alpha/2}\frac{S^2}{\sqrt{n}}, \overline{X} + Z_{\alpha/2}\frac{S^2}{\sqrt{n}}\right)$ 

d) none of these

3)	To d	lecide about Ho, SPRT invo	lves _	regions.
	a)	only 1	b)	only 2
	c)	3	d)	4
4)	Leve	el of significance is the prob	ability	of
	a)	Type one error	b)	Type two error
	c)	both (a) and (b)	d)	power of a test
5)	Amc β is	ng all critical regions of size called	$\alpha$ , th	e critical region that minimizes
	a) c)	Best critical region minimum critical region	b) d)	Powerful critical region none of these
6)	The a)	test $H_0$ : $\mu = 70$ against $H_1$ left	:μ< b)	70 leads to tailed test right
	c)	Two	d)	none of these
7)	Neyı a)	man-Pearson Lemma provid Unbiased	des b)	critical region (C.R.). admissible
	c)	minimal	d)	most powerful

10

Set | F

Max. Marks: 80

- 8) In SPRT decision about the null hypothesis is taken \_\_\_\_\_.
  - a) After each successive observation
  - b) After fixed number of observations
  - c) At least 5-observations
  - d) None of them
- 9) A sequence of symbols shows lack of randomness if there are: \_\_\_\_\_.
  - a) Too many runs
- b) Too few runsd) Neither a nor b
- 10) Which of the following Non-parametric test utilizes the empirical distribution function?
  - a) Median test

c) Both a and b

- b) Wilcoxon's signed rank testd) Kolmogorov-Smirnov test
- c) Wald-Wolfowitz run test d)

### B) Fill in the blank

- 1) To obtain 95% confidence limits for a parameter we take  $\alpha =$  \_\_\_\_\_
- 2) Sequential Probability Ratio Test was developed by \_
- 3) The distribution of quantity independent of population parameter is known as \_\_\_\_\_.
- 4) Rejecting null hypothesis when it is true is called \_\_\_\_\_.
- 5) Kolmogorov-Smirnov test is a \_\_\_\_\_ sided test.
- 6) Ordinary sign test utilizes \_\_\_\_\_ distribution.

### Q.2 Solve any eight of the following:

- a) Define interval estimation.
- **b)** Define Power of the test.
- c) State properties of likelihood ratio.
- d) Obtain confidence interval for population mean when sample of size 49 is drawn from  $N(\mu, 16)$  with 5% level of significance, where sample mean is 5.
- e) Define probability of Type two error.
- f) What are the values of A and B in SPRT where  $\alpha = \beta = 0.1$
- g) Explain relative efficiency.
- h) What are the assumptions of Non parametric (NP) tests?
- i) Giving an example define run in the run test.
- j) What is the test statistic for Wilcoxon's Signed Rank test?

### Q.3 A) Attempt any two of the following:

- 1) Obtain  $100(1 \alpha)\%$  confidence interval for mean  $\mu$  of N ( $\mu$ ,  $\sigma^2$ ) distribution when  $\sigma^2$  is unknown.
- 2) If  $x_1, x_2, \dots, x_n$  be a random sample of size n from a distribution with pdf

 $f(x,\theta) = \theta x^{\theta} \quad 0 < x < 1 \quad \theta > 0$ 

Obtain the best critical region for testing  $H_0 = \theta = 1$  against  $H_1 = \theta = 2$ 

- 3) Obtain SPRT for testing  $H_0 = \lambda = \lambda_0$  against  $H_0 = \lambda = \lambda_1$  where  $(\lambda_1 > \lambda_0)$  and  $\lambda$  is the mean of Poisson distribution.
- **B)** An urn contains 6 marbles of which  $\theta$  are white and remaining are black. **06** Suppose two marbles are drawn at random without replacement in order to test H<sub>0</sub> =  $\theta$  = 3 against H<sub>1</sub> =  $\theta$  = 4. H<sub>0</sub> is rejected if both marbles are white otherwise accepted. Compute size of the test

16

### Q.4 A) Attempt any two of the following:

- 1) Let  $X_1, X_2, X_3$  are independent drawn from N( $\mu$ , 1). Define T =  $\sqrt{3}(\frac{X_1+X_2+X_3}{3} - \mu)$  Is T a Pivotal quantity?
- 2) Explain in short Median test.
- 3) Obtain L.R. test for testing Ho:  $\mu = \mu 0$  against H1 :  $\mu \neq \mu 0$  based on a random sample from N( $\mu$ ,  $\sigma^2$ ) distribution when both  $\mu$  and  $\sigma^2$  are unknown.
- **B)** Obtain  $100(1 \alpha)\%$  confidence interval for difference between means  $(\mu 1 \mu 2)$  in case of two normal populations  $N(\mu_1, \sigma_1^2)$  and  $N(\mu_2, \sigma_2^2)$  where  $\sigma_1^2$  and  $\sigma_2^2$  both are unknown.

### Q.5 Attempt any two of the following.

- a) State and Prove Neyman Pearson Lemma.
- b) Define UMP test. Construct a UMP test of size  $\propto$  for testing  $H_0: \theta = \theta_0$  against  $H_1: \theta > \theta_0$  based on a sample of size n from an exponential distribution with parameter  $\theta$ .
- c) Explain in detail Mann-Whitney nonparametric test.

08

Seat	
No.	

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **GEOLOGY (Special Paper - XIII)** Photogeology & Remote Sensing (19201652)

Day & Date: Tuesday, 20-06-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks.

#### Q.1 A) Choose correct alternatives from the options.

- A passive sensor uses: 1)
  - a) Sun as the source of energy
  - b) Flash light as *a* source of energy
  - c) Its own source of energy
  - d) None of these
- A cell with 1m spatial resolution covers an area of 1m<sup>2</sup>, whereas a 2) pixel with 0.1m spatial resolution covers an area of: \_\_\_\_\_.
  - a) 0.1m<sup>2</sup> b)
  - c) 10cm<sup>2</sup> d)
- Remote sensing uses which of the following waves in its procedure? 3)

d)

Sonar waves b)

Electro-magnetic waves

c) Gamma- rays

a) Electric field

- A pocket stereoscope is used to view \_\_\_\_\_. 4)
  - a) Digital satellite data
  - b) hard copy of aerial data
  - c) microscopic minerals
  - d) fine grained minerals in the field
- 5) Bedding plane between limestone and shale in vector format can be represented by \_\_\_\_\_.
  - a) point b) line
  - c) polygon d) all of these
- A unique reflectance pattern of individual object on the earth is called 6) as
  - a) spectral signature
  - optical sign b) c) spatial signature signature d)
- Digital Number (DN) of each pixel represent its \_\_\_\_\_ value. 7)
  - a) brightness value dimensional b)
  - c) ground value d) temperature
- Raster data is stored in \_\_\_\_\_ format. 8)
  - a) tabular X-Y coordinate b)
  - c) pixel/grid d) flowchart

Set

10

- 100cm<sup>2</sup>
- 0.001m<sup>2</sup>

Max. Marks: 80

06

16

10

06

80

08

16

- 9) Wavelengths of \_\_\_\_\_ region falling on water surface are completely absorbed. a) Visible
  - IR b)
  - c) UV Radio d)

#### A point on the ground directly in line axis of the aerial photograph 10) is

- a) Kadir
- b) Nadir

c) Natial

None of these d)

#### B) Answer the following questions in one sentence.

- Which point on aerial photograph represent Nadir on the ground? 1)
- 2) What is the percentage of forward overlap for viewing 3D aerial photographs?
- What is the type of resolution when two satellite imageries of same 3) area captured at different dates?
- 4) What are the two data formats used in GIS?
- What Digital Number (DN) represents in digital images? 5)
- What is LISS III? 6)

#### Solve any eight of the following: Q.2

- What is orbit and its types? a)
- Give the specifications of LISS III sensor. b)
- What is radiometric resolution? C)
- How do you recognize horizontal lava flows from the aerial photographs? d)
- What is photo interpretation? e)
- What is mosaicking of photographs? **f**)
- What is the percentage of forward and lateral overlaps? g)
- What is the colour of green vegetation in IR and near IR region? h)
- Name any two global space programmes. i)
- What is spatial data? i)

Q.3	A)	Attempt any two of the following:					
		1) Describe ray diagram of mirror stereoscope.					
		2) List the seven elements of photo-interpretation.					

3) What are types of active sensors?

B)	Describe various information printed on the aerial photographs.	
-,		

#### Q.4 A) Attempt any two of the following: Describe raster data model. 1)

- 2) Describe Thermal sensors.
- 3) Explain atmospheric windows.
- B) Describe components of GIS.

#### Q.5 Attempt any two of the following.

- Explain spectral signature / reflectance curve. a)
- Describe supervised classification of image. b)
- Describe various drainage patterns and their significance. C)

Seat	
No.	

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **MICROBIOLOGY (Special Paper - XIII) Microbial Genetics (19201660)**

Day & Date: Tuesday, 20-06-2023 Time: 03:00 PM To 06:00 PM

**Instructions**: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks
- 4) Use of log tables and calculator is allowed.

#### Q.1 Choose correct alternatives from the options. A) 1)

- In replication unwinding of DNA is carried out by enzyme. a) Topoisomerase b) Primase
- c) Helicase **DNA** polymerase d) A base pair substitution mutation in which codon specifying for one
- 2) amino acid is substituted by another codon which specify functionally same amino acid is called as mutation.
  - a) Missense b) Non sense
  - c) Frame shift d) Neutral

#### "Hot spots" in the rll region of phage T4 indicate that \_\_\_\_\_. 3)

- a) Increased temperature causes more mutations
- b) Not all base pairs are CG and AT
- c) Mutation is totally random along the genome
- d) Surrounding bases affect the mutation rate of a bp
- type of restriction enzyme most commonly used in r-DNA 4) technology.

a)	Type I	b)	Type II
$\sim$	Type III	4)	Tuno IV

c) Type III d) Type IV

5) A cis-trans complementation test is carried out to identify .

- a) If two mutations are allelic in nature
- b) If two genes interact with one another
- c) The number of genes influencing phenotype
- d) To understand the dominance/recessive relationships between alleles

#### 6) The chemical nucleotide DNA sequencing also known as Method.

- a) Sanger b) Maxam-Gilbert
- c) Automated d) Edman

#### The process which shows manipulation of proteins by using modern 7) techniques of molecular biology is known as

- a) Protein Engineering **Genetic Engineering** b)
- c) genomic library **DNA** library d)

#### DNA fingerprinting was developed by 8) El. Khurana

- a) Francis crick b)
- c) Alec Jeffrey James Watson d)

Max. Marks: 80

- 9) NCBI stands for \_\_\_\_
  - a) National center for biotechnology information
  - b) National center for biology information
  - c) National center for biochemistry information
  - d) National center for botany information

# 10) \_\_\_\_\_ is a sequence alignment tool.a) PRINTb) PROSITE

- a) PRINT c) PIR
- d)

BLAST

### B) Define the following.

- 1) FASTA
- 2) Semi conservative replication
- 3) Missense mutation
- 4) Bioinformatics
- 5) Operon
- 6) Vector

### Q.2 Solve any eight of the following:

- a) What is adaptor?
- **b**) Define cosmid.
- c) What is GenBank?
- d) What is polyadenylation?
- e) Define phagemid.
- f) What is DDBJ?
- g) Explain the structure of DNA polymerase III.
- **h)** Enlist applications of protein engineering.
- i) What is suppression mutation?
- j) Enlist the application of genetic engineering.

### Q.3 A) Attempt any two of the following:

- 1) Give a detailed account on Restriction endonucleases.
- Describe in detail selection of recombinant on the basis of white-blue screening.
- 3) Describe in brief effect of mutation on translation.
- B) Discuss in detail the concept of Lac operon.

### Q.4 A) Attempt any two of the following:

- 1) Give a detailed account on folded fibre model of *E. coli*.
- 2) Give a brief account on structure and function of RNA polymerase. Add a note on role of  $\sigma$  (Sigma) factor of RNA polymerase.
- 3) Define DNA profiling. Discuss in brief steps involved in DNA fingerprinting.
- B) What is transcription? Discuss in detail Mechanism of transcription. 08

### Q.5 Attempt any two of the following.

- a) What is electrophoresis? Explain in detail electrophoresis of DNA.
- **b)** Describe in detail prokaryotic DNA replication.
- c) Give a detailed account on genetic complementation using cis-Trans test.

16

06

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Seat No.	t												Set	Ρ
I	B.Sc	. (Ser	nestei I	r - V ELE P	l) (New CTROI ower l	/) (CBC NICS (S Electro	S) E pec nics	Exar al l (19	ninatio Paper - 20167	on: Ma - XIII) 6)	rch/A	April-2	2023	
Day & Time	& Date : 03:0	e: Tue 0 PM <sup>-</sup>	sday, 20 To 06:0	0-06- 0 PM	2023			·				Max.	Marks	80
Instr	uctio	ns: 1) 2) 3) 4) (	All ques Draw n Figures Use of le	stions eat la s to th og tal	are con abelled o ne right i bles ano	mpulsory diagrams indicate f d calcula	v. s whe full m tor is	ereve arks allov	r necess wed.	sary.				
Q.1	A)	Choo 1)	ose the Collec a) P c) P	e <b>corr</b> tor, E Power Power	ect alte mitter a BJT MOSF	ernatives and Gate ET	are t	<b>n the</b> he te b) d)	<b>e option</b> erminals IGBT GTO	<b>s.</b> of				10
		2)	UPS m a) U b) U c) U d) U	neans Jninte Jnijun Jnder Jninte	s errupted ction Po Perforr erruptab	Power S ower Sup ning SCF le Power	SCR oply R Sup	ply						
		3)	Revers a) T c) P	se ree empe Peak i	covery o erature nverse	current de voltage	epen	ds o b) d)	n Storag Forwar	 e charę d curre	ge ent			
		4)	The m turn of a) b c) g	inimu ff is ca reak ate tr	ım value alled over cu igger cu	e of curre  rrent urrent	ent be	elow b) d)	which th latchin holding	ne thyri g curre g curre	stor be ent nt	comes	6	
		5)	A freev a) Ir c) C	whee nduct Capac	ling dio ive load itive loa	de is use id	d in d	contr b) d)	olled red Resist None d	ctifier ir ive load of these	i case d e	of	·	
		6)	An ele a) Ir c) C	ectron nverte Chopp	ic circui er per	t which c	onve	erts a b) d)	c power Rectifie Amplifi	<sup>,</sup> into do er er	powe	r is	·	
		7)	The U, a) S b) tr c) N d) a	JT m Saw to rigger legati II of ti	ay be us both osc ing dev ive resis hese	sed as cillator ice stance de	evice	·						
		8)	a) R c) C	_ is u Rectifi Chopp	ised as er ber	a DC to I	DC c	onve b) d)	erter. Inverte Cyclo-(	r convert	er			
		9)	The se a) C c) C	eries Class Class	inverter A C	uses		_ typ b) d)	e of cor Class I Class I	nmutat 3 D	ion.			

		10) is unidirectional device. a) TRIAC b) DIAC c) SBS d) SCR	
	B)	<ul> <li>Fill in the blanks.</li> <li>1) Power MOSFET is a controlled device.</li> <li>2) SCR is a triggered device.</li> <li>3) SMPS means Mode Power Supply.</li> <li>4) In SCR the magnitude of latching current is always the holding current.</li> <li>5) The buried gate is fabricated in device.</li> <li>6) Heat sink is used for the purpose of</li> </ul>	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	A calculate the conduction angle of SCR, if firing angle is 45 <sup>0</sup> . What is the need of heat sink? State the principle of Speed control of DC motor. Draw the construction diagram and symbol of PUT. Write classification of Choppers. State any two advantages of IGBT. What is SCR triggering? What are the applications of power diode? What is commutation? State difference between inverter and chopper.	16
Q.3	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Explain working of flasher circuit.</li> <li>2) Explain switching characteristics of power BJT.</li> <li>3) Explain two transistor analogy of SCR.</li> </ul>	10
	B)	Write a short note on single phase half wave controlled rectifier with resistive load.	06
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Explain single phase full wave controlled rectifier with resistive load.</li> <li>2) Define GTO, and explain its construction. What are the applications of GTO?</li> <li>3) With the help of neat circuit diagram explain operation of step down chopper using SCR.</li> </ul>	08
	B)	Explain with suitable diagram emergency lighting system.	80
Q.5	Atte a) b)	<b>mpt any two of the following.</b> Explain construction and switching characteristics of power MOSFET. Draw circuit diagram of three phase full wave controlled rectifier with resistive load and explain its operation.	16

c) Describe construction and working of IGBT with suitable diagram.

Seat No.						Set	Ρ
E	3.Sc.	(Sen	nester - \ CO	/I) (New) (CBCS) MPUTER SCIENC Web Technology	Exan E (P (192	nination: March/April-2023 aper - XIV) 201668)	
Day 8 Time:	Date 03:00	: Tues ) PM T	day, 20-06 o 06:00 Pl	5-2023 M	·	, Max. Marks:	80
Instru	uction	IS: 1) / 2)   3)   4) U	All question Draw neat Figures to t Jse of log ta	is are compulsory. labelled diagrams wh he right indicate full n ables and calculator is	ereve narks s allov	r necessary. ved.	
Q.1	A)	<b>Choo</b> 1)	ese the cor By default a) Cach c) Datal	rect alternatives fro , ASP.NET stores ses e base	m the sion I b) d)	e <b>option.</b> Ds in Cookies Global Variable	10
		2)	a) Oper c) Exec	not a member of ADC i uteReader	b) d)	ExecuteStream CommandText	
		3)	The a) Wind c) File	is not an Authentic ows	ation f b) d)	ype in ASP.NET. Passport Form	
		4)	The inform called a) Contr c) View	nation that is appende state. rol	ed to tl b) d)	ne end of the page URL is Hidden Field Query String	
		5)	The property o a) \W c) \w	_ is used to matches r f RegularExpression∖	nodigi /alidat b) d)	t characters in regularexpression ion control. \D \d	
		6)	The day in a ca a) Selec c) Date	calendar control ev alendar web server co ctionChanged Changed	vent is ontrol. b) d)	used to customize individual VisibleMonthChanged DavRender	
		7)	The execution. a) Exec	_method of command uteNonQuery	b)	ct returns single value after ExecuteScaler	
		8)	The defau control is a) -1	It value for ParentLev	elDisp b)	olay property of SiteMapPath	
		9)	c) 1 The contents o a) Time c) Interv	of Timer control ne r run code. /al	d) ed to b) d)	More than one set for periodically update the Period Wait	

06

16

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**08** 

16

- 10) The control is used to represent any HTML, plain text, enter, blank space etc. in control tree.
  - a) Label
  - Text b) c) Hidden Literal d)
- Fill in the blank. B)
  - 1) Ajax stands for .
  - 2) ASP.Net web forms are inherited from class.
  - 3) By default web server used for executing ANP.Net application is \_\_\_\_\_
  - The property of button control is used to assign single method 4) for multiple buttons.
  - The last event in web page life cycle is 5)
  - By default value of CommandType property of command object 6) is \_\_\_\_\_.

#### Solve any eight of the following: Q.2

- Explain Table control with an example. a)
- Explain View and Multiview control. b)
- Explain ValidationGroup property. C)
- d) What is page life cycle?
- What is XML? Explain with an example. e)
- What is a Query string? f)
- What is HTTP status code? g)
- Explain the historical development of ASP.Net. h)
- What is AutoPostback? Give example. i)
- j) What is assembly? Give types of assembly.

