SLR-DB-1

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ENGLISH (COMPULSORY)
Communication Skill (BT1101)

Day & Date: Monday, 20-11-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

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

Q.1 Choose the correct alternative from the given options. **08**

1) Where did Gandhi meet his missionary friends?
   a) Orissa b) Vellore
   c) Madras d) Panji

2) What was the school attached to?
   a) Bus stand b) Hospital
   c) Temple d) Library

3) According to Rabindranath Tagore what is necessary to win freedom?
   a) Patience b) Friends
   c) Allies d) Wars

4) Who sang praises for the flowers?
   a) Bard b) Oracle
   c) Saints d) Birds

5) How does the father discover the son in his room?
   a) Sleeping b) Sobbing
   c) Playing d) Reading

6) What is the suitable prefix of the word – Legal?
   a) unlegal b) illegal
   c) inlegal d) delegal

7) What is the suitable suffix of the word – Manage?
   a) Manage b) Management
   c) ill manage d) Pre manage

8) Which of the following is used to join sentences, clauses and words?
   a) adverbs b) interjection
   c) conjunction d) verb

Q.2 Write the answer in short. (Any Four) **12**

a) What is the context of Gandhi's talk on religion?
b) What kind of relationship did the author have with his grandmother?
c) Discuss the poet's state of mind in the poem - Let Me Not Pray to be Sheltered from Danger.
d) Discuss the theme of the poem - The Lotus.
e) Define the ending of the poem - The Toys in your words.
f) What is the significance of the Sparrows in the lesson - The Portrait of a Lady'?

Q.3 Answer the following questions. (Any One) **10**

a) Define what is Communication and the process of Communication?

OR

b) Write in detail about the channels of Communication.

Q.4 Write a detail note on various intrapersonal skills? **10**

SLR-DB-2

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
CHEMISTRY (Paper - I) (BT1102)

Day & Date: Tuesday, 21-11-2023 Max. Marks: 40
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 non-storage calculator is allowed.

Q.1 Multiple Choice Questions. **08**

1) Range of pH is _____.
a) 0-14 b) 1-14
c) 14 d) above 14

2) In Sp 2 hybridization, bond angle is _____.
a) $120°$ b) $60°$
c) $109°$ d) $180°$

3) In first order reaction, the rate of reaction depends upon the _____ power of concentration of reactants.
a) first b) second
c) zero d) fourth

4) The Henderson Hasselbalch equation explains the relationship between _____.
a) pH and pOH b) pH and logKa
c) pH and pKa d) pOH and pKa

5) In periodic table, the horizontal rows are called periods and the vertical columns are known as the _____.
a) groups b) class
c) element d) atom

6) Methane molecule is _____ hybridized.
a) sp2 b) sp3
c) sp1 d) sp4

7) The number of moles of the solute per kilogram of the solvent is called _____.
a) molality b) molarity
c) mole fraction d) mass percentage

8) _____ is not colligative property.
a) Osmotic pressure b) Elevation in B.P.
c) Vapour pressure d) Depression in freezing point

Q.2 Answer of the following. (Any Four) **08**

a) Name any four non-covalent interactions that occur between biological molecules.
b) How many sigma bonds and pi bonds are there in C_2H_2?
c) What is the difference between orbit and orbital?
d) What is the Henderson-Hasselbalch Equation?
e) Describe noble gas elements.

Q.3 Write short note. (Any Two) **08**

a) What are the limitations of the Henderson Hasselbalch equation?
b) Write a note on molecular geometry and bond angles of CH_4.
c) Calculate the molarity of a solution containing 5 g of NaOH in 450 mL solution.

Q.4 Answer of the following. (Any Two) **08**

a) Write a note on integrated rate equation for zero order reactions.
b) What is osmotic pressure, and how is it measured?
c) Write a note on reaction kinetics.

Q.5 Answer of the following. (Any One) **08**

a) Illustrate the classification of the elements in the periodic table.
b) Derive Henderson - Hasselbalch equation.

SLR-DB-3

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester – I) (New) (CBCS) Examination: Oct/Nov-2023
Biochemistry (Paper - II) (BT1103)

Day & Date: Wednesday, 22-11-2023 Max. Marks: 40
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: **08**

1) Which of the following is an example of monosaccharide?
   a) Galactose b) Sucrose
   c) Lactose d) Maltose

2) What is the composition of nucleotide?
   a) a sugar + a phosphate b) a base + a sugar
   c) a base + a phosphate d) a base + a sugar + phosphate

3) Which of the following amino acid is sweet in taste?
   a) Glycine b) Alanine
   c) Glutamic acid d) None of these

4) Which one of the following nucleic acids has a left-handed helix?
   a) M-RNA b) T-RNA
   c) A-DNA d) Z-DNA

5) Which of the following is not a monosaccharide with 5 carbon atoms?
   a) Arabinose b) Xylulose
   c) Trehalose d) Ribulose

6) What should be the complementary strand of 3.... ATGGCTTGA....5'?
   a) 3'.... TACCGAACT....5' b) 5'.... TACCGAACT....3'
   c) 3'.... TAGGCAAGT....5' d) 5'.... TAGGCAAGT....3'

7) The molecular formula of a disaccharide is _____.
   a) C12 H22 O12 b) C11 H22 O12
   c) C12 H22 O11 d) C6 H12 O6

8) Identify the pyrimidine base of nucleic acids in the following _____.
   a) Cytosine b) Guanine
   c) Hypoxanthine d) Adenine

Q.2 Answer any four of the following. **08**

a) Define monosaccharide.
b) Draw structure of lactose.
c) Define Lipids.
d) Write a short note on primary structure of