#### Q.3 A) Attempt any two of the following:

- What is the SiteMap file? Explain TreeView control with an example. 1)
- 2) Explain User management in detail.
- What is a dynamic compilation? Explain in detail. 3)
- What are client-side and server-side validation? Explain each validation B) 06 control with an example.

#### Attempt any two of the following: Q.4 A)

- Explain the UpdatePanel and timer control with example. 1)
- Explain the data reader object with an example. 2)
- How programmatically assign the master page? Explain with an 3) example.
- What are different methods for the execution of the command? Explain any B) **08** two methods with an example.

#### Q.5 Attempt any two of the following.

- Design a web page that inserts and updates record using stored procedure. a)
- b) What are application folders? Explain each application folder with example.
- What is cookies? Explain cookies in detail with example. C)

#### No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **PHYSICS (Paper-XV)** Materials Science (19201620) Day & Date: Wednesday, 21-06-2023 Max. Marks: 80 2) Figures to the right indicate full marks. 3) Draw neat labelled diagrams wherever necessary. 4) Use of log table and calculators is allowed. Choose the correct alternatives from the options. 10 1) Ceramics are <u>materials</u>. a) Organic metallic b) Inorganic metallic d) None of these c) Inorganic non metallic 2) polymers occurs naturally. a) Nylon b) Starch d) Teflon c) PVC Cement are example of \_\_\_\_\_ composites. 3) a) Large particle b) Short particle d) Micro particle c) Continuous fibre 4) technique is used to determine the crystal structure of material. a) SEM b) XRD c) FTIR d) UV-VIS PZT means \_\_\_\_\_. 5) a) Phosphor zinc tin b) Lead zirconium titanate c) Potassium zirconium titanate d) None of these Applied force per unit cross sectional area of a body is called . 6) a) Stress b) Hardness c) Strain d) Creep The property of material to undergo permanent deformation even 7) after removal of force is called b) Plasticity a) Hardness d) Ductility c) Creep 8) Bakelite is obtained by reaction of formaldehyde with a) Ethene b) Phenol

Seat

Time: 03:00 PM To 06:00 PM

### **Instructions:** 1) All questions are compulsory.

### Q.1 A)

- c) Urea
  - d) Styrene

			SLR-QA-2	32
		9)	Low density polymers have structure. a) Linear b) Cross linked c) Branched d) None of these	
		10)	The materials which are used for structural applications in the field of medicine are a) Biomaterial b) Metals c) Composites d) Alloys	
	B)	<b>Ans</b> 1) 2) 3) 4) 5) 6)	wer in one sentence. What are copolymers? Define – intensity of magnetization. What is S.I. unit of electrical conductivity? What is refractive index of water? Give an example of elastomer. Define – Biocompatibility.	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	wer t Wha Give Wha Give Wha Defin Defin Wha State	the following (Any Eight): at is degree of polymerization? e any four examples of ceramics. at is creep? e any four applications of composites. at is biomechanism? ine specific heat and state its unit. ine nanosized materials. at is homopolymers? at are composites? te any four mechanical properties of biomaterials.	16
Q.3	A)	<b>Ans</b> 1) 2) 3)	wer the following (Any two): Explain properties and applications of biomaterials. Discuss ceramic processing in detail. Discuss classification of materials.	10
	B)	Write films	te a note on chemical bath deposition method of formation of thin s.	06
Q.4	A)	<b>Ans</b> 1) 2) 3)	wer the following (Any two): Explain applications of biomaterials. Discuss thermosetting polymers. Discuss property of nanomaterials.	08
	B)	Expl	lain mechanical, electrical and optical properties of material.	08
Q.5	<b>Ans</b> a)	<b>wer t</b> Disc mate	<b>the following (Any Two).</b> cuss various physical methods of synthesis of nanostructured rerials.	16
	b) c)	Disc Disc	cuss various methods of fabrication of polymers in detail. cuss particle reinforced composites and fibre reinforced composites.	

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Seat No.								Set	Ρ
B.S	с. (	Sen	nester - C	VI) (New) HEMISTR Inorganic	(CBCS) E RY (Specia Chemistr	Exam al Pap ry (19	ination: N per - XIV) 201611)	larch/April-20	23
Day & [ Time: 0	Date 3:00	: We ) PM	dnesday, To 06:00	21-06-2023 PM	3			Max. Mar	′ks: 80
Instruc	tion	1) 2 3 4	) All quest ) Figures ) Draw ne ) Use of lo	tions are co to the right at labelled og table and	mpulsory. indicate full diagrams wh I calculators	marks nereve is allo	r necessary	<i>ų</i> .	
Q.1 A	.)	<b>Cho</b> 1)	ose the c is a) Mona c) Sam	<b>orrect alte</b> the most in azite sand arskite	r <b>natives fro</b> portant ore	<b>m the</b> of lan b) d)	<b>options.</b> thanides. Orthite Cerite		10
	2	2)	Achinons a) Five c) Thre	s have e	_ incomplet	e oute b) d)	ermost shells Four Two	S.	
		3)	Supercor a) 3 c) 1	nductors ha	s val	ence e b) d)	electrons. 4 2		
	2	4)	Germani semicono a) n-typ c) Mixe	um doped v ductors. e d oxide	vith accepto	r atom b) d)	then it is ca Supercond p-type	alled as luctor	
	ł	5)	In structu pr a) 166 c) 177	ire of dibora n.	ane distance	betwe b) d)	een two bor 133 144	on atoms is	
	(	6)	Metal pip a) Activ c) Pass	e line can t e sive	oe made	by b) d)	applying ex Corroded Shiny	xternal E.M.F.	
	-	7)	Tetramer a) 2c - 2 c) 4c - 2	ric alkyl lithi 2e 2e	um has a ch	laracte b) d)	eristic 3c - 2e 5c - 2e	_bonding.	
	8	8)	Name of a) Sodi c) Ethy	HC=CNA is um acetyler lene sodiun	ຣັ າຍ າ	b) d)	Sodium eth Acetylene	nanide sodium	
	ę	9)	Metal in a) higher c) higher	metal carbo er er positive	nyls are usu	ually in b) d)	higher neg zero and lo	lation. ative w	

Q.1	B)	Fill in the blanks with suitable answer.	06
	-	1) is the best general method of preparation of TU elements.	
		<ol><li>Most of the lanthanides are in nature.</li></ol>	
		<ol><li>Concept of super conductivity was introduced by</li></ol>	
		4) Electrical conductivity decreases with of temperature.	
		5) Electrochemical theory of corrosion is first explained by	
		6) Terminal carbonyl group linked with metal through bonds.	
Q.2	Ans	wer the following (Any Eight):	16
	a)	Why lanthanons are rare in occurrence?	
	b)	Explain why neutron can cause head-on-collision.	
	c)	Define p-type semiconductors.	
	d)	Why metal show good luster?	
	e)	Explain electrical conductivity of metals.	
	f)	Define electron deficient molecule.	
	g)	Why borazine is called inorganic benzene?	
	h)	Draw a structure of xenon difluoride.	
	i)	Explain any two applications of passivity.	
	j)	Explain effect of moisture on corrosion.	
Q.3	A)	Answer the followings (Any two):	10
		1) Explain the electronic configuration of lanthanides.	
		2) Explain the methods of protection of metals from corrosion.	
		3) Discuss preparation and properties of alkylaluminium compounds.	
	B)	What is mean by organometallic chemistry? Describe one method of	06
	-	each for synthesis of organometallic compounds of Li, Be and Al.	
Q.4	A)	Answer the followings (Any two):	08
	-	1) What is TU elements? Explain the preparation of TU elements by	
		neutron capture followed by $\beta$ -decay method.	
		2) Define semiconductors. Explain extrinsic semiconductors.	
		3) Draw and explain the structure of XeF <sub>6</sub>	
	B)	Explain factors affecting the corrosion.	08
Q.5	Ans	wer the following (Any Two).	16
	a)	What is f-block elements and explain ion exchange process of	
	,	separation of lanthanides?	
	b)	What is superconductors? Explain in brief preparation, structure and	
		application of superconductors.	
	c)	Draw and explain the structure of diborane.	

b) gas

d) water

10) \_\_\_\_\_ is essential for corrosion. a) solid

c) liquid

Max. Marks: 80

Seat No.

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **BOTANY (Special Paper- XIV)** Plant Biotechnology (19201602)

Day & Date: Wednesday, 21-06-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.
- 4) Use of log table and calculators is allowed.

#### Q.1 A) Choose the correct alternatives from the options.

- In r-DNA technology an enzyme used to cut DNA molecules is \_\_\_\_ 1)
  - a) ligase

c) polymerase

- b) restriction endonuclease d) phosphorylase
- In r-DNA technology an enzyme used to join different DNA molecules 2) is .
  - a) ligase

b) restriction endonuclease

c) polymerase

- d) phosphorylase
- Introduction of DNA into cells by exposing to high voltage electric 3) pulse is \_\_\_\_\_.
  - a) Electrolysis

- b) Electrostatistics d) Electroplating
- c) Electroporation
- Transgenic plants are developed by \_\_\_\_\_. 4)
  - a) introducing foreign genes
  - b) stopping spindle formation
  - c) deleting certain chromosome parts
  - d) introducing gene mutations
- Microinjection is \_\_\_\_\_ method of gene delivery. 5)
  - a) biological b) chemical c) physical
    - d) all of these
- 6) The chemical which ensures gene delivery by chemical means
  - İS

- a) Polyethylene glycolb) Calcium oxidec) Sodium acetated) Sodium cyanid d) Sodium cyanide
- In Southern blotting technique, \_\_\_\_\_ paper is used for blotting the 7) DNA.
  - b) Whatman no. 1 a) Tissue
  - c) Butter d) Nitrocellulose

08

# SLR-QA-234

b) Thermus aquaticus

d) Bacillus anthracis

b) 20% NaCl

- 8) *Taq* polymerase enzyme is obtained from \_\_\_\_\_.
  - a) Thiobacillus aquaticus
  - c) Treponema aquaticus
- 9) Virus free plants are produced by using \_\_\_\_\_ culture.
  - a) xylem b) leaf
  - c) meristem d) bark
- 10) In tissue culture, for surface sterilization \_\_\_\_\_ chemical is used.
  - a) 70% ethanol
  - c) 10% Sodium acetate d) 45% Sodium Tartarate

### B) Answer the following questions in one sentence only.

- A collection of total genomic DNA from a single organism is called \_\_\_\_\_.
- 2) Gene gun is \_\_\_\_\_ method of gene delivery.
- 3) Annealing temperature in PCR is \_\_\_\_\_.
- The plant part to be used for tissue culture is known as \_\_\_\_\_
- 5) Unorganized mass of cells produced during the tissue culture is known as \_\_\_\_\_.
- 6) \_\_\_\_\_ medium is used as an ideal medium in tissue culture technique.

### Q.2 Answer the following (Any Eight):

- a) Define vector and give any one example.
- b) What are transgenic plants? Give any two examples.
- c) What is the purpose of using PCR in Biotechnology?
- d) What is the purpose of culturing anthers in Biotechnology?
- e) Enlist methods of gene transfer.
- f) What is somatic hybridization?
- g) Enlist the plant hormones used in tissue culture.
- **h)** What is bacterial transformation?
- i) Enlist the steps in PCR.
- j) Enlist chemicals used for surface sterilization.

Q.3	A)	Answer the following (Any two):	10
		<ol> <li>Write a note on - DNA libraries.</li> <li>Write a note on - Marker and Reporter genes.</li> </ol>	
		<ol> <li>Write a note on - Complementation and colony hybridization.</li> </ol>	
	B)	Explain any two vectors used in recombinant DNA technology.	06
Q.4	A)	Answer the following (Any two):	08

- 1) Give any four terminologies used in tissue culture.
- 2) Describe the role of Biotechnology in Agriculture.
- 3) Describe the enzymes involved in recombinant DNA technology.
- B) Describe the process of tissue culture.

16

16

### Q.5 Answer the following (Any Two).

- a) With neat labelled diagram, explain the Polymerase Chain Reaction (PCR).
- b) Write a note on any two Biotechnological Industries and their role.
- c) With neat labelled diagram, explain Southern Blotting Technique.

No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **ZOOLOGY (Special Paper- XIV)** Evolutionary Biology (19201628)

Day & Date: Wednesday, 21-06-2023 Time: 03:00 PM To 06:00 PM

Seat

### **Instructions:** 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.
- 4) Use of log table and calculators is allowed.

#### Q.1 A) Choose the correct alternatives from the options.

- Homo erectus differed from Cro-Magnon man in . 1)
  - a) Small jaw c) Large jaw

- b) Drawing paintings d) Making tools
- 2) The main difference between the 'Sixth extinction' and the previous five extinctions is that, the sixth extinction
  - a) mainly affects plants
  - c) occurs at a faster rate

#### 3) This is an example of industrial melanism

a) Mutation

c) Extinction

- c) Neo Lamarckism
- The force that initiates evolution is 4)
  - a) Variation
    - b) Mutation d) Adaptation
- The extent bacterial group that is most closely related to the 5) ancestor from which mitochondria evolved is .
  - a) Purple photosynthetic bacteria
  - b) Archaebacteria
  - c) Cyanobacteria
  - d) Methanogens

#### 6) In some animals, the same structures develop along different directions due to adaptations to different needs, this is called as \_\_\_\_\_.

- a) Divergent Evolution
- b) Convergent Evolution
- c) Parallel Evolution d) Saltation
- 7) is another name of human evolution. a) Neogenesis
  - b) Anthropogenesis
  - c) Metagenesis
- d) Fossilizes
- In the present time CO2 and nitrogen have replaced \_\_\_\_\_. 8)
  - a) Hydrogen

c) Methane

- b) Ammonia
- d) Both Methane and Ammonia



Max. Marks: 80

- 10

- b) mainly occurs on islands
- d) is exclusive of human activities

**SLR-QA-235** 

b) Neo Darwinism

d) Natural selection

		9)	Th∈ a) c)	e idea of use and disuse o Lamarck Darwin	of organs b) d)	was given by Morgan Hugo de Vries	·	
		10)	Rar Indi a) c)	mapithecus and Shivapith ia. Himalayan hills Nagraj hills	ecus wer b) d)	e discovered at Shivalik hills Ganga hills	in	
	B)	<b>Give</b> 1) 2) 3) 4) 5) 6)	e <b>De</b> Mig Ma Ger Che Fos Par	finition. gration ss extinction netic drift emogeny ssil rapatric				06
Q.2	Ans <sup>v</sup> a) b) c) d) e) f) g) h) i)	wer ti Desc Expl Expl Expl Desc Expl Expl Expl Desc	<ul> <li>ver the following (Any Eight):</li> <li>Describe the organic evolution.</li> <li>Explain inter-population variation.</li> <li>Describe Molecular evolution.</li> <li>Explain mass extinction.</li> <li>Explain socio-cultural evolution of man.</li> <li>Describe here table variations and their role in evolution.</li> <li>Describe different types of modes of speciation.</li> <li>Explain mutation and migration.</li> <li>Explain molecular analysis of human origin.</li> <li>Describe chaemogeny.</li> </ul>				16	
Q.3	A)	<b>Ans</b> 1) 2) 3)	wer Exp Exp Exp	<b>the following (Any two)</b> blain evolution of horse. blain Hardy Weinberg law blain evolution of eukaryo	: tes.			10
	B)	Short note on Heritable variation and their role in evolution						
Q.4	A)	<b>Ans</b> 1) 2) 3)	wer Exp Des Exp	<b>the following (Any two)</b> blain Lamarckism. scribe the endosymbiotic blain geological time scale	: theory. e.			08
	B)	Desc	cribe	e five stages of socio-cultu	ıral evolu	tion of man.		08
Q.5	Ans a) b) c)	<b>wer t</b> l Defir Desc Expl	h <b>e f</b> e ne m cribe ain ł	ollowing (Any Two). hicroevolutionary changes different types of fossils. <-T extinction.	i.			16

			Numerical Analysis (19201636)	
Day Time	& Da e: 03:0	te: We 00 PM	′ednesday, 21-06-2023 Ма: И То 06:00 РМ	x. Marks: 80
Instr	uctio	o <b>ns:</b> 1 2 3	1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Use of scientific calculators is allowed.	
Q.1	A)	<b>Cho</b> 1)	So by the correct alternatives from the options.If $f(x) = e^x$ then $\Delta^6 e^x =$ a) $(e^h + 1)^6 e^x$ b) $(e^h - 1)^6 e^{-x}$ c) $(e^h - 1)^6 e^{-x}$ d) $(e^h - 1)^6 e^{2x}$	10
		2)	$ \begin{pmatrix} E^{\frac{1}{2}} + E^{-\frac{1}{2}} \end{pmatrix} (1 + \Delta)^{\frac{1}{2}} = \ $ a) $\Delta + 1$ b) $\Delta - 1$ c) $\Delta + 2$ d) $\Delta + 3$	
		3)	If $f(x) = 3x^2 - 2x^2 + 1$ then $\Delta^3 f(x) = $ a) 18 b) -18 c) 8 d) -8	
		4)	<ul> <li>Interpolation is the technique of the estimating the value of a function for any</li> <li>a) Intermediate value of the independent variable.</li> <li>b) Intermediate value of the constant</li> <li>c) Intermediate value of technique</li> <li>d) Intermediate value of the dependent variable.</li> </ul>	
		5)	The Lagrange's interpolation formula for unequal intervals for points is a polynomial of degree a) $n+1$ b) $n$ c) $n-1$ d) $n+2$	r ' <i>n</i> '
		6)	Using forward difference, the formula for $f'(a) =$ a) $\frac{1}{h} \Big[ \Delta f(a) + \frac{1}{2} \Delta^2 f(a) + \frac{1}{3} \Delta^3 f(a) + \cdots \Big]$	
			b) $\frac{1}{h} \left[ \nabla f(a) + \frac{1}{2} \nabla f^2(a) + \frac{1}{3} \nabla f^3(a) + \cdots \right]$ c) $\frac{1}{h} \left[ \nabla f(a) + \frac{1}{2} \nabla f^2(a) + \frac{1}{3} \nabla f^3(a) + \cdots \right]$	
			$\frac{1}{h} \left[ \Delta f(a) - \frac{1}{2} \Delta^2 f(a) + \frac{1}{3} \Delta^3 f(a) - \cdots \right]$ d) $\frac{1}{h^2} \left[ \Delta f(a) - \frac{1}{2} \Delta^2 f(a) + \cdots \right]$	

No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023

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		7)	The exact value of $\int_{1}^{1} \frac{1}{1+4} dx$ is =	
			a) .63915 b) .69315 c) .96315 d) .69351	
		8)	The solution of $(E - 1)^3 u_n = 0$ is a) $u_n = (c_1 + c_2 n + c_3 n^2)(3)^n$ b) $u_n = c_1 + c_2 n + c_3 n^2$ c) $u_n = (c_1 + c_2 n + c_3 n^2)(4)^n$ d) $u_n = (c_1 + c_2 + c_3 n)(-1)^n$	
		9)	The order of difference equation $y_{(n+2)} - 2y_{(n)} + y_{(n-1)} = 1$ is a) 1 b) 2 c) 4 d) 3	
		10)	Trapezoidal rule is obtained by putting $n = $ in general quardrature formula. a) 1	
~ 1	D)		c) S d) U	00
Q.1	D)	<b>- III I</b>	The value of $\binom{\Delta^2}{a^x} = \frac{1}{a^x}$	00
		2) 3) 4)	Gauss's backward interpolation formula is Simpson's one-third rule is To find the value of 1 <sup>st</sup> order derivative at tubulated point the value of P is	
		5) 6)	The solution of $u_{x+2} - 6u_{x+1} + 9u_x = 0$ is $\Delta \tan_x^{-1} =$	
Q.2	Atte a)	<b>mpt a</b> Eval	any eight of the followings. uate $\Delta^2(ab^x)$	16
	b) c) d) e) f) g) b)	With With State State State	usual notation, prove that $\delta = E^{\frac{1}{2}} - E^{-\frac{1}{2}}$ usual notation, prove that $\Delta^3 y_2 = \Delta^3 y_5$ the Newton's backward interpolation formula. the Gauss's forward interpolation formula. Newton's cotes quadrature formula. the Trapezoidal rule for integration.	
	i)	Solv	$u_{n+2} - 2u_{n+1} + u_n = 0$	
	j)	Solv	$e \ u_{n+2} - 4u_{n+1} + 4u_n = 2^n$	
Q.3	A)	<b>Atte</b> 1) 2)	mpt any two of the followings. Solve i) $y_{n+2} - 4y_{n+1} + 3y_n = 5^n$ ii) $y_{x+1} y_x + (x+2) y_{x+1} + xy_x + x^2 + 2x + 2 = 0$ Solve	10

i)  $\Delta(e^x \log 2x)$ 

 $\int^{2} e^{x^{2}} dx \quad \text{taking}$ 

$$ii) \qquad \Delta^2 \left( \frac{5x+12}{x^2+5x+6} \right)$$

3) Using Newton's backwards difference formula, construct an interpolating polynomial of degree 3, for the data f(-0.75) = -0.0718125, f(-0.5) = -0.02475, f(-0.25) = 0.3349375, f(0) = 1.10100 hence find  $f\left(-\frac{1}{3}\right)$ 

**B)** Using Simpson's  $\frac{1}{3}$ <sup>rd</sup> rule to estimate the integral

the number 10 intervals.

### Q.4 A) Attempt any two of the followings.

- 1) Prove that  $\mu = \frac{2+\Delta}{2\sqrt{(1+\Delta)}} = \sqrt{\left(1 + \frac{1}{4}\delta^2\right)}$
- 2) The table gives the distance in nautical miles of the visible horizon for the given heights in feet above the earth's surface.

x=height	100	150	200	250	300	350	400
y=distance	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the values of y when

- i) x = 218 ft
- ii) x = 410

3) Solve 
$$y_{n+2} - 4y_n = n^2 + n - 1$$

B) Given that

c)

••••••							
<i>x</i> :	1.0	1.1	1.2	1.3	1.4	1.5	1.6
f(x):	7.989	8.403	8.781	9.129	9.451	9.750	10.031
Find $\frac{dy}{dx}$ a 1) $x =$ 2) $x =$	nd $\frac{d^2y}{dx^2}$ at 1.1 1.6						

### Q.5 Attempt any two of the followings.

- a) State and prove Simpson's 3/8<sup>th</sup> rule and hence evaluate  $\int_{1}^{1} \frac{x^2}{1+x^3} dx$
- b) State and prove Lagrange's interpolation formula for unequal intervals and hence find the polynomial f(x) from the following data.

<i>x</i> :	0	1	2	5
f(x):	2	3	12	147
Solve				

- Solve 1)  $y_{x+1}^2 - 3y_{x+1}y_x + 2y_x^2 = 0$
- 2)  $y_{n+2} 2y_{n+1} + y_n = n^2 2^n$

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**08** 

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Seat No.

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **STATISTICS (Special Paper- XIV)** Probability Theory (19201644)

Day & Date: Wednesday, 21-06-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of calculators is allowed.

#### Q.1 A) Choose the correct alternatives from the options.

- Let  $X_1, X_2, ..., X_n$  be a random sample from certain distribution. 1) Let  $Y_1 < Y_2 < \cdots < Y_n$  be corresponding order statistic. Let Z =min  $\{X_1, X_2, \dots, X_n - Y_1\}$  Then Z is called \_\_\_\_ order statistic. b) n<sup>th</sup> a) First
  - c) Second d) none of these
- Distribution of \_\_\_\_\_ cannot be obtained using order statistics. 2)
  - a) sample median b) sample mean
  - c) Minimum d) sample range
- 3) If  $\{X_n, n > 0\}$  be a sequence of iid p(1) r.vs. then  $\sqrt{n}(\bar{x}_n - 1)$  has distribution.
  - a) P(1) b) *P*(*n*) c) N(0,1)d) None of these
- 4) A sequence  $\{Xn\}$  is said to be converges in distribution to a r.v. X if
  - a)  $\overline{F_n(x)} \to F(x)$  as  $n \to \infty$ b)  $F_n(x) \to f(x)$  as  $n \to \infty f(x)$  is p. d. f.c)  $F_n \to 0$  as  $n \to \infty$ d)  $F_n(x) \to 1$  as  $n \to \infty$
- W.L.L.N does not hold good for the sequence  $\{X_n\}$  of i.i.d r.v. 5)
  - a) Cauchy b) Chi-Square
  - c) Normal d) Exponential
- In Markov chain state *j* is said to be accessible from state *i* if . 6) a)  $P_{ij}^{(n)} = 0$ b)  $P_{ii}^{(n)} = 0$ 
  - c)  $P_{ii}^{(n)} > 0$ d) None of these

Max. Marks: 80

06

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- 7) Which one of the following is not a one of the possible assumptions of Markov Chain (M.C.)?
  - a) There are finite or countable number of states
  - b) There are finite number of future periods
  - c) A future step depends upon present state and not on past states
  - d) The states are both collectively exhaustive and mutually exclusive
- 8) In a stochastic process the parameter space may be \_\_\_\_\_.
  - a) Discrete b) Continuous
  - c) Discrete or Continuous d) None of these
- 9) In M/M/1:  $\infty$  /*FCFS* model the parameter 1 represents \_\_\_\_\_.
  - a) allowable number of customers in queue
  - b) number of customers being served
  - c) number of service channels
  - d) first preference to specific customer

#### In queuing theory steady state condition will be achieved if \_\_\_\_\_.

a) $\lambda > \mu$	b)	$\lambda < \mu$
--------------------	----	-----------------

c)  $\lambda = \mu$  d)  $\rho > 2$ 

### Q.1 B) Fill in the blank

1) For a random sample of size 5 pdf of first order statistic is given by  $f(y_1) =$ \_\_\_\_.

\_-

- 2) The probability density function of the  $n^{th}$  order statistic  $X_{(n)}$  is \_\_\_\_\_.
- 3) Convergence in law is also called as \_\_\_\_\_
- 4) A stochastic matrix is one in which each row sum is \_\_\_\_\_.
- 5) In usual notations traffic intensity is given by \_\_\_\_\_
- 6) In M/M/1 :  $\infty$  /FIFO model, expected waiting time of customers in queue is \_\_\_\_\_.

### Q.2 Solve any Eight of the following

- a) Define Order statistic.
- **b)** Find the c.d.f of first order statistics.
- c) Let  $X_1, X_2, ..., X_n$  be a random sample of size n from a population having p.d.f.

$$f(x) = \begin{cases} \theta e^{-\theta x} & , x > 0\\ 0 & , o.w \end{cases}$$

Find the distribution of smallest order statistic.

- d) State Weak Law of Large Number. (WLLN)
- e) Define convergence in probability.
- f) Define finite Markov Chain
- g) State Chapman-Kolmogrov equation.
- **h)** Give one example of discrete state and discrete time of stochastic process.
- i) State any two assumptions made while deriving probability distribution in queuing system.
- **j)** Write queue discipline in queuing theory.

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#### Q.3 A) Solve any two of the following

Let  $Y_1 < Y_2 < Y_3 < Y_4$  be a order statistic of a random sample of 1) size 4 from the distribution having p.d.f.

$$f(x) = \begin{cases} 2x & , 0 < x < 1 \\ 0 & , 0.w \end{cases}$$
 Find  $P(Y_3)$ 

Let {*X<sub>n</sub>*} be a sequence of r.vs.  $F_{X_n} = \begin{cases} 1 - \left(1 - \frac{1}{n}\right)^{nx} \\ 0 \end{cases}$ x > 02) 0.*W*.

Show that  $X_n \xrightarrow{law} X$ , as  $n \to \infty$ , where X is exp(1) r. v.

3) If  $\{X_n, n \ge 0\}$  be a M.C. with 3 states 0, 1, 2 and one step TPM.

$$P = \begin{bmatrix} 3/_4 & 1/_4 & 0\\ 1/_4 & 1/_2 & 1/_4\\ 0 & 3/_4 & 1/_4 \end{bmatrix} \text{ and initial distribution } P[X_0 = K] = \frac{1}{3}, K = 0, 1, 2$$

> 1/2)

find joint distribution of  $X_0$  and  $X_1$ 

- One customer arrives at a counter in a bank after every 15 minutes. 06 B) Staff on the counter takes 10 minutes on an average for serving a customer. Under the assumptions for applying  $M/M/1 : \infty$  /FCFS model, find:-
  - 1) Average queue length
  - Expected waiting time in the queue. 2)

#### Q.4 A) Solve any two of the following

- Let  $X_i$  be *i*. *i*. *d*.  $P(\lambda)$  then test whether WLLN holds good for this 1) sequence.
- Let {  $X_n, n \ge 1$ } be a Markov chain with 3 states 1, 2, 3 with one 2) step TPM

  - $P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \end{bmatrix}$  and initial distribution and initial probability L0.3 0.4 0.3 distribution  $P(X_0 = 1) = 0.7, P(X_0 = 2) = 0.2, P(X_0 = 3) = 0.1$
  - $P_{12}^{(2)}$ i)
  - ii)  $P(X_1 = 1)$
- 3) Give any two characteristics of queuing model  $M/M/1:(\infty/FCFS)$
- If  $X_n \xrightarrow{p} X$  and  $Y_n \xrightarrow{p} Y$  as  $n \to \infty$  than show that  $X_n + Y_n \xrightarrow{p} X + Y$  as  $n \to \infty$ 08 B) also show that  $X_n - Y_n \xrightarrow{p} X - Y$  as  $n \to \infty$

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### Q.5 Answer the following (Any Two).

a) Let  $X_1, X_2, X_3$  be the random samples of size 3 with the distribution having p.d.f.

$$f(x) = \begin{cases} 2x & , 0 < x < 1 \\ 0 & , 0 \cdot w \end{cases}$$

Find  $P(X_{(1)} \ge m)$  where m is median.

b) For a Markov chain  $\{X_n, n \ge 1\}$  one step TPM is as follows.

$$P = \begin{bmatrix} 0 & 1 & 0 \\ p & 0 & q \\ 0 & 1 & 0 \end{bmatrix}$$
 check whether states are recurrent or not.

- c) Customers arrive at a certain petrol pump in a Poisson process with an average time of 5 minutes between arrivals. The time intervals between services at the petrol pump follow exponential distribution and the mean time taken to service a vehicle is 2 minutes.
  - 1) find the probability that the pump is idle.
  - 2) what would be the expected queue length?
  - 3) what would be average waiting time in the queue?
  - 4) obtain average time spent by a customer in the system.

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **GEOLOGY (Special Paper- XIV)** Geomorphology and Geotectonics (19201653)

Day & Date: Wednesday, 21-06-2023 Time: 03:00 PM To 06:00 PM

### **Instructions:** 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labelled diagrams wherever necessary.

#### Q.1 A) Choose the correct alternatives from the options.

- No major river can erode vertically beyond 1)
  - a) Mean Sea Level

c) valley floor

b) local base level d) Interfluve

#### 2) A steep river with a high discharge and a large supply of readily mobile bedload is likely to have which of the following channel forms?

- a) Meandering b) Straight c) Braided d) Sinuous
- River capture is characteristically present in \_\_\_\_\_ stage. 3)
  - a) Youth b) Mature
  - c) Old d) none of these
- The concept "The present is the key to the past" is given by . 4) a) Steno
  - b) James Hutton
  - c) W.M. Davis d) W.D. Thornbury

The end product of normal cycle of erosion is called \_\_\_\_\_. 5)

- a) Peneplain
- c) Monodnock
- What is a transform boundary? 6)
  - a) A transform boundary is when two plates collide.
  - b) A transform boundary is when two plates slide past one another.
  - c) A transform boundary is when two plates move toward each other.
  - d) A transform boundary is when two plates pull away from each other.
- 7) What is the lithosphere?
  - large, flat stones sitting on top of malleable magma a)
  - b) the plates that make up the crust and the upper part of the mantle
  - c) the plates that make up the crust
  - d) the upper part of the mantle

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Max. Marks: 80

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- b) Pedeplain
- d) all of these

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			SLR-QA-23	38		
		8)	Which among the following is called "Mushroom rocks"?a) Pedestal rocksb) Yardangsc) Ventifactsd) Desert pavements			
		9)	The term for wear and tear of the load sediments being transported by moving natural agency through the process of mutual impacts is	/ a 		
		10)	Which of the following are not water-laid deposits associated with glaciers?a) Morainesb) Kames d) Varves			
Q.1	B)	Ans 1) 2) 3) 4) 5) 6)	wer the following questions in one sentence. Name the endogenetic processes. What causes eustatic rejuvenation? In which stage of erosion cycle, flood plain occurs? What is Tethys Sea? What is Gondwana land? What is saltation?	06		
Q.2	Ans a) b) c) d) e) f) g) h) i) j)	swer the followings (Any Eight): Where island arcs are formed? What is loess? What is Horn? What is magnetic reversal? What is karst topography? What is palaeomagnetism? What is aggradation? What is wave cut platform? What is the term when two plates are separating away? Why one plate slide below the other after collision?				
Q.3	A)	<b>Ans</b> 1) 2) 3)	<b>wer the following (Any two):</b> Volcanic arc What is Plate? Characteristics of mature stage river	10		
	B)	Explain the term 'Uniformitarianism'.				
Q.4	A)	<b>Ans</b> 1) 2) 3)	<b>wer the following (Any two):</b> Transportation by river Depositional features by glacier Explain any two evidences of rejuvenation	08		
	B)	Mid-	Oceanic Ridges	08		
Q.5	Ans a) b)	wert Deso Expl	<b>he following (Any Two).</b> cribe in detail depositional features formed by the work of wind. ain various causes of rejuvenation.	16		

### No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **MICROBIOLOGY (Special Paper- XIV)** Microbial Biochemistry (19201661)

Day & Date: Wednesday, 21-06-2023 Time: 03:00 PM To 06:00 PM

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**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Choose the correct alternatives from the options. Q.1 A)

- 1) In protein synthesis, activation of amino acids is carried out by enzyme.
  - Isomerase a)
  - b) Protease
  - c) amino acyl tRNA synthetase
  - d) amino acyl transferase

#### The pH at which the protein is least soluble is its \_\_\_\_\_ pH. 2)

- a) Acidic b) Alkaline d) Isoelectric
- c) Neutral
- 3) is initiation codon.
  - a) GUG b) UAG
  - d) UAC c) CUG
- The process of fixing the enzyme on an inert support for repeated 4) use is called \_\_\_\_\_.
  - a) Activation
- b) Inactivation
- c) Immobilization d) Inhibition
- 5) component is responsible for bioluminescence.
  - a) Luciferin b) Biotin
  - c) Threonine d) Luciferase
- Movement of ribosome by one codon on mRNA is called . 6)
  - a) Transformation c) Translocation
    - b) Transfection d) Transcription
- Precursor for biosynthesis of purine by de novo pathway is . 7)
  - a) PRPP

- b) orotic acid d) Glucose
- c) Carbamoyl aspartate
- When  $V0 = \frac{1}{2}$  Vmax then Km is equal to 8)
  - a) Enzyme concentration b) substrate concentration
  - c) ES concentration d) product concentration

Max. Marks: 80

			SLR-QA-2	39					
		9)	Lactate dehydrogenase is an example of enzyme.a) Isoenzymesb) Multienzymec) Allostericd) Holoenzyme						
		10)	The enzymes having two binding sites, one catalytic and regulatory are calleda) Isoenzymesb) allosteric enzymesc) Multienzymesd) immobilized enzymes						
	B)	1) 2) 3) 4) 5) 6)	Name initiation and termination codons. Explain role of C <sub>55</sub> lipid carrier in peptidoglycan synthesis. Orotic acid is intermediate compound in the synthesis of Name the key intermediates produced in ED pathway. Write the final equation of Michaelis and Menten for single substrate. Enlist the pentoses produced in pentose phosphate pathway.						
Q.2	Ans <sup>s</sup> a) b) c) d) e) f) g) h) i)	wer the following (Any Eight): Define isoenzyme with example. Give significance of Km. Explain ribozyme with example. Significance of immobilization. What is bioluminescence? Draw schematic diagram of glyoxylate pathway. Active site Explain why 'Pyruvate as a key metabolite' is true. Explain enzyme specificity. Assay of enzymes.							
Q.3	A)	<b>Ansv</b> 1) 2) 3)	<b>wer the following (Any two):</b> Arabinose operon Allosteric enzymes with examples Pentose phosphoketolase pathway	10					
	B)	Desc mole	Describe different methods of isolation of enzymes on the basis of nolecular size.						
Q.4	A)	<b>Ansv</b> 1) 2) 3)	wer the following (Any two): What is immobilization? explain different methods of immobilization. Describe any two methods of isolation of enzymes on the basis of electric charge. Explain 'Catabolite repression'.	08					
	B)	Desc	cribe peptidoglycan synthesis.	08					
Q.5	Ans a) b) c)	<b>wer t</b> l Assir Bios <u>y</u> Give	<b>he following (Any Two)</b> milation of Nitrogen ynthesis of Purine by de novo pathway an account of 'protein synthesis'.	16					

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B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 ELECTRONICS (Special Paper- XIV) Embedded System Design (19201677)											
Day & Date: Wednesday, 21-06-2023         Max. Marks: 8           Time: 03:00 PM To 06:00 PM         Max. Marks: 8											
Instru	uctio	n <b>s:</b> 1) 2 3 4	) All quest ) Figures 1 ) Draw ne ) Use of lo	ions are compul to the right indica at labelled diagra og table and calc	sory. ate full ma ams where ulators is a	rks eve allo	r necessary. wed.				
Q.1	A)	<b>Cho</b> 1)	ose the c An embe a) Com c) Outp	orrect alternativ dded system col puting ut	<b>ves from t</b> nsists of m k	t <b>he</b> ninir D) d)	<b>options.</b> mum a device. Input I/O	10			
		2)	An electro embedde a) gene c) both	onic system des ed system. ral (a) & (b)	igned for _ k c	) d)	application is called an dedicated many				
		3)	In C lang a) Cons c) Varia	uage the Keywo stants ibles	rds are als b c	so c c) d)	called as reserved words Integers				
		4)	The grou a) Cons c) Varia	p of similar quar stant ıble	ntities in C k c	prc o) d)	ogramming is called as Array Keyword	·			
		5)	In embec a) Softv c) Both	lded C programr vare delay a) and b)	ning delay k c	r tin o) d)	ne generation technique is Hardware delay RC circuit	<u> </u>			
		6)	The data a) 8 byt c) 2 byt	range of float va es es	ariable is _ k c	) d)	bytes. 1 byte 4 bytes				
		7)	The in C a) Logic c) Arith	programming % cal metic	sign is k c	) d)	_ type of operator. Relational Bit wize				
		8)	To interfa switching a) Trans c) Capa	ace the Relay wit device. sistor acitor	th 8051 mi k c	icro o) d)	ocontroller, is used as Diode Switch i				

#
- 9) In 16x2 LCD number of columns and row are \_\_\_\_\_ respectively.
  - a) 16 & 2 b) 2 & 16
  - c) 18 & 2 d) 2 & 18
- 10) The loop clause \_\_\_\_\_ is also called as superloop in C programming.
  - a) For (; ;)

- b) while (1)
- c) both a) and b) d) while...do

#### Q.1 B) Answer the following.

- 1) Define the embedded system.
- 2) State the Input and Output statement.
- 3) On execution of the statement X = Y/Z, where Y =14, Z = 3, what is the value returned to X, if X variable is integer type?
- 4) To display the BCD data on LCD, which code of the character should be sent to LCD?
- 5) State the name of header file necessary to be included in embedded C program for 8051.
- 6) State the number of keywords are available in C language.

#### Q.2 Answer the following (Any Eight):

- a) Mention four characteristics of an embedded system.
- b) Mention four applications of an embedded system.
- c) Give control signals of 16x2 LCD.
- d) Mention data types of the C language.
- e) Define constants and variables of the C Language.
- f) Give the arithmetic operations in C language.
- g) Give structure of embedded C program.
- **h**) Write the syntax of for loop statement.
- i) Mention the features of C language.
- **j**) Give the format specifier for integer and float.

#### Q.3 A) Answer the following (Any two):

- 1) What is the need of operating system? Write a note on superloop.
- 2) Write Embedded C program for blinking the LED.
- 3) Describe interfacing of Seven segment display to microcontroller 8951.
- B) What is operators in C programme? Explain any two operators with 06 suitable program.

### Q.4 A) Answer the following (Any two):

- 1) Write embedded C program for generation of square of at port P2.
- 2) Discuss while loop with suitable example.
- 3) Explain the minimum hardware requirement for embedded system.
- B) Discuss the development of an embedded system for measurement of temperature. Give flow chart of the required firmware.

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#### Q.5 Answer the following (Any Two).

- a) Describe in detail the designing of an embedded system for speed control of DC motor by using PWM Techniques.
- b) With suitable diagram, describe interfacing of 16 x 2 LCD to 8951 microcontroller.
- c) What is if control statement? Describe in detail if control statement in detail with suitable example.

#### No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **COMPUTER SCIENCE (Paper- XV)** Advanced Java (19201669)

Day & Date: Wednesday, 21-06-2023 Time: 03:00 PM To 06:00 PM

4)

8)

Seat

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Choose the correct alternatives from the options. Q.1 A)

- 1) Which of the following is used to call stored procedure?
  - a) Statement
    - c) Callable statement d) Called statement
- 2) driver uses ODBC driver to connect to the database. b) native - api driver
  - a) jdbc-odbc bridge driver
  - c) network protocol driver
- 3) is used to execute parameterized query. b) preparedstatement interface
  - a) statement interface
  - c) resultset interface
  - is the extension of Deployment Descriptor file in servlet.
  - b) .web .java a)
  - c) .xml d) .class
- Which cookie it is valid for single session only and it is removed 5) each time when the user closes the browser?
  - a) Persistent Cookie c) Both a and b
    - b) Non-persistent Cookie d) None of these
- 6) Which of the following attributes are mandatory in <jsp:useBean/> tag?
  - a) id, type b) id, class
  - c) type, class d) type, property
- Which of the following method can be used to read a form 7) parameter in JSP?
  - a) request.getParameter()

A servlet maintain session in

- c) request.getValue()
- d) response.getValue()

b) response.getParameter()

b) Prepared statement

d) thin driver

d) None of these

- a) Servlet Context
- b) Servlet container
- c) Servlet response heap
- d) Servlet request heap

Max. Marks: 80

06

16

- 9) Which of the following is the correct syntax to declare comments in JSP?
  - a) <%-- This is JSP comment--%>
  - b) <!-- This is JSP comment-->
  - c) ...//...
  - d) All of the above
- 10) Which class can handle any type of request means protocolindependent?
  - a) HttpServlets

b) GenereicServlets

c) Both a & b

d) None of Above

#### B) Fill in the blank.

- 1) \_\_\_\_\_ object stores references to the request and response objects.
- 2) JSTL stands for \_\_\_\_\_.
- 3) JDBC stands for \_\_\_\_\_.
- 4) \_\_\_\_\_ driver is called as thin-driver in JDBC.
- 5) tag is used to execute java source code in JSP.
- 6) method is used to specify before any lines that uses the Pint Writer.

#### Q.2 Answer the following (Any Eight):

- a) What is the JDBC Statement?
- **b)** Write two Uses of Drivers.
- c) What is mean by CGI?
- d) What is mean by Java Bean?
- e) Define the term Servlet?
- f) What are struts?
- g) What is mean by Hibernate?
- h) Define Session in Servlet?
- i) What is mean by scriplet tag?
- j) Explain HttpSession in servlet?

Q.3	A)	<ul> <li>Answer the following (Any two):</li> <li>1) Explain Component and features of JDBC.</li> </ul>	10
		<ol> <li>Explain Servlet life Cycle in detail.</li> <li>Explain the use of prepared statement with example.</li> </ol>	
	B)	<ul><li>Short note on</li><li>1) GenericServlet</li><li>2) Resultset interface</li></ul>	06
Q.4	A)	<ul> <li>Answer the following (Any two):</li> <li>Write Steps to create application of Hibernate.</li> <li>Explain features of Struts.</li> <li>Explain features of servlet.</li> </ul>	08

B) Define the term JSP. Explain JSP architecture in detail. 08

### Q.5 Answer the following (Any Two).

•

- What is cookies and explain advantages and disadvantages of cookies a) in Servlet?
- Explain types of JDBC drivers with suitable example. Explain Session tracking mechanism in Servlet. b)
- c)

Seat No.	t					Set	Ρ
B.	Sc.	(Sen	nester -	VI) (New) (CBCS)	) Exam	ination: March/April-20	23
	Atom	nic, I	Molecula	ar Physics and Q	aper- A Juantur	n Mechanics (19201621	)
Day & Time	& Date : 03:0	e: Th 0 PM	ursday, 22   To 06:00	2-06-2023 PM		Max. Mar	ks: 80
Instr	uctio	<b>ns:</b> 1 2	) All quest ) Figures †	ions are compulsory to the right indicate fi	ull marks	i.	
Q.1	A)	Cho	ose the c	orrect alternatives	from the	options.	10
		1)	<i>m<sub>j</sub></i> can ha a) j(j + c) j(j +	ave only value 1) 1)	es, from b) d)	−j to +j, excluding zero. 2 <i>j</i> + 1 (2 <i>j</i> + 1)	
		2)	The minin is obtaine a) one c) half	mum energy of a par ed by substituting n e	ticle con equal to _ b) d)	fined to one dimensional rigio  zero two	l box
		3)	In the spe converge a) sharp c) princ	ectra of Na, the ence. o, diffuse ipal, sharp	and b) d)	_ series have same fundamental, sharp principal, diffuse	
		4)	Pure rota a) ultrav c) micro	tional spectra occur <i>v</i> iolet owave	in b) d)	region. infra-red x-ray	
		5)	The maximum ber r a) $2n$ c) $n^2$	imum number of elec n is	ctrons in b) d)	a shell of given quantum 2n <sup>2</sup> 2(2n + 1)	
		6)	To obser a) Polar c) both	ve Raman effect, mo r a) and b)	blecules r b) d)	nust be non-polar none of these	
		7)	The quar a) proba c) reflec	ntity ψψ* is called ability density ction coefficient	 b) d)	probability current density transmission coefficient	
		8)	If the cou field, ther a) anon c) Stark	ipling between <i>l</i> * and n we observe nalous Zeeman effec c effect	l <i>s</i> * is br t b) d)	oken in an external magnetic strong field Stark effect Paschen back effect	

- 9) For a free particle the potential energy V(r) =\_\_\_\_\_
  - a) -1 b) 0 c) +1 d) +2
- 10) The energy operator is given by \_\_\_\_
  - a)  $i\hbar \frac{\partial}{\partial t}$ c)  $\frac{\hbar}{i} \frac{\partial}{\partial t}$ b)  $\hbar \frac{\partial^2}{\partial t^2}$ c)  $\frac{\hbar}{i} \frac{\partial}{\partial t}$ b)  $\hbar \frac{\partial^2}{\partial t^2}$ c)  $\frac{\hbar}{i} \frac{\partial}{\partial t}$ 
#### Q.1 B) Fill in the blanks.

- 1) In operator equation  $H\psi = E\psi$ , the eigen value is \_\_\_\_\_.
- In Stark effect the number of split energy levels, corresponding to a given j-value is given by \_\_\_\_\_.
- 3) The separation between two successive energy levels in harmonic oscillator is equal to \_\_\_\_\_.
- 4) The electronic configuration of alkali metal Rb (Z = 37) is \_\_\_\_\_.
- 5) The reduced mass  $(\mu)$  of a rigid rotator is given by \_
- 6) If quantum number l = 2, then the values of magnetic orbital quantum number are \_\_\_\_\_.

#### Q.2 Answer the followings (Any Eight):

- **a)** Determine the term symbol for  $S = \frac{1}{2}$  and L = 2.
- b) Give selection rules for Paschen Back effect.
- c) What are different series in alkali spectra?
- d) Draw neat and labelled diagram of vibration-rotation spectra.
- e) Give characteristic properties of Raman lines.
- f) State Heisenberg uncertainty principle.
- **g)** Find the ground state energy of an electron confined to move in one dimensional potential box of length 1 Å. (*Given*:  $m = 9.1 \times 10^{-31} kg$ ,  $\hbar = 1.054 \times 10^{-34} I s$ )

**h)** Determine eigen value of operator  $\frac{d^2}{dx^2}$  for eigen function sin *nx*.

- i) Write correct form of Laplacian operator  $(\nabla^2)$  in spherical polar coordinates  $(r, \theta, \phi)$ .
- j) State Frank Condon principle.

#### Q.3 A) Answer the followings (Any two):

- 1) Write a note on weak field Stark effect in hydrogen.
- 2) Obtain an expression for rotational energy levels of a diatomic molecule.
- 3) Explain in brief Spectrum of Sodium.
- B) Write a note on intensity rules for atomic spectra. Illustrate with 06 examples.

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#### Q.4 A) Answer the followings (Any two):

- 1) Show that Hamiltonian operator  $\hat{H}$  commutes with momentum operator  $\hat{P}$  for a free particle.
- 2) Write a note on zero point energy of linear harmonic oscillator.
- 3) Determine the energy eigen values of a particle in one dimensional rigid box and explain it with energy spectrum.
- **B)** Derive an expression for vibrational energy levels of diatomic molecules **08** and explain vibrational spectra.

#### Q.5 Answer the following (Any Two).

- a) Derive Schrodinger's time independent wave equation for a particle in one dimension.
- b) Explain anomalous Zeeman effect and obtain an expression for term shift.
- c) Obtain eigen values of operators  $L^2$  and  $L_z$ .

Seat					Sat	P		
No.		maatar VII) (Naw) (CBCS) Ex		ination, Marah		ี าว		
B.3C.	(561	CHEMISTRY (Specia Organic Chemistry	kan I Pa (19)	iper - XV) 201612)	Aprii-20	23		
Day & Date: Thursday, 22-06-2023         Max. Marks: 80           Time: 03:00 PM To 06:00 PM         Max. Marks: 80								
Instructio	ons: ´	1) All questions are compulsory. 2) Figures to the right indicate full n	nark	S.				
Q.1 A)	Cho	oose the correct alternatives fror	n the	e options.		10		
	1)	a) amphoteric a) basic	b) d)	acidic neutral				
	2)	Sugar on hydrolysis gives a) glucose + galactose c) fructose + galactose	b) d)	two glucose units glucose + fructose	e			
	3)	a) A c) C	b) d)	B D				
	4)	Tuberculosis is caused by a) M. Leprae c) M. Tuberculosis	mic b) d)	roorganism. P. Vivax P. Falciparum				
	5)	is an auxo chromic group. a) C0 c) –0H	b) d)	C = C $C = S$				
	6)	is natural insecticide. a) Pyrethrum c) Endosulphan	b) d)	Ethephon Monocrotophos				
	7)	Quinoline undergoes sulphonatio a) 2 & 4 c) 2 & 6	n at b) d)	position number 3 & 5 5 & 8				
	8)	Mutarotation is observed in a) acidic c) basic	_ so b) d)	lvent. amphoteric neutral				
	9)	Name the drug having structure.						
		O2N-(0)-CH-CH-	NH	CO CHCI2				
		a) Isoniazide	b)	Chloromycetin				

		<ul> <li>10) is example of monoazo dye.</li> <li>a) Orange IV</li> <li>b) Congo red</li> <li>c) Bismarck brown</li> <li>d) Malachite green</li> </ul>	
	В)	<ul> <li>Fill in the blanks.</li> <li>1) When mixture of furan, ammonia and steam is passed over heated alumina forms</li> <li>2) Killiani's synthesis is used to length of carbon chain by one C-atom.</li> <li>3) Hormones initially secreted in blood of animals by</li> <li>4) is an anticancer drug.</li> <li>5) is prepared by condensation of one mole of benzaldehyde with two moles of N, N-dimethylaniline.</li> <li>6) Methyl isocyanate is used in the synthesis of</li> </ul>	06
Q.2	Ans <sup>s</sup> a) b) c) d) e) f) g) h) i)	wer the followings (Any Eight): Explain acidic character of pyrrole. How will you convert glucose to fructose? Write classification of vitamins. Give synthesis of isoniazide. Give synthesis of phenolphthalein. What are agrochemicals, give its example. Give two methods for preparation of pyridine. Draw structure of lactose. Give its uses. Define antibiotic and antimalarial. Write any two properties of good dye.	16
Q.3	A)	<ul> <li>Answer the followings (Any two):</li> <li>1) What are heterocyclic compounds? How pyrrole is prepared from acetylene and succinimide?</li> <li>2) What is pharmacodynamic agents? How they are classified?</li> <li>3) Give synthesis of Indole-3-acetic acid from acetic acid.</li> </ul>	10
	B)	Prove that open chain structure of glucose on analytical basis.	06
Q.4	A)	<ul> <li>Answer the followings (Any two):</li> <li>1) Discuss the classification of carbohydrates.</li> <li>2) Give synthesis of thyroxine.</li> <li>3) Write any four qualities of an ideal drug.</li> </ul>	08
	B)	What are carbohydrates? How will you arrive configuration of D-glucose from D-arabinose?	80
Q.5	<b>Ans</b> a) b)	<b>wer the following (Any Two).</b> Discuss the structure of vitamin - A on the basis of analytical evidence. Give classification of dyes based on chemical structure.	16

c) Give Skraup synthesis.

Complete the following reaction.



**BOTANY (Special Paper- XV)** Cell Biology (19201603) Day & Date: Thursday, 22-06-2023 Max. Marks: 80 Time: 03:00 PM To 06:00 PM **Instructions:** 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Use of log table and calculator is allowed. Q.1 A) Choose the correct alternatives from the options. is the part of microscope on which the object of investigation 1) is positioned. a) Lens b) Diaphragm c) Stage d) Mirror 2) The scanning electron microscopy is most often used to reveal . a) surface structures b) internal structures c) both surface and internal structures d) None of these The components of prokaryotic cells are \_ 3) a) plasma membrane b) DNA c) cytoplasm d) All of these 4) The three scientists that contributed to the cell theory are . a) M. Schleiden, T. Schwann, R. Virchow b) M. Schleiden, T. Schwann, Alberts c) M. Schleiden, W. Sutton, R. Virchow d) Preuss, T. Schwann, R. Virchow are power house of cell. 5) a) Chloroplasts b) Ribosomes c) Lysosomes d) Mitochondria 6) The spindle apparatus is formed during the phase of mitosis. a) telophase b) metaphase c) prophase d) anaphase The term chromosome was first coined by \_\_\_\_ 7) a) Sutton b) Boveri d) Hoffmeister c) Waldever Cyclin is associated with \_\_\_\_\_. 8) b) Cylosis a) Mitosis c) Glycolysis d) Leptospirosis

Seat No.

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023

									SLR-	QA-244
		9)	a) c)	is lon Interpha Metapha	gest stage ise ase	e in the cell	cycl b) d)	e. Anaphase None of the	above	
		10)	Ch a) c)	romosom Anapha Telopha	e structur se se	e can be ol	bserv b) d)	ed best durir Metaphase None of the	ng above	
Q.1	В)	Fill i answ 1) 2) 3) 4) 5) 6)	n th wer/ Wh In v Wh Wh org Wh Wh	te blanks Give the mat is regu- which stag- nich are the mich Micro ganelles? nich are the nich organ	<b>/Definitio</b> <b>name /P</b> Ilated by c ge of meio ne sex chro scope is u ne three su nelle traps	on /One se redict the cyclins and osis does sy omosomes used, to stu ub stages o the sunligh	nten prod Cdk' ynap ? dy th of Inte	<b>ce answer /</b> l <b>uct etc.</b> ? sis takes plac ne ultra-struct erphase?	One-word ce? ture of cell	06
Q.2	Ans a) b) c) d) e) f) g) h) i) j)	wer ti Defir Wha Defir Give Sket Give Defir Wha Enlis Wha	he f ne N ne T any ch a any ne e at is i st the	<b>following</b> Magnificat mean by felocentrid y two fund and label y two sign electron m mean by e compor mean by	s (Any Ei ion. prokaryoti c chromos ctions of L the Endop ifficance o icroscopy cell cycle? nents of Ei autosome	ght): c cell? some. ysosome. lasmic retio f Mitosis. dkaryotic ce s?	culun ell.	n.		16
Q.3	A)	<b>Ans</b> 1) 2) 3)	wer Wr Wh Exp	the follo ite a note nat are rib plain meta	wings (A on sampl osomes? aphase of	<b>ny two):</b> e preparati Give the fu mitosis wit	on in Inctio h sui	electron mic ons of ribosor table diagrar	roscopy. nes. n.	10
	B)	State	e the	e differen	ce betwee	n prokaryo	tic ar	nd eukaryotic	cell.	06
Q.4	A)	<b>Ans</b> 1) 2) 3)	wer Giv De <sup>-</sup> dia Sta	<b>the follo</b> ve signific fine mitoo gram. ate the fur	wings (An ance of m chondria a nctions of	<b>ny two):</b> eiosis. nd explain cytoskeleto	its ul on.	trastructure v	vith suitabl	<b>08</b> e
	B)	Expl	ain 4	4 types of	f chromos	omes acco	rding	to centrome	re position	. 08
Q.5	<b>Ans</b> a)	<b>wer t</b> l Write Micro	he f e the osco	<b>ollowing</b> e constructope.	<b>s (Any Tv</b> ction, princ	<b>vo).</b> ciple and us	se of	Transmissio	n Electron	16
	b)	Expla	ain t	the ultras	tructure ar	nd function	s of c	chloroplast.		

c) Describe the stages of meiosis -I with labelled diagram.

Seat	
No.	

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 ZOOLOGY (Special Paper - XV) Animal Behavior and Chronobiology (19201629)

Day & Date: Thursday, 22-06-2023 Time: 03:00 PM To 06:00 PM

**Instructions**: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks
- 4) Use of log table and calculator is allowed.

#### Q.1 A) Choose correct alternatives

1)

- \_\_\_\_\_ is considered as father of classical conditioning.
  - a) Konrad Lorenz b) Karl von Frisch c) Niko Tinbergen d) Ivan Pavlov
- 2) Building of nest by birds, singing to attract males, territoriality, migration, parental care are examples of type of behavior.
  - a) Innate or stereotyped or Instinctive
  - b) Learned Behaviors
  - c) Standardized
  - d) Conventional

## 3) The scientific division of biology that study animal behavior is called as \_\_\_\_\_.

- a) Applied Zoology
- b) Ecologyd) Ethnology
- c) Ethology d) E
- 4) Three pioneers in the study of animal behavior-Tinbergen, Frisch and Lorenz received novel prize in the year \_\_\_\_\_.
  - a) 1960 b) 1973
  - c) 1999 d) 1980
- 5) Birds learning to ignore scare crow is an example of \_\_\_\_\_ behavior.
  - a) Habituation b) Imprinting
  - c) Reflexes d) Conditioning
- 6) In circadian cycle, biological clocks are entrained to day/night cycles that approximate only a \_\_\_\_\_ hour cycle.
  - a) 10 b) 20 c) 24 d) 48
- 7) The environmental factor that drive endogenous biological rhythms is called \_\_\_\_\_.
  - a) Search Image b) Zeitberger
  - c) Migration d) Chemical Cue
- 8) The modification of behavior as a result of experience is called \_\_\_\_\_.
  - a) Orientation b) Ethology
  - c) Learning d) Habituation

Set |

Max. Marks: 80

		<ul> <li>9)hormone is produced in response to darkness.</li> <li>a) Growth Hormone</li> <li>b) Melatonin</li> <li>c) Prolactin</li> <li>d) Testosterone</li> </ul>	
		<ul> <li>10) In most species, usually invest more in their offspring.</li> <li>a) Siblings</li> <li>b) Male</li> <li>c) Conspecifics</li> <li>d) Female</li> </ul>	
	B)	Give one sentence answer to the following.1)Taxis2)Stimuls3)Chronomedicine4)Altruism5)Migration6)Chronobiology	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	ve any eight of the following: Define- kinesis with example. Define- instinct with example. Define- imprinting with example. Melatonin and its function. Define- altruism with example. Define- chronotherapy. Define- courtship. Define- Chronopharmacology. Define- reflex with example. Define- habituation with example.	16
Q.3	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Define Chronobiology and its role in diseases.</li> <li>2) Elaborate on proximate and ultimate causes of behavior with suitable examples.</li> <li>3) Discuss Niko Tinbergen's contributions to the study of animal instincts with an example.</li> </ul>	10
	B)	With suitable examples, discuss Konrad Lorenz's contribution in behavioral science.	06
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Explain the concept of society with honey bee as an example.</li> <li>2) Write an account on the significance of asymmetry of sex and sexual dimorphism.</li> <li>3) Discuss photoperiod and regulation of seasonal reproduction in vertebrates.</li> </ul>	08
	B)	Define mate choice and with suitable examples elaborate intra and intersexual selection.	08
Q.5	Atte a) b)	<b>mpt any two of the following.</b> Give a detailed account on the foraging and dance language in honey bees. Define "associative learning' and discuss classical and operant conditioning with example.	16
	<b>c</b> )	Explain characteristics and types of biological rhythms with their	

**c)** Explain characteristics and types of biological rhythms with their significance.

Seat No.						Set	Ρ
B.Sc.	(Ser	nester - MA	VI) (New) (CB0 ATHEMATICS ( Graph Theo	CS) I (Spe ory ('	Examination: March/Ap cial Paper - XV) 19201637)	oril-20	23
Day & Da Time: 03:	ite: Th 00 PN	ursday, 22 1 To 06:00	2-06-2023 9 PM		Ма	x. Marl	ks: 80
Instruction	o <b>ns:</b> 1 2	) All ques ?) Figures	tions are compuls to the right indica	ory. te full	marks.		
Q.1 A)	Cho 1)	ose the c lf e = (u, a) lsola c) lnitia	<b>correct alternativ</b> <i>v</i> ) is a edge in dia ited vertex il vertex	<b>es fro</b> agrap b) d)	om the options. h then <i>V</i> is called as Terminal vertex None of these		10
	2)	A vertex a) 0 c) 2	is called isolated	verte: b) d)	x if and only if it has a degree 1 3	e	_·
	3)	In a grap edges co a) Simp c) Pseu	h each edge conr onnected the same ble graph udo graph	nects e pair b) d)	two distinct vertices and no t of vertices is called Multigraph None of these	wo	
	4)	Repeate a) Wall c) Circu	d vertex is not allo c uit	bwed b) d)	in Trail Path		
	5)	lf plane g a) K c) K-1	graph has K comp	onen b) d)	t then n - e + r = KH K <sup>2</sup> +1		
	6)	Sum of c a) Ever c) Prim	legrees of the ver າ e	tices b) d)	n undirected graph is Odd None of these		
	7)	A tree wi a) 6 c) 5	th 5 vertices has <sub>.</sub>	b) d)	_edges. 4 25		
	8)	A tree wi a) 1 c) 3	th vertex is	s calle b) d)	ed a trivial tree. 2 4		
	9)	The bina a) 52 c) 35	ry number 11010	1 <sub>(2)</sub> is b) d)	equivalent to decimal numbe 53 25	er	

SLR-QA-246

Page 1 of 4

10) Convert  $\cdot$  78125<sub>(10)</sub> to hexadecimal is \_\_\_\_\_.

a)	• C8	 b)	• 8C
c)	· 88	d)	· CC

#### Q.1 B) Give answer of the following:

- 1) Convert to hexadecimal 1110110100101110<sub>(2)</sub>
- 2) Draw complete Bipartite graph K<sub>33</sub>
- 3) Draw a cycle C<sub>5</sub>
- 4) Give an example of graph which contains an Eulerian circuit but not Hamiltonian cycle.
- 5) Draw the graph whose incidence matrix is:

	$e_1$	$e_2$	$e_3$	$e_4$	$e_5$	
$v_1$	ΓO	0	1	-1	1	1
$v_2$	-1	1	0	0	0	
$v_3$	0	0	0	0	0	
$v_4$	1	0	0	0	-1	
$v_5$	LO	-1	0	0	0 -	I
$v_6$	0	0	-1	1	0	

6) Draw tree on 5 vertices.

#### Q.2 Answer the followings (Any Eight):

- a) Convert 3D59(16) to binary.
- **b)** Convert  $110111 \cdot 01101_{(2)}$  to hexadecimal.
- c) Find degree of each vertex.



- d) Define regular graph and give example.
- e) Define bipartite graph, give example.
- **f)** Find diameter of graph





i) Find spanning tree of



06

10

### Q.3 A) Answer the followings (Any two):

- 1) Show that the maximum number of edges in a simple graph with *n* vertices is  $\frac{n(n-1)}{2}$
- 2) Find number of walk of length 3 from  $v_3$  to  $v_1$  and also check the connectedness of the graph.
- 3) Find the minimal spanning tree of the weighted graph using Prim's algorithm



### Q.4 A) Answer the followings (Any two):

- 1) Write prefix and post fix from the expression a + (b \* c) (c/f + e)
- 2) Show that a simple graph with *n* vertices and *k* component can not have more than  $\frac{(n-k)(n-KH)}{2}$  edges.
- 3) Find the indegree and out degree of each vertex of directed graph.



- 1)  $109 \cdot 78125_{(10)}$  to binary
- 2)  $32 \cdot 304_{(5)}$  to decimal
- 3)  $73D5_{(16)}$  to octal
- 4) 10110100101110(2) to hexadecimal

08





16

#### Q.5 Answer the following (Any Two).

a) Apply Dijkstra's algorithm to the graph. Find shortest path from a to z.



b) By using Kruskal's algorithm, find minimal spanning tree of graph.



c) i) Show that the graph G and  $G^1$  is isomorphic.



ii) Show that following graph G and G<sup>1</sup> is not isomorphic.



No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **STATISTICS (Special Paper- XV) Designs of Experiments (19201645)** 

Day & Date: Thursday, 22-06-2023 Time: 03:00 PM To 06:00 PM

2)

Seat

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Q.1 A) Choose the correct alternatives from the options.

- 1) In case of LSD with m treatments, the degrees of freedom for error is
  - a) m-1 b) m<sup>2</sup> c) (m-1) (m-2) d) m<sup>2</sup>-1
  - - Randomized block design is a \_\_\_\_ b) Two restrictional design
      - a) One restrictional design Three restrictional design c)
- The main purpose of confounding in a factorial experiment is to 3) reduce the size of \_\_\_\_\_.
  - a) blocks b) replicates d) experimental units
  - c) treatments
- The factors like date of sowing and breeds are often used as 4)
  - a) experimental unit
  - c) replicates d) None of these

#### In CRD with k treatments, the degrees of freedom for treatments 5)

- is a) N-k b) N-1
- d) (k-1) (N-k) c) k-1

#### The total number of interaction effects in a 2<sup>3</sup> factorial experiment 6) is

- a) 8 b) 2
- c) 3 d) 4
- If different effects are confounded in different replicates, it is said to 7) be .
  - a) Complete confounding
    - b) Balanced confounding d) None of these

d) None of these

b) treatments

- c) Partial confounding
- In a LSD, number of rows, columns and treatments are \_\_\_\_\_. 8)
  - a) all different c) not necessarily equal
- b) always equal d) None of these

Max. Marks: 80

		9)	In L deg	SD with 6 trea	atments with two m will be	o mis	sin	g observations, the error	
			a) ັ	20		b)	19	9	
			c)	18		d)	17	7	
		10)	In a be o	2 <sup>3</sup> factorial exobtained by	kperiment, all ef 	fects	an	nd their sum of squares can	
			a) c)	Yates' metho Both a and b	d	b) d)	M N	lodulo technique leither a nor b	
	В)	Atter 1) 2) 3) 4) 5) 6)	npt a Expl Defii State Defii Wha State	all of the folio ain the term T ne experiment e the formula o ne Local contr at is full form of e the formula t	wing: reatment. al unit. of a missing obs ol. f ANOCOVA? to find M.S.S.	serva	tior	n in LSD.	06
Q.2	Ans	swer t	he fo	ollowings (Ar	ny Eight):				16
	a) b)	Give	an e	example of mis	sina plot techni	aue.			
	c)	Desc	ribe	the principle o	f replication.				
	d)	State	mat	thematical mo	del used in CRI	).			
	e) f)	Defin	e eff	iciency of des	ign of experime	nt.			
	a)	Expla	ain si	plit plot design					
	ĥ)	Give	two	merits of CRD	·				
	i)	State	mai	in effects in $2^2$	factorial experi	ment.			
	])	State	the	neadings of co		vA ta	ble	<b>)</b> .	
Q.3	A)		ver t	he followings	s (Any two):				10
		1) V 2) F	stim	ate the param	neters in RBD				
		3) E	Expla	ain total and paran	artial confoundi	ng.			
	B)	Give	layo	ut of RBD.					06
Q.4	A)	Ansv	ver t	he followings	s (Any two):				08
		1) [ 2) [ 3) [ e	Defin Deriv Expla expei	e block and yi e the formula hin Yate's proc riment.	eld. for one missing edure to obtain	obse facto	erva oria	ation in RBD. I effect totals in 2 <sup>2</sup> factorial	
	B)	Expla RBD	ain th	ne procedure c	of testing of equ	ality	of t	wo treatments means in	08

#### Q.5 Answer the following (Any Two).

- a) State mathematical model, assumptions and analysis of variance table in case of CRD.
- **b)** Derive the formula for two missing observations in LSD.
- c) Derive the expressions for main and interaction effects in 2<sup>3</sup> factorial experiment.

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No.	

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 GEOLOGY (Special Paper-XV) Environmental Geology (19201654)

Day & Date: Thursday, 22-06-2023 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

Set

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Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat diagrams wherever necessary.

#### Q.1 A) Rewrite the sentence by filling the blanks with the correct answer 10 from the given options. Solution of reducing the slope angle is used to prevent \_\_\_\_\_. 1) flood b) tsunami a) subsidence d) landslide c) The main effect of human activities that causes subsidence is by 2) a) vibrations from highways b) increasing runoff by paving c) lowering the water table removing vegetation d) 3) Fire is common hazard associated with the activity. flood a) volcano b) subsidence c) landslide d) The most destructive landslides generally occur on 4) a) gentle slopes intermediate slopes b) c) steep slopes leveled ground d) What is the Polar climate like? 5) a) cold b) very cold c) hot d) warm Albedo of vegetation on the earth is 6) a) very low b) low c) white high d) Slides are less likely where rock layers dip 7) a) parallel to slope b) into the slope c) steeply d) gently against slope 8) Channel spreading controls \_ b) a) flood Tsunami c) Landslide d) Volcano In urban areas, \_\_\_\_\_ is a solution for flood problems. 9) restoration of flood plains a) channel cleaning and deepening b) non-disposal of garbage in stream c) all solutions as mentioned in a, b & c d) What percentage of energy that enters in the atmosphere is absorbed 10) by the atmosphere that leaves 51% for the earth's surface to absorb? 21 a) 30 b)

c) 19 d) 70

	В)	<ul> <li>Answer the following.</li> <li>1) Define landslide.</li> <li>2) Define earthquakes.</li> <li>3) Define Retention Wall for landslide.</li> <li>4) Define Bolting for landslide.</li> <li>5) Define 'greenhouse effect'.</li> <li>6) Define Flood Plain.</li> </ul>	06
Q.2	Writ a) b) c) d) e) f) g) h) i)	e answers to any eight of the following. What is dam failure? What is an avalanche? What is a water spreading solution? What is 'gully plugging'? What is gabion structure? What is an artificial levee? What is channel modification? What is the energy budget of earth? What is a coastal hazard related to subsidence? What is global warming?	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain the climate like between 30 to 40 degree Latitude.</li> <li>2) Explain in detail process of channel spreading method application to control floods.</li> <li>3) Explain five preparedness measures of volcanic hazard.</li> </ul>	10
	B)	Write the Hazardous effects of Tsunami.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Role of continuous contour trenching (CCT) in hazard prevention.</li> <li>2) Explain non-conventional energy resources.</li> <li>3) Explain the relation of rock type with floods.</li> </ul>	08
	B)	Role of vegetation & rock structures in flood and landslide hazards.	08
Q.5	Atte a) b) c)	mpt any Two of the following. Causes & effects of subsidence & prevention measures. Explain tropical climate & add note on its coastal nature. Explain the hydro thermal energy? Add note on India's potential for the same.	16

Max. Marks: 80

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **MICROBIOLOGY (Special Paper- XV)** Clinical Microbiology (19201662)

Day & Date: Thursday, 22-06-2023 Time: 03:00 PM To 06:00 PM

#### **Instructions:** 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat labeled diagrams wherever necessary.

#### Q.1 A) Choose the correct alternatives from the options.

- rickettsial disease is transmitted from person to person by 1) the human louse.
  - a) Epidemic Typhus
  - c) Scrub typhus
- b) Endemic Typhus

b) Klebsiella pneumoniae

- d) Spotted fever
- 2) is antifungal drug.
  - a) Penicillin
  - c) Streptomycin
- is anaerobic pathogen. 3)
  - a) Proteus vulgaris c) Escherichia coli
- d) Clostridium perfringens

b) Gelatin agar

#### medium is used for cultivation of Rickettsia. 4)

- a) Nutrient agar
- Chicken embryos c) Milk agar d)

#### Streptomycin was discovered by 5)

- a) W. Beijerinck b) Joseph Lister c) Salman Waksman d) Winogradsky

#### Vancomycin inhibit synthesis. 6)

- a) Protein b) Carbohydrate
- c) Cell wall d) DNA

Acid fast staining method is used for staining of . 7)

- a) Micrococcus c) Metabacterium
- Mycoplasma b)

b) Azidothymidine

- Mycobacterium d)
- 8) is antiviral drug.
  - a) Ampicillin

Virus

c) Mold

a)

9)

- c) Azithromycin
- is a cellular.
- Yeast b)
  - d) Rickettsia

d) Neomycin



10

Seat No.

		10) Ebola is transmitted by	
		a) Mosquitoes b) dog bite	
		c) Air d) Fruit bats	
Q.1	B)	<ul> <li>Answer in one or two words.</li> <li>1) Names of pigments produced by <i>P. aeruginosa</i>.</li> <li>2) How cholera is transmitted?</li> <li>3) Which medium is used for cultivation of <i>M. leprae</i>?</li> <li>4) Which organism produce oxidase enzyme?</li> <li>5) Examples of killed vaccines.</li> <li>6) Which medium used for cultivation of <i>vibrio</i> cholerae?</li> </ul>	06
Q.2	Ans a) b) c) d) e) f) g) h) i) j)	wer the followings (Any Eight): Define Pathogenicity. List properties of <i>clostridium perfringens</i> . How to dispose sharp device? Which part of cell is responsible for adhesion? How to dispose clinical samples? What are toxoids? What are attenuated vaccine? give examples of like vaccines. Give examples of antiprotozoal agents? Give examples of antifungal agents.	16
Q.3	A)	<ul> <li>Answer the followings (Any two):</li> <li>1) Advantages and disadvantages of bioweapons</li> <li>2) Subunit vaccine</li> <li>3) Mechanism of bacterial invasion.</li> </ul>	10
	B)	Write a short note on mechanism of pathogenicity by fungal infection.	06
Q.4	A)	<ul> <li>Answer the followings (Any two):</li> <li>1) Structure of AIDS virus</li> <li>2) Recombinant vaccine</li> <li>3) Transmission of malaria</li> </ul>	08
	B)	Explain in detail mechanism of action of streptomycin and penicillin.	08
Q.5	Ans a) b)	<b>wer the following (Any Two).</b> Give an account on mechanism of antibiotic resistance. Write on transmission, clinical features, laboratory diagnosis and treatment of infection caused by <i>cryptococcus</i>	16
	<b>c</b> )	Types of bacterial toxins and mechanism of action	

c) Types of bacterial toxins and mechanism of action.

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Seat No							Set	Ρ
B.Sc.	(Ser	nester -	VI) (New) (C	BCS) Ex	am	ination: March/A	April-20	23
	•	EL	EĆŤROŃIČS	S (Specia	al P	aper - XV)	•	
		Elec	tronics Insti	rumentat	ion	n (19201678)		
Day & Dat	e: Th	ursday, 22	2-06-2023			Ν	/lax. Mar	ks: 80
Time: 03:0	0 PN	1 To 06:00	PM					
Instructio	ns: 1 2 3 4	) All quest 2) Figures † 3) Draw ne 4) Use of lo	ions are comp to the right indi at labeled diag og tables and c	ulsory. icate full ma rams wher alculators i	arks eve is al	s. r necessary. llowed.		
01 (1)	Cha	ana tha a	orrect alterna	tivoo from	the	ontiono		10
Q.1 A)	1)	The quar	ntity which is to	be measu	red	is known as		10
	,	a) meas	surement		b)	measurand		
		c) meas	sure		d)	None		
	2)	Excitation	n is needed for		L )			
		a) LVD c) them	ı nocouple		d)	piezo sensor None		
	3)	Improper	may re	sult in erro	rs ir	measurement		
	5)	a) Grou	nding	Sult in cho	b)	Shielding		
		c) both	a and b		d)	None		
	4)	In case o	f AD 620 gain	is set with		external resistor.		
		a) One	_		b)	Two		
	<b>5</b> )	c) Three		500	a)	Four		
	5)	IC	IS SUITABLE FOR	ECG.	h)	I M 555		
		c) AD 6	20		d)	AD 594		
	6)	IC	includes thern	nocouple fa	áilur	e alarm.		
	- /	a) LM 5	55	I	b)	μA 741		
		c) AD 6	20		d)	AD 594		
	7)	It is esse	ntial to make _	befor	re u	sing the circuit for		
		measure	ment. ralization		<b>b</b> )	offset compensatio	n	
		c) balar	ncing		d)	None	11	
	8)	, The prob	lem of voltage	drop in the	, inte	erconnectina wirina	can be	
	- /	overcom	e by using			······································		
		a) offse	t compensatio	n i i				
		D) 4-201	ma current trar	nsmission s	syst	em		

- c) buffer circuitd) None

#### 10) is used to observe transient response. b) Digital multimeter a) Analog multimeter c) Cathode Ray Oscilloscope d) Digital Storage Oscilloscope B) Answer the following. 06 is the heart of CRO. 1) 2) Why IC AD620 is used for battery powered portable equipment? Collecting the data from some system for a period of time is known 3) as What is chopper? 4) The first stage of data acquisition system is 5) Which instrument is used to record one quantity with respect to 6) another quantity? 16 Q.2 Answer the followings (Any Eight): What is excitation? Why it is required? a) What is shielding? Give its importance. b) What is programmable gain amplifier? What is its importance? C) Give the salient features of AD594. d) e) Draw the block diagram of single channel DAC. What is offset compensation? f) What is NRZ recording? g) Give the advantages of digital data recording. h) Draw the circuit diagram of ratiometric conversion. i) Draw the pin diagram of IC AD620 and give its pin description. j) Q.3 A) Answer the followings (Any two): 10 Explain 4-20 mA current loop used in industries. 1) 2) Explain general block diagram for electronic instrument design for measurement. Explain LCR-Q meter. 3) 06 Write a note on X-T recorder. B) Q.4 A) Answer the followings (Any two): 08 Explain multi channel data acquisition system. 1) 2) Write a note on digital multimeter. Explain the working of data logger. 3) Draw the block diagram of CRO and explain the function of each block. **08** B) Answer the following (Any Two). 16 Q.5 Explain instrumentation amplifier using op amp. Derive the expression a) for gain.

- b) With the help of block diagram explain the working of pH meter.
- c) Explain function generator with the help of block diagram.

- 9) The digital multimeter is capable of measuring
  - a) ac and dc voltage
- b) ac and dc currentd) All of these

- c) resistance
- ·\_\_\_\_.
- SLR-QA-250

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No.	

### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 **COMPUTER SCIENCE (Paper- XVI)** Data Communication and Networking – II (19201670)

Day & Date: Thursday, 22-06-2023 Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks. Q.1 A) Choose the correct alternatives from the options. provides a connection-oriented reliable service for sending 1) messages. a) TCP b) IP c) UDP d) All of the above Addressing mechanism is done at 2) a) Physical Layer b) Data Link Laver c) Application Layer d) None of the above HTTP is protocol. 3) a) Application layer b) Transport layer c) Network layer d) Physical layer The resources needed for communication between end systems are 4) reserved for the duration of Session between end systems in . a) Packet switching b) Frequency switching c) Line switching d) Circuit switching 5) Which transmission media has the highest transmission speed in a network? a) Coaxial cable b) Twisted pair cable c) Optical fiber d) Electrical cable 6) Wireless transmission can be done via a) Radio waves b) Microwaves c) Infrared d) All of the Above Application layer offers service. 7) a) End to end b) Process to process c) Both of these d) None of these The packet of information at the application layer is called \_\_\_\_\_. 8) a) Packet b) Message c) Segment d) Frame A television broadcast is an example of transmission. 9) a) Half-duplex b) Simplex c) Full-duplex d) Automatic

Max. Marks: 80

10)	The	layer is responsible for the process-to-process delivery
	of the entir	e message.

a) Transport

- b) Physical d) Data link
- c) Network

#### B) Fill in the blank.

- 1) \_\_\_\_\_ is a set of rules that governs data communication.
- 2) \_\_\_\_\_ is a set of procedures used to restrict the amount of data the sender can sent before waiting for an acknowledgement.
- 3) Router operates in \_\_\_\_\_ layer of OSI Reference Model.
- 4) The \_\_\_\_\_ layer is the layer closest to the transmission medium.
- 5) A \_\_\_\_\_\_ is a device that forwards packets between networks by processing the routing information included in the packet.
- 6) The \_\_\_\_\_ is the physical path over which a message travel.

### Q.2 Answer the followings (Any Eight):

- a) Define the term data communication?
- **b)** Define protocol and standard?
- c) Define the term Amplitude and Bandwidth.
- d) Define the term Distortion and Noise.
- e) What is mean by Framing?
- f) What is mean by Error Control?
- g) What is Data Compression?
- **h**) What is mean by Network Devices? List out different network devices.
- i) Explain Shannon Capacity Theorem.

## Q.3 A) Answer the followings (Any two): 1) What is an error? Explain the types of errors.

- 2) Explain Congestion Control in Datagram Subnets.
- Explain Simplex and Stop and Wait protocol.
- **B)** Short note on FTP and SMTP.

### Q.4 A) Answer the followings (Any two):

- 1) Explain data flow in detail.
- 2) What is mean by Modulation. Explain Amplitude Modulation?
- 3) What is mean by transmission media. Explain Coaxial Cable transmission media?
- B) Explain the TCP/IP reference model with neat diagram. 08

#### Q.5 Answer the following (Any Two).

- a) Define Multiplexing. Explain the various types of multiplexing?
- b) Explain Distance Vector Routing Algorithm in detail?
- c) Define Switching. Explain different types of Switching?

06

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06

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Seat No.				Set	Ρ
E	3.Sc	:. (Se	mester - VI) (New) (CBCS) Examinatio PHYSICS (Paper - XVII) Electronics (19201622)	on: March/April-2023	
Day & Time <sup>.</sup>	Date	e: Frid 0 PM	day, 23-06-2023 To 06 <sup>.</sup> 00 PM	Max. Marks	s: 80
Instru	ictio	ns: 1) 2) 3) 4)	All questions are compulsory. Draw neat labelled diagrams wherever necess Figures to the right indicate full marks Use of log tables and calculator is allowed.	sary.	
Q.1	A)	Mult 1)	tiple choice questions.Op. amp has input base currents are 26 nA a offset current isa) 23 nAb) 46 nAc) 6 nAd) 10 nA	and 20 nA, the input	10
		2)	IC 555 consists of comparators. a) nine b) three c) four d) two		
		3)	The liquid used in LCDs are a) cholesteric b) nemat c) electrolyte d) water	ic	
		4)	OP AMP, inverting amplifier produces phase between its input and output. a) 0 b) 90 c) 120 d) 180	shift of degree	
		5)	Which diode is also called as Silicon Unilater a) PNPN b) Tunne c) Zener Diode d) Varac	al Switch? I Diode tor Diode	
		6)	<ul> <li>E-MOSFET can be operated in mo</li> <li>a) enhancement</li> <li>b) both enhancement as well as depletion</li> <li>c) depletion</li> <li>d) neither enhancement nor depletion</li> </ul>	de.	
		7)	In IC 555 square wave generator, for perfect a) $RA = RB$ b) $RA >$ c) $RA < RB$ d) $RA \neq$	square wave <i>RB</i> <i>RB</i>	
		8)	In the normal operation of an SCR, anode is cathode. a) zero b) negati c) positive d) positiv	at potential w.r.t. ve e as well as negative	
		9)	Triac is same as that of two back-to-back co a) Transistors b) Diacs c) FETs d) SCRs	nnected	

10)	In MOSFET,	MOS forms a small
-----	------------	-------------------

- a) resistancec) inductance capacitance impedance b)
  - d)

B) Fill in the blank/Definition/One sentence answer/ One word answ	ver/ 06
<ul> <li>Give the name/Predict the product etc.</li> <li>1) In IC 555 pin no. 3 is</li> <li>2) FET is controlled device.</li> <li>3) Why the name MOSFET?</li> <li>4) PNPN diode is junctions device.</li> <li>5) Diac is directional device.</li> <li>6) What is Operational Amplifier?</li> </ul>	
<ul> <li>Q.2 Solve any eight of the following:</li> <li>a) Draw the symbols of n and p channel D- MOSFET.</li> <li>b) Calculate duty cycle of an IC 555 astable multivibrator, where RA = 3 and RB = 2.5KΩ</li> <li>c) Compare transfer characteristics of D-MOSET and E-MOSFET.</li> <li>d) Draw the constructional diagram of Diac.</li> <li>e) What is Nixie tube?</li> <li>f) Define CMRR.</li> <li>g) Draw the circuit diagram of Op. Amp.as adder.</li> <li>h) Draw pin diagram of IC 741.</li> <li>i) IC555 monostable mode consists of R = 1KΩ and C = 0.01 µF. Calcul pulse width.</li> <li>j) OP AMP is used in inverting mode with R1 = 2KΩ and R2 = 15KΩ. Calcul pulse gain AV.</li> </ul>	<b>16</b> 3KΩ ate alculate
<ul> <li>Q.3 A) Attempt any two of the following: <ol> <li>Draw and explain block diagram of operational amplifier.</li> <li>Explain construction, working of SCR.</li> <li>Op. amp. is used in non-inverting mode with R1 = 2KΩ, R2 = 1 Calculate output voltage for input voltage of 100 mV and 2V.</li> </ol></li></ul>	<b>10</b> 0ΚΩ.
B) Short note on LED.	06
<ul> <li>Q.4 A) Attempt any two of the following: <ol> <li>Explain construction and working of D-MOSFET.</li> <li>Design an IC555 astable multivibrator to generate the output si with frequency 500Hz, duty cycle 80 % and C = 0.1 μF.</li> <li>Explain the structure and operation of EPID.</li> </ol> </li> </ul>	<b>08</b> ignal
Q.4 B) Explain functional block diagram of IC555.	08
<ul> <li>Q.5 Attempt any two of the following.</li> <li>a) Explain the applications of IC 555 as square wave generator.</li> <li>b) Explain op. amp. as an inverting amplifier.</li> <li>c) Explain operation and characteristics of Triac.</li> </ul>	16

	Ana	vtical and Industrial O	rganic Ch	er - XVI) emistry (1920161	7)
/ & Date ie: 03:0	e: Frid 0 PM	ау, 23-06-2023 Го 06:00 РМ	5	N	/ax. Marks
tructio	ns: 1) 2)   3)   4)	All questions are compulsor Draw neat labelled diagrams Figures to the right indicate f Jse of log tables and calcula	y. wherever ne full marks ator is allowe	ecessary. d.	
A)	Mult 1)	<b>ple choice questions.</b> In paper chromatography tl a) Paper c) Water	he stationary b) O d) Ja	phase is rganic liquid ar	
	2)	is the most commo soap from oils, fats, fatty ac a) KOH c) NH4OH	only used alka cids. b) N d) N	ali in the manufacture laOH la <sub>2</sub> CO <sub>3</sub>	e of hard
	3)	The organic detergents of s group. a) -OSO3 <sup>-</sup> c) -SO3 <sup>-</sup>	sulphonate ty b) -{ d) F	vpe contain SO₃H &COO⁻	as active
	4)	Decolourisation of cane su a) activated carbon proc c) sulphitation process	gar is done b ess b) io d) <i>A</i>	by on exchange process All of these	;
	5)	1, 3 butadiene on treatmen a) Buna-S rubber c) Neoprene	t with styren b) E d) A	e gives 3una-N rubber All of these	
	6)	<ul> <li>Microwave assisted chemic</li> <li>a) occur at accelerated r</li> <li>b) are completed in shore</li> <li>c) produce reasonably g</li> <li>d) all of the above</li> </ul>	cal reactions eaction rates t time ood yields	, 3	
	7)	The silica gel used in colun a) adsorbent c) column support	nn chromato b) e d) n	graphy acts as ffluents one of these	<u> </u> .
	8)	Primarily the reagent SeO <sub>2</sub> a) Allylic c) both a and b	is used to ox b) b d) n	kidise the pos enzylic either a nor b	sition.
	9)	The ratio of alcohol and pe a) 1:4 c) 3:1	trol in power b) 1 d) 3	alcohol is : 1 : 2	

10) Vulcanisation is carried by heating rubber with \_\_\_\_\_.

a) ethene b) urea c) phenol d)

sulphur

**SLR-QA-253** 

### Seat No.

B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023

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## Q.1

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#### B) Definition.

- 1) Saponification
- 2) Thermosetting
- 3) Massecuite
- 4) Umpolung
- 5) Biocatalytic Reactions
- 6) Rf value

### Q.2 Solve any eight of the following:

- a) Write the uses of Teepol
- **b)** Define the terms.
  - 1) Elastomers
  - 2) Thermoplastics
- c) Draw a neat labelled block diagram of Gas chromatographic apparatus.
- d) What are raw materials used in the preparation of soap?
- e) Applications of phenol formaldehyde resins
- f) Write the byproducts of sugar industry.
- g) Write the synthesis and uses of NaBH4.
- h) Mention the advantages of Phase Transfer Catalyst (PTC).
- i) Define the terms.
  - 1) Rectified spirit
  - 2) Absolute alcohol
- j) What is the general principle of chromatography?

Q.3	A)	Attempt any two of the following:	10
		<ol> <li>Explain oxidation process by OsO4with mechanism and its applications.</li> </ol>	
		<ol> <li>What are ionic liquids? Name two examples. What are advantages?</li> <li>Describe crystallisation of sugar.</li> </ol>	
	B)	Write a note on use of Lithium Aluminium Hydride (LAH) in Reduction.	06
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) What are anionic detergents? Give suitable examples.</li> <li>2) Describe Ziegler Natta polymerisation in detail.</li> <li>3) What is chromatography? Classify chromatographic methods based on nature of mobile phase and stationary phase.</li> </ul>	08
Q.4	B)	Explain principle, experimental process and applications of Thin Layer Chromatography.	08
Q.5	Atte	mpt any two of the following.	16
	a)	With a neat labelled diagram discuss the hot process of manufacturing of soap.	
	b)	What is addition polymerisation? Discuss in detail the free radical mechanism of polymerisation of alkenes.	

c) What is meant by fermentation process? How is ethyl alcohol obtained from molasses?

16

Seat No.			Se	t P
В	.Sc. (Se	mester - VI) (New) (C BOTANY (\$ Nurserv, Gardening	CBCS) Examination: March/April-2023 Special Paper - XVI) g & Horticulture (19201608)	3
Day & Time:	Date: Fric 03:00 PM	ay, 23-06-2023 To 06:00 PM	Max. Mar	ks: 80
nstru	ctions: 1) 2) 3)	All questions are compu Draw neat diagrams and Figures to the right indica	llsory. I give equations wherever necessary. ate full marks.	
Q.1	<b>A) Mul</b> t 1)	<b>iple choice questions.</b> Which chemical is usec a) IBA c) Gibberellic acid	d for de-greening of fruit? b) Cytokinin d) Ethylene	10
	2)	Liver red is variety of _ a) Orchid c) Anthurium	 b) Aster d) Gladiolus	
	3)	Vegetative propagation a) Runners c) Slips	n of date palm is through b) Suckers d) Stolon	
	4)	Which among these is   a) Auxin c) Abscisic acid	plant growth retardant? b) Gibberellin d) Cytokinin	
	5)	Protray are related to _ a) Post Harvest c) Transport	 b) Processing d) Nursery	
	6)	India is known as home a) Vegetables c) Fruits	e of b) Spices d) Flowers	
	7)	Which among the giver a) Mumbai c) Delhi	n cities is known as garden city? b) Chandigarh d) Bengaluru	
	8)	The tag colour associat a) Golden yellow c) Purple	ted with certified seeds b) Blue d) White	
	9)	Germination of seed wh source a) Ovipary c) Asepsis	hile it still remains attached with the parent b) Apomixis d) Vivipary	
	10)	Queen of flowers is a) Orchid	 b) Gladiolus	

c) Anthurium d) Rose SLR-QA-255

# S N

# C

		SLR-QA-255						
	B)	Answer the following.061)What is manure?2)Enlist the methods of seed dormancy breaking.3)What are the three types of nurseries?4)Define pomology.5)Define olericulture.6)Define seed bank.						
Q.2	Solv a) b) c) d) e) f) g) h) i) j)	e any eight of the following:16What is sucker?Define biofertilizers.What are biopesticides?What is seed viability?Define seed technology.Define Patch-Budding.Define approach grafting.What is scion?Define tuber.What are cut flowers?						
Q.3	A)	Attempt any two of the following:101)Write the aims and objectives of the nursery and gardening.2)What is grafting? Describe different types of grafting.3)What is seed dormancy? Enlist the importance of seed dormancy.						
	B)	Write short note on the following.061)Genetic erosion2)Home gardening and its types						
Q.4	A)	Attempt any two of the following:101)What are Plant Growth regulators? Describe the role of PGR's in Horticulture.102)What is Bonsai? Describe in detail method of making Bonsai.103)What is weed? Describe in detail methods of weed control.10						
Q.4	B)	Describe/Explain/Solve the following061)Define gardening and types of gardening in detail studied by you.2)What is CAD? How CAD helps in landscaping?						
Q.5	Atte a) b) c)	mpt any two of the following.16What is layring? Describe different types of layring techniques.What is floriculture? Describe the importance of flower shows and exhibitions.What is seed? Describe the importance of seed testing and seed certification.						
Seat No.							Set	Ρ
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I	3.Sc	.(Sen	nester - V I	I) (New) (CBCS) I BOTANY (Special Biostatistics (1	Exan   Pap  920 <sup>-</sup>	nination: March/Aj er - XVI) I609)	pril-2023	
Day & Time:	Date 03:00	: Frida ) PM 1	ay, 23-06-2 Го 06:00 PM	023 M			Max. Marks	: 80
Instru	ictior	<b>is</b> : 1) / 2) [ 3) F	All question Draw neat la Figures to th	s are compulsory. abelled diagrams whe ne right indicate full m	erever arks.	necessary.		
Q.1	A)	<b>Multi</b> 1)	<b>ple choice</b> Interpretat a) biolog c) geolo	<b>questions.</b> ion of probler gical gical	n is ca b) d)	alled as biostatistics. mathematical algological		10
		2)	Formulatin a) math c) both	g and testing of hypo ematics a and b	thesis b) d)	s is an important functi statistics all of these	on of	
		3)	<i>Me</i> or Mdr a) Arithr c) Mode	n sign is used for netic mean	b) d)	Median Deviation		
		4)	Primary da a) Direc b) Indire c) Inves d) all the	ata are collected by m t personal investigation ct oral investigation tigation through ques e above	ethod on tionna	of		
		5)	Classificat a) differ c) indivi	ion is the process of o ent dual	dividin b) d)	g things into o similar single	classes.	
		6)	To collect a) quant c) both a	the data according to itative a and b	qualit b) d)	ty is called as qualitative none of these	classificatio	n.
		7)	Standard o a) Karl F c) Harve	deviation was first wo Pearson ey Goldstein	rked c b) d)	out by Milton Friedman Herman Hollerith		
		8)	Tabulation a) one c) three	is divided into	_ type b) d)	e. two four		
		9)	Sampling   a) two c) six	process can be group	ed un b) d)	der the categ five four	ories.	
		10)	The proces a) rando c) both a	ss of judgement samp om a and b	oling b b) d)	pelongs to san non- random all of these	npling.	

	В)	Give the definition of the following.(1)1)What is statistics?2)Define variables.3)Give the definition of secondary data.4)What is mean?5)Define probability.6)Give the definition of tabulation.	)6
Q.2	Solv a) b) c) d) e) f) y) h) j)	<i>x</i> <b>e any eight of the following:</b> Explain the sample. Write on Measurement. Give the discrete variable. Write the uses of biological sciences. Explain the primary data. Write on direct personal interview. Explain the source of note. Explain the source of note. Explain the continuous variables. Write a note on compound events. Give the character of $\chi^2$ test.	16
Q.3	A)	Attempt any two of the following:11)Write a note on Chi Square Test.2)Explain the compound and independent event.3)Describe the merit of standard deviation.	10
	B)	Write short notes any two of the following.(1)1)Standard Deviation2)Demerit of range3)Merit of Mode	)6
Q.4	A)	Attempt any two of the following:01)Explain the demerit of median.2)Write a note on arithmetic mean.3)Describe the deliberate sampling.	38
Q.4	B)	Attempt any one of the following.01)Explain the stratified and systematic sampling.2)Describe the classification of data.	38
Q.5	Atte a) b)	mpt any two of the following. Explain the method of collecting secondary data. Describe the use of statistics.	16

**c)** Write the basic principles studied by you.

y & Date: Friday, 2 ne: 03:00 PM To 0	23-06-2023 6:00 PM	·	, Max. Marks	: 80
tructions: 1) All q 2) Draw 3) Figui 4) Use	uestions are compulsory. a neat labelled diagrams whe res to the right indicate full m of log tables and calculator is	erever narks s allov	necessary. wed.	
A) Multiple 1) a) b) c) d)	<b>choice questions.</b> is a domestic fowl. A bird which lives in a part A bird of some foreign brea A bird kept for obtaining m A specific bird kept for bre	icular ed leat al eding	region nd eggs purposes only	10
2) tan a) c)	is the term used for bre ks and ponds. Vermiculture Horticulture	eding b) d)	of fish in specially constructed Agriculture Pisciculture	
3) c)	species produces silk o Attacus atlas Attacus ricini	of the b) d)	superior quality. Bombyx mori Antheraea assamensis	
4) c)	is not the economic imp Source of food. Good source of vitamins	bortan b) d)	ce of fish. Source of water Polishing agent	
5) The a) c)	e generic name of Apis Fish Lac insect	b) d)	Honey bee Prawn	
6) Hoi a) b) c) d)	ney is Nectar of flower Nectar stored in honey sac Nectar mixed with saliva a Nectar and Water sucked	c nd St by ho	ored in honey sac ney bee	
7) b) c) d)	is the method of transfer Transfer of DNA Transfer of whole individua Transfer of whole nucli All of above	ection al chro	for making transgenic animal. omosome	
8) Silk a)	t fiber is obtained from which	n stag b)	e of silkworm Larvae	

ZÓÒLOGY (Special Paper - XVI) Applied Zoology (19201630)

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### Q.1

- c) Cocoon d) Adult

## **SLR-QA-257**

Set Ρ B.Sc.(Semester - VI) (New) (CBCS) Examination: March/April-2023

- is given major importance in dairy farm management.
  a) Increase in yield and quality of milk
  b) Increase in the number of cattles
  c) Increase in the number of cows
  d) Increase in the number of baffaloes 9)

		<ul> <li>10) is not a important component of poultry farm management.</li> <li>a) Disease free breed</li> <li>b) Proper food</li> <li>c) Dirty condition</li> <li>d) Litter management</li> </ul>						
	B)	<ul> <li>Give one sentence answer.</li> <li>1) Which insect is used in lac culture?</li> <li>2) Define poultry.</li> <li>3) What is lac culture?</li> <li>4) What is pisiculture?</li> <li>5) Which country has the highest produce of silk?</li> <li>6) Which bee is called the Indian bee?</li> </ul>	06					
Q.2	Solv a) b) c) d) e) f) g) h) i)	ve any eight of the following: Give four application of biostatistics in fishery. State the function of honey bee. State the life cycle of lac insect. Give two examples of milk products and state it's preparation. State rearing methods of poultry. State the significance of transgenic animals. Define prawn culture. State the law and regulation fishery. Define fishing crafts.	16					
Q.3	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Describe the different types of honey bees in India.</li> <li>2) Describe the different types of diseases of silkworm.</li> <li>3) Describe the rearing method of poultry.</li> </ul>						
	B)	Short Note1)Types of silk	06					
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Describe the incubation and hatching of eggs.</li> <li>2) Explain the depletion of fish resources.</li> <li>3) Describe the importance of bee colonies in crop pollination.</li> </ul>	08					
Q.4	B)	Explain the different types of method of beekeeping.	08					
Q.5	Atte a) b) c)	Implication and remote sensing of GIS fisheries.       16         Explain Sericulture.       Describe poultry breeds.						

Seat No.				Set P
B.Sc.	(Ser	nester - VI) (New) (CBCS) MATHEMATICS (Spe Integral Calculus	Exa ecial	mination: March/April-2023 Paper - XVI) 201638-A)
Day & Date	: Frid	ay, 23-06-2023	(102	Max. Marks: 80
Instruction	<b>is</b> : 1)	All questions are compulsory.		
	2)   3)   4)	Draw neat labelled diagrams whe Figures to the right indicate full n Use of log tables and calculator	ereve narks is allo	er necessary. Sowed.
Q.1 A)	Cho	ose the correct alternative for	each	of the following. 10
	1)	Integral $\int_{a}^{b} f(x) dx$ is said to be	e imp	roper if
		a) both the limits are finite b) $f(x)$ is bounded		
		c) one or both the limit of integration of the compared of th	egrat	ion are infinite
		d) $f(x)$ is not bounded in [a,	<i>b</i> ]	
	2)	$\int_{0}^{1} x^{m-1} (1-x)^{n-1} dx  \text{is converse}$	rgen	t when
		a) $m > 0, n > 0$ c) $m > 0$	b) d)	n > 0 m > 1 n > 1
	3)	$\int_{1}^{\infty} \frac{dx}{x}  \text{is } \underline{\qquad}.$		
		<sup>1</sup> a) convergent c) oscillatory	b) d)	divergent conditionally convergent
	4)	The integral $\int_0^\infty \frac{x^{2n}}{1+x^{2m}} dx$ is con	verg	ent if
		a) $n < m$	b)	n > m $n \neq m$
	5)	The value of $\int_{-1}^{1} x^3 (1-x)^2 dx$ i	u) c	$n \neq m$
	,	a) $\frac{1}{1}$	b)	<u> </u>
		<b>C)</b> $\frac{1}{1}$	d)	60 <u>1</u>
	6)	$\int_{0}^{\pi/2} \sin^3 x \cos^5 x  dx =$		300
	,	a) $\frac{1}{2}$	- <sup>.</sup> b)	1
		$^{12}$	d)	10 1
	7)	$\frac{-7}{24}$	~, -	16
	1)	a) 1 $p  unlet p = p = p$	=_ b)	$\frac{\pi}{2}$
		c) $\frac{\pi}{\sin p\pi}$	d)	$p\pi/\sin p\pi$

Q.2

Q.3

State and prove Abel's test for the improper integral of a product of two b) 06 function.

## Attempt any two of the following: 1) Solve $\int_0^2 \frac{dx}{(2x-x^2)}$ Q.4 A)

- 2)
- Show that  $\beta(m, n) = \boxed{m \quad n}$   $\boxed{m+n}$ Find by using the double integration the area of the circle  $x^2 + y^2 = a^2$ 3)
- Show that  $\sqrt{\pi}$   $\boxed{2m}$   $\boxed{=2^{2m-1}}$   $\boxed{m}$   $\boxed{m+\frac{1}{2}}$ B)

#### Attempt any two of the following. Q.5

- If f and g are two positive functions [a, b] and x = a is singular point such a) that  $\lim_{x \to a} \frac{f(x)}{g(x)} = L$  where *L* is a nonzero finite number then show that  $\int_{a}^{b} f(x) dx$  and  $\int_{a}^{b} g(x) dx$  behave alike.
- Using the transformations  $\frac{x^2}{y} = U$ ,  $\frac{y^2}{x} = V$  find  $\iint x^2 y^2 dx dy$  over the area bounded by four parabolas  $y^2 = 4x$ ,  $y^2 = 8x$   $x^2 = 4y$ ,  $x^2 8y$ b)

1) Evaluate  $\boxed{-1/2}$   $\boxed{-3/2}$ 

2) Prove that 
$$\beta(m,n) = \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx$$

16

Seat No.							Set	Ρ
В	S.Sc.	(Ser	nester - V MAT Pı	′I) (New) (CBCS) THEMATICS (Spe rogramming in C	Exar cial (192	nination: March/A Paper - XVI) 01638-B)	April-2023	
Day & Time:	Date 03:00	: Frida ) PM T	ау, 23-06-20 Го 06:00 PN	)23 /	-		Max. Marks	: 80
Instru	ction	i <b>s</b> : 1) / 2)	All question Figures to t	s are compulsory. he right indicate full r	narks			
Q.1	A)	Seleo 1)	<b>ct the corre</b> Every prog a) Color c) Comr	e <b>ct alternative for ea</b> ram statement in C μ na	orogra b) b) d)	the following. m must end with a Semi colon None of these	·	10
		2)	Who is fath a) Bjarn c) Denn	ner of C language? e Stroustrup is Ritchie	b) d)	James A Gosling None of these		
		3)	are a) Keyw c) Varial	e only in lower case l ord bles	etters b) d)	Identifiers Constant		
		4)	The charac a) New I c) Horize	cter '\n' means ine ontal line	 b) d)	Vertical line Back space		
		5)	char data t a) 01 c) 03	ype requires	bytes b) d)	of memory. 02 04		
		6)	"Is not equ a) <= c) !=	al to" is the meaning	of op b) d)	erator >= ==		
		7)	Arithmetic a) Right c) Top to	expression is evalua to Left o Bottom	ted fro b) d)	om Left to Right Bottom to Top		
		8)	a) print f c) getch	andard input functior () ()	n in C b) d)	language. scan f () None of these		
		9)	a) switch c) goto	the jumping statemer	nt. b) d)	while None of these		
		10)	is th function. a) int c) null	e return type of func	, tion if b) d)	no value returned from void float	m the	

	B)	Fill in the blanks.	06			
	,	1) Standard ANSI C recognizes number keywords.				
		2) The meaning of the operator "&&" is				
		3) is pictorial representation of algorithm.				
		4) One dimensional array is also called as				
		5) An array index starts with number				
		6) is the header file contains maths function.				
02	۸ ++ <i>c</i>	and any eight of the following:	16			
Q.2	Alle	What does int main (void) mean?	10			
	a) b)	If $x=37$ and $y=5$ the integer variable then find $x/y$ and $x^{0}/y$				
	D)	M bat is keyword? List some keyword in C				
	d)	Draw a Block diagram of C-Tokens				
	۵) ۵)	Explain the size of operator				
	f)	Explain Ritwise operator				
	a)	Write note on the While Statement				
	9) h)	Explain for statement				
	i)	What is array? List the types of arrays.				
	i)	Define Backward jump of goto statement and write its syntax.				
	3/	, , , , , , , , , , , , , , , , , , ,				
Q.3	A)	Attempt any two of the following:	10			
		<ol> <li>Describe the term basic structure of C-programs.</li> </ol>				
		<ol><li>Explain increment and decrement operators.</li></ol>				
		3) Explain the term for matted outputs.				
	B)	Discuss two-dimensional array with example.	06			
04	۸)	Attempt any two of the following:	08			
Q.4	A)	1) Write in detail History of C	00			
		2) Give full note on the switch statement				
		3) Write a programme to find even number from 1 to 10 by using				
		do while loop.				
	B)	Discuss in detail C-data types.	08			
	,	- 71				
Q.5	Atte	empt any two of the following.	16			
	a)	Explain arithmetic and relational operators.				
	b)	b) Discuss the different forms of if statement in details.				

**b)** Discuss the different forms of if statement in details. **c)** Write a C programme to find the solution of equation  $ax^2 + by + c = 0, a \neq 0$ 

SLR-QA-26	50
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Seat	
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## B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 STATISTICS (Special Paper- XVI) Quality Management and Reliability (19201650)

Day & Date: Friday, 23-06-2023 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

Set

Instructions: 1) All questions are compulsory.

a) P-charts

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicate full marks
- 4) Use of log tables and calculator is allowed.

#### Multiple choice questions. Q.1 A)

a) 4

c) 3

Which charts are particularly more effective for sample size One? 1)

b)

C-charts

- c) X & S chart **CUSUM Chart** d)
- 2) Deming's philosophy had principles.
  - a) 10 b) 12 c) 14 20 d)

#### 3) EWMA Control charts first introduced by

- a) Lucas Saccucci b)
- c) Shewarts d) Roberts

#### 4) What is the full form of E in the EWMA chart?

- a) Exponentially b) Experimentally
- c) Exactly Estimated d)

#### 5) Average Sample number for single sampling plan

- a) N b) n
  - c) N-n d) None of these
- In acceptance sampling, when there is a finite probability that the lot 6) may be rejected even if quality is actually good is called .
  - a) producer's risk b) Consumer's risk c) both a) and b)
    - d) None of these

### The structure function of a binary system S takes any one of \_\_\_\_\_ 7) possible values.

- b) 2
- d) None of these
- EWMA charts are better than Shewhart control charts in detecting 8) the \_\_\_\_\_ shift.
  - a) Large process b) Medium process
  - c) Small process Every process d)

#### 9) When we accept the lot in single sampling plan a) d < c

- b) d < c
- d) None of these c) d > c

#### 10) DMAIC is often associated with

- a) Acceptance sampling b) Kaizen board
- c) Five-Sigma d) Six -Sigma

10

Ρ

		<ol> <li>Range of <i>λ</i> in EWMA expression.</li> <li>Number of dimensions of quality</li> <li>AOQ stands for</li> <li>The structure function of a binary system S takes any one of possible values.</li> <li>A set of components whose functioning ensures the functioning of the system is known as</li> </ol>						
Q.2	Solv a) b) c) d) e) f) g) h) i) j)	ve any Eight of the following (Two marks each) What is the meaning of quality? What is ATI? State magnificent tools of statistical Process Control (SPC). Define 100% inspection. Define Series System. Define Consumer's risk. Explain scatter plot or diagram in short. Define LTPD. Define sample inspection. Define a Structure function of a system of n components.	any Eight of the following (Two marks each)16Vhat is the meaning of quality?Vhat is ATI?State magnificent tools of statistical Process Control (SPC).State magnificent tools of statistical Process Control (SPC).Define 100% inspection.State System.Define Consumer's risk.State plot or diagram in short.Define LTPD.Structure function of a system of n components.					
Q.3	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Write a note on magnificent tool of quality- Control Chart.</li> <li>2) State the control limits of EWMA control chart for monitoring process mean.</li> <li>3) Show that hazard rate of a series system of components having independent life times is summation of component hazard rates</li> </ul>	10					
	B)	In a single sampling plan if sample size $n = 10$ , acceptance number $C = 2$ , and lot quality $p = 0.08$ , find the probability of accepting the lot by using binomial distribution.	06					
Q.4	A)	<ol> <li>Attempt any two of the following:</li> <li>Write the advantages of Accepting sampling.</li> <li>State the control limits of EWMA control chart for monitoring process mean.</li> <li>Find the structure function of a parallel system of n components.</li> </ol>	08					
	B)	Explain the Tabular CUSUM for monitoring the process mean.	80					
Q.5	Atte a) b) c)	<b>mpt any two of the following.</b> Write a note on magnificent tool of quality- Cause and effect diagram. Explain Double Sampling plan. Find the failure rate function (hazard rate) for a 2-out-of-3 system, where components are independent and life time $T_i$ , of $i^{th}$ component is exponentially distributed with mean 100 hrs, for $i = 1,2,3$ .	16					

## B) Fill in the Blanks.

- TQM stands for \_\_\_\_\_.
   Range of *i* in EW/MA expression

## C

06

## 6

Sea	t				Set	Ρ
NO. R	Sc /	Som	ostor - VI) (Now) (CBCS		vamination: March/April-2023	2
0.	00. (	Cen	Statistics (Spec Time Series Anal	ial I ysis	Paper- XVI) s (19201651)	•
Day a Time	& Dat : 03:0	e: Fri 0 PM	day, 23-06-2023 To 06:00 PM		Max. Marks:	80
Instr	uctio	<b>ns</b> : 1) 2	) All questions are compulsory ) Figures to the right indicate	/. full r	narks.	
Q.1	A)	Cho 1)	ose the correct alternative f Value of a in the trend line Y a) Always negative c) Always zero	rom = α	<pre>the following. a + bX is b) Always positive d) Can be negative or positive</pre>	1(
		2)	The long term movement of a) Trend c) seasonal variation	time	-series is b) cyclical variation d) Noise	
		3)	The data is defined as estimated seasonal compone a) Seasonalised c) Deseasonalised	s the ent r b) d)	original time series data with the emoved. Seasonal None of these	
		4)	<ul><li>Increase in the number of parseason is</li><li>a) Secular trend</li><li>c) Seasonal variation</li></ul>	tient b) d)	s in the hospital during rainy Irregular variation Cyclical variation	
		5)	There are component a) One c) Three	s in b) d)	the time series. Two Four	
		6)	The loss of crops due to hea a) Secular trend c) Cyclical variations	vy fl b) d)	ood is an example of Seasonal movements Irregular variation	
		7)	A trend is the better fitted tre residuals is a) Maximum c) Positive	nd fo b) d)	or which the sum of squares of Minimum Negative	
		8)	An orderly set of data arrang occurrence is called	ed in	n accordance with their time of	
			<ul><li>a) Animmetic series</li><li>c) Geometric series</li></ul>	(a (b	Time series	
		9)	Moving averages remove the a) the average is weighted b) the period is even	е сус	lical variation if	

- c) the period is oddd) the period is same as that of cycle

10

06

16

10

06

**08** 

80

16

10)	Exponentially Weighted Moving Averages (EWMA) method is also
	called as

- a) Method of Exponentiation b) Exponential smoothing
  - d) None of these
- c) Progressive averages

#### Fill in the blank. B)

- The fitted trendline is said to be best, if the sum of squares of 1) residuals is
- In time series analysis, the independent variable is 2)
- Link relative method is also called as 3)
- If for a time series process, its mean, variance and autocorrelation 4) structure do not change over time, then it is called as .
- The longform of MA model is \_\_\_\_\_. 5)
- The longform of AR model is . 6)

## Q.2 Solve any Eight of the following.

- **1)** Define MA(2) model.
- 2) State multiplicative model of a time series. Also describe every term involved in it.
- 3) How many components are there for a time series? List down all components.
- 4) Define auto-correlation function.
- 5) When do we call a time series as a stationary time series?
- 6) Define AR(1) model.
- 7) Define seasonal variation. Also give examples of this kind of variation.
- 8) What are the merits of moving average method?
- 9) Define trend of a time series.
- **10)** What are the demerits of least square method?

Q.3	A)	Attempt any Two of the following.
-----	----	-----------------------------------

- 1) Write a note on method of progressive averages.
- Discuss link relative method. 2)
- Describe run test for checking randomness of a series against 3) trend and seasonality.

#### B) Attempt the following.

Discuss utility of time series analysis.

#### Q.4 A) Attempt any Two of the following

- Explain the difference between cyclic variation and seasonal 1) variation.
- 2) Describe auto-covariance function. Also state its properties.
- 3) Discuss ratio to moving average method.

### B) Attempt the following.

Describe exponential smoothing.

#### Q.5 Attempt any Two of the following.

- Discuss merits and demerits of ratio to moving average method. a)
- Describe least square method for trend estimation. b)
- Write down the estimation procedure for parameters of MA(2) process. C)

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Max. Marks: 80

## B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 GEOLOGY (Special Paper - XVI) Geochemistry (19201655)

Day & Date: Friday, 23-06-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figure to right indicate full marks.
- 4) Use of log table or calculator is allowed.

### Q.1 A) Choose the correct alternative from the option.

- According to the cosmic abundance which of the following element is abundant \_\_\_\_\_.
  - a) Iron \_\_\_\_\_ b) Carbon
  - c) Silicon d) Hydrogen
- 2) Which of the following radioactive element has half life of 5730 years?
  - a) 235Uranium
- b) Thorium d) 16O
- 3) Who had introduced the term siderophile, chalcophile, lithophile, and atmophile?
  - a) Goldschmidt (1923)

c) 14C

4)

- b) Clarke (1924)d) Cameron (1737)
- c) Ringwood (1975)
- Chromium is strongly lithophile element in earth's crust but it is

found as chalcophile in some meteorites because of \_\_\_\_\_.

- a) Oxygen rich
- b) Oxygen deficiency
- c) Hydrogen deficiency d) Carbon deficiency
- 5) The stony meteorite is composed of: \_\_\_\_\_
  - a) rocky material b) Iron
  - c) Nickel d) all of them
- 6) Resembling of Tektites is \_\_\_\_
  - a) The Obsidian b) The basalt
  - c) The rhyolites d) Thegranodiorite
- 7) An alpha particle is same as?
  - a) A helium nucleus c) A proton
- b) A hydrogen nucleus
- d) A positron

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16

## **SLR-QA-262**

- 8) Elements are those of the B subgroup whose ions have 18-electron in the outer shell are \_\_\_\_\_.
  - a) Siderophile b) Chalcophile
  - c) Lithophile d) Atmosphere
- 9) Geochemical processes operate only because of \_\_\_\_\_
  - a) Presence of various chemical on the earth's crust.
  - b) Water circulation system.
  - c) A flow of energy from a higher to a lower potential or intensify.

b) Shale

d) High pressure in the crust

### 10) The upper crust of the earth mainly consists of \_\_\_\_\_.

- a) Sandstone c) Limestone
- d) Igneous and metamorphic rocks

### B) Define the following.

- 1) Isotone
- 2) Secular change
- 3) Solid solution
- 4) Colloids
- 5) Captured
- 6) Radiogenic isotopes

### Q.2 Solve any Eight of the following.

- List the four most abundant elements in average composition of igneous rocks.
- 2) Give the any two examples of isomorphism.
- 3) List the types of radioactivity.
- 4) Name the types of colloidal system.
- 5) Name the trace elements in igneous rocks.
- 6) List the types of chemical bonding.
- 7) Name the first series transition metals.
- 8) Give the examples of hydrophilic sol.
- **9)** Name kinds of solid solution based on the mechanism that causes variation in chemical composition.
- **10)** Give the example of covalent bonding.

# Q.3 A) Attempt any two of the following: 1) Write note on Stony iron meteorites.

- 2) Discuss in detail the geological applications of Isotopes.
- 3) Explain in brief the geochemical periodic table.

### B) Write short note on evolution of earth. 06

Q.4	A)	<ul> <li>A) Attempt any Two of the following: <ol> <li>Discuss in short Ur-Th-Pb method of dating the geologic event.</li> <li>Write short note on Polymorphism with suitable example.</li> <li>Explain in brief cosmic abundance of elements with suitable diagram.</li> </ol> </li> <li>B) Define stable isotopes. Explain in brief the types of stable isotopes.</li> </ul>				
	B)					
Q.5	Atte a) b) c)	<b>mpt any two of the following:</b> Discuss in short the average chemical composition of igneous rocks. Explain in details the Goldsmith's classification of elements. Discuss in brief the different types of radioactivity. Add note on radioactive decay.	16			

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## B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 MICROBIOLOGY (Special Paper - XVI) Environmental Microbiology (19201663)

Day & Date: Friday, 23-06-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Use of log table and calculator is allowed.

4) Draw neat labelled diagrams whenever necessary.

# Q.1 A) Choose the correct alternative from the option. 1) The process of removal of pollutants with the use of microorganisms

- ine process or removal of pollutants with the use of microorgani is called \_\_\_\_\_.
   a) eutrophication b) bioremediation
  - c) oxidation d)
    - d) pollution
- 2) Sludge digester produces \_\_\_\_\_ as major product.
  - a) NH3 b) CH4
  - c) press mud d) spent wash
- 3) \_\_\_\_\_ is the strong oxidizing agent used in COD determination.
  - a) FAS b) KMnO4
  - c) K2Cr2O7 d) FeSO4
- 4) The waste water generated by \_\_\_\_\_ industry is called spent wash.
  - a) Textile b) Paper and pulp
  - c) Cyanide d) Distillery

5) Sulfolobus acidocaldarius is an example of extreme \_\_\_\_\_

- a) Acidophile b) Alkaliphile
- c) Halophile d) Thermophile
- 6) \_\_\_\_\_ elements act as key elements in eutrophication.
  - a) N&C b) N&P c) N&K d) P&C

7) Andersen sampler is used to collect \_\_\_\_\_ sample.

- a) Water b) Milk
- c) Sewage d) Air
- 8) One carbon credit corresponds to 1 metric ton of \_\_\_\_\_ prevented from entering the atmosphere.
  - a) Sulfur oxide b) carbon dioxide
  - c) Nitrogen d) Oxygen
- The process of dissolving metals from ore bearing rocks using microorganisms is called \_\_\_\_\_.
  - a) Bioleaching b) Bioremediation
  - c) Bioaccumulation d) Biodegradation
- 10) \_\_\_\_\_ is the waste generated by dairy industry.
  - a) Molassesb) spent washc) Wheyd) SWL



Max. Marks: 80

	B)	<ul> <li>Answer the following questions.</li> <li>1) In Primary oil recovery % oil is recovered.</li> <li>2) Name the commercial methods used for bioleaching.</li> <li>3) List two important organisms involved in bioleaching process.</li> <li>4) Xanthan gum produced by microorganisms is used for</li> <li>5) In B.O.D test liberated is titrated against sodium thiosulphate.</li> <li>6) Name the organism responsible for Zoogloeal film formation.</li> </ul>	06
Q.2	Wrii a) b) c) d) e) f) g) h) i)	te any eight of the following. Define bioremediation. Write classification of lakes on the basis of nutrient level. Give characteristics of Distillery industry waste. Define Alkali philes with examples. Define B.O.D. and C.O.D. Explain carbon sequestration. Significance of microorganisms in air. Define equalization. Name different committees involved in regulatory framework of biosafety in India. Explain sedimentation step in waste water treatment.	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Write about characteristics of marine organisms.</li> <li>2) Explain Sludge digestion.</li> <li>3) Give flow sheet of treatment of paper and pulp industry waste.</li> </ul>	08
	B)	Give an account of general characteristics and importance of extremophiles-thermophiles, Psychrophiles and acidophiles.	80
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Write in detail Microbially enhanced oil recovery (MEOR).</li> <li>2) Write on characteristic and treatment of textile industry waste.</li> <li>3) Describe various methods of sampling of air.</li> </ul>	10
	B)	Write on sources, effects and control of 'Eutrophication.'	06
Q.5	Atte a) b)	empt any two of the following. Explain 'Bioleaching' with special reference to copper leaching. Write an essay on biological safety.	16

c) Write in detail about secondary treatment of sewage.

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Instru	uctio	ns: 1) 2) 3) 4)	All q Drav Figu Drav	uestions are compulsory. w neat labelled diagram wh ires to right indicate full ma w neat labelled diagrams w	erever rks. heneve	necessary. er necessary.
Q.1	A)	Selec 1)	ct the A sa a) b) c) d)	e correct alternative from Itellite is kept in the orbit by Centripetal force and cent Magnetic force and Centri Centripetal force and grav Electric force and gravitati	the for baland rifugal petal for itational onal for	Ilowing. cing between two forces force orce al force orce
		2)	The a) c)	channel width of transmitte 60 KHz 30 MHz	er in ce b) d)	ll phone system is 30 KHz 60 MHz
		3)	Fast a) c)	est LAN topology is Ring Star	 b) d)	Bus Square
		4)	Whe a) c)	en speed of radio signal is k of target. altitude range	nown, b) d)	radar is used to determine direction position
		5)	Pho a) c)	to diode operated with forward forward and reverse	bias b) d)	s. reverse None
		6)	Eart a) b) c) d)	h station is used To control satellite position To control TV satellite sigr To transmit TV signal To receive the TV signal	n in ge nal	ostationary
		7)	Cell a) c)	ular phone uses ope simplex full duplex	eration. b) d)	duplex triplex
		8)	Star a) c)	t and stop bit are used with Synchronous Random	b) d)	_data. Asynchronous None
		9)	Perr a) c)	nanent bond in optical fiber Joinder Splicing	is b) d)	Binder Connector

## Seat No.

## B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2023 ELECTRONICS (Special Paper- XVI) Modern Communication Systems (19201684)

Day & Date: Friday, 23-06-2023 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

10

# SLR-QA-265

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		<ul> <li>10) A micro wave diode with N type silicon cathode and metal anode forming junction is Diode.</li> <li>a) Gunn</li> <li>b) Schottky</li> <li>c) Tunnel</li> <li>d) varactor</li> </ul>	
	B)	<ul> <li>Answer in one sentence.</li> <li>1) What is transponder?</li> <li>2) What are the types of splicing techniques used in optical fiber?</li> <li>3) Explain the function of MTSO in cellular system.</li> <li>4) Define URL and HTTP.</li> <li>5) What is RADAR? What are its types?</li> <li>6) Define domestic and global satellite.</li> </ul>	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	<ul> <li>ve any eight of the following.</li> <li>Define baud rate and power calculation used in optical fiber communication.</li> <li>Give any two advantages and disadvantages of micro wave.</li> <li>What are different data codes used in digital communication.</li> <li>What is roll of control unit in cell phone?</li> <li>What is satellite communication?</li> <li>List any four applications of optical fiber communication.</li> <li>What is cavity resonator?</li> <li>What is computer networking? What are its types.</li> <li>List the applications of internet communication.</li> <li>What is roll of duplexer in satellite earth station?</li> </ul>	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) What is network topology? What are its types? Explain any one of the topologies.</li> <li>2) What is optical fiber? Explain its types.</li> <li>3) Explain cellular communication system.</li> </ul>	10
	B)	Explanation transmission lines used for micro wave communication.	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) How satellite orbit is selected?</li> <li>2) Explain serial and parallel communication used in digital data communication.</li> <li>3) Explain the need of light for optical communication.</li> </ul>	08
	B)	What is modem? What are its types? Explain QPSK modem with necessary block diagram.	08
Q.5	Atte a) b)	<b>mpt any Two of the following.</b> Explain Klystron tube used for micro wave communication. Explain cell phone with necessary block diagram.	16

c) Explain the applications of satellite communication.

E	3.Sc	. (Sei	mest	er - VI) (New) (CBCS) COMPUTER SCIENO Advanced Pythor	Exar CE (P n (19	nination: March/April-2023 Paper- XVII) 201671)	
Day 8 Time:	Date 03:0	e: Frid 0 PM	lay, 23 To 06	8-06-2023 :00 PM		Max. Marks:	80
Instru	uctio	<b>ns:</b> 1) 2)	All qu Figure	estions are compulsory. es to the right indicate full ı	narks		
Q.1	A)	<b>Choo</b> 1)	<b>ose th</b> Which fields' a) c)	e correct alternatives. n of the following widget is ? Input Accept	used b) d)	in the GUI to construct input Entry Scanner	10
		2)	a) c)	that can contain text and Label Button	d can b) d)	perform an action when clicked. Textbox Frame	
		3)	Which the da a) c)	n of the following argument atabase connectivity? Username Database name	b) d)	quired to perform connection in Password All of these	
		4)	What progra a) c)	provides two-way commur ams in a network. Socket Port	nicatic b) d)	on between two different HTTP Protocol	
		5)	Whicł a) c)	n of the following is not the fg bd	prope b) d)	erty of Button class? bg pd	
		6)	Whicł reque a) c)	n method of the socket mo ests from a client socket fro Socket.acceptSocket Socket.accept	dule a m and b) d)	llows a server socket to accept other host? Socket.SendTo Accept.socket	
		7)	Whicł a) c)	n of the following is not par Model Task	t of th b) d)	e Django architecture? View Template	
		8)	a) c)	_ method run the SQL que execute() executeNonQuery	ry and b) d)	l return the result. executeQuery() runQuery()	
		9)	Whicł a) c)	n of the following is the adv High scalability Portability	vantag b) d)	je of Django framework? Rapid web development All of these	
		10)	a) c)	_ is used as a container. Canvas both a and b	b) d)	Frame None of these	

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## 06

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### B) Fill in the blanks.

- 1) \_\_\_\_\_ is a standard GUI library for Python using which we can build desktop apps.
- 2) \_\_\_\_\_ widget is used in the GUI to draw shapes.
- 3) \_\_\_\_\_ is used to execute the SQL statements in Python.
- 4) In Python \_\_\_\_\_ is a web framework that allows to quickly create efficient web pages.
- 5) \_\_\_\_\_ python library is used to send and receive data over HTTP.
- 6) \_\_\_\_\_ allows Python programs to access MySQL databases.

### Q.2 Answer any Eight of the following.

- a) Give the advantages of MySQL connector in python.
- **b)** What is spinbox in tkinter?
- c) Give the use listbox widget in tkinter.
- d) Define migrate. Write a command to migrate the Django app.
- e) Give the benefits of Django framework.
- f) Define Socket? Write a syntax to create socket object.
- g) Define URL? Give its example.
- h) Define XML? Give syntax to declare XML tag.
- i) Define Entry widget in tkinter.
- **j)** What is URL routing in Django?

### Q.3 A) Attempt any Two of the following.

- 1) Explain any two Python Containers.
- 2) Explain the tkinter event and bindings with example.
- 3) Design a GUI application to draw line, oval, rectangle and polygon using Canvas.

### B) Write note on.

Architecture of Django.

### Q.4 A) Attempt any Two of the following.

- 1) Explain the different Layout management methods in GUI Programming.
- 2) Write a Python GUI application to add and delete a record from student table using stored procedure.
- 3) Explain the following widgets in detail.
  - i) Label
  - ii) Checkbutton
  - iii) Radiobutton

### Q.5 Attempt any Two of the following.

- a) Explain different steps to connect python application to the database.
- **b)** Design a Django application to display 'Hello World!' on Web Page.
- c) Explain the different steps for creation of client Socket using TCP/IP.

B.Sc	:. (Sei	mester - VI) (New) (CBCS) Software Testing	Exa (1920	mination: March/April-2023 01671-01)							
& Dat e: 03:0	e: Satu 00 PM	urday, 01-07-2023 To 06:00 PM		Max. Marks	: 80						
ructio	ns: 1) 2)	All questions are compulsory. Figures to the right indicate full	marks								
A)	<b>Cho</b> 1)	<ul> <li>Choose the correct alternatives.</li> <li>1) Which of the following is not a valid phase of SDLC (Software Development Life Cycle)?</li> </ul>									
		<ul><li>a) Requirement Phase</li><li>c) Abstraction Phase</li></ul>	d)	Design Phase							
	2)	White boxtesting is related to th a) True	ne boi b)	undary value analysis. False							
	3)	Which of the following is not a a) Testing Planning c) Test Design	part o b) d)	f Software Testing Life Cycle? Requirement Gathering Testing Closure							
	4)	Bugs are those software mistal phase.	kes th	at occurred during the coding							
	5)	a) True	b)	False							
	5)	<ul><li>a) Regression Testing</li><li>c) Unit Testing</li></ul>	b) d)	Adhoc Testing Integration Testing							
	6)	Which of the following testing is a) Structural testing c) Both a and b	s also b) d)	known as white-box testing? Design based testing None of these							
	7)	System testing is a a) Black box testing c) Grey box testing	b) d)	White box testing None of these							
	8)	Regression testing can be used a program, but often also for tra a) True	d not o acking b)	only for testing the correctness of the quality of its output. False							
	9)	Performance testing explores s simplified to a) Speed c) Stability	b) d)	ll system qualities, that can be Capacity All of these							
	10)	Which of the following is a part a) Schedule c) Both a and b	of the b) d)	e Test Plan? Risk None of these							

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Day Time

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## Q.1

SLR-QA-267 Set P

	B)	<ul> <li>Fill in the blank.</li> <li>1) testing is related to black-box testing.</li> <li>2) SDLC stands for</li> <li>3) White box testing techniques are</li> <li>4) "V" model is testing model.</li> <li>5) The key objective of Integration testing is</li> <li>6) is a functional testing.</li> </ul>	06
Q.2	Ans a) b) c) d) e) f) g) h) i) j)	wer any eight of the following. Give any two use of software testing. What is soak testing? What is the difference between a Bug and a Defect? Give the meaning of Boundary Value Analysis. Define stress testing. Give the advantages of Spiral Model. Define prototyping. Characteristics of Good Test Case. Disadvantages of White box testing. Advantages of black box testing.	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain the Hybrid Model.</li> <li>2) Explain the concept of Defect life cycle.</li> <li>3) Explain bottom-up integration strategies.</li> </ul>	10
	B)	<ul><li>Write short note on.</li><li>1) System Testing</li><li>2) Top Down Incremental Integration Testing</li></ul>	06
Q.4	A)	<ul> <li>Answer any Two of the following.</li> <li>1) What is the difference between a Test Plan and a Use Case?</li> <li>2) Explain in detail Adhoc testing.</li> <li>3) Explain a testing life cycle with illustration.</li> </ul>	08
	B)	Explain Errors, Faults, and Failures in the process of programming and testing with the diagram.	08
Q.5	Atte a) b)	<b>mpt any two of the following.</b> Explain the phases of fundamental test process. What is software testing? Why it is important in SDLC?	16

c) Explain in detail Waterfall model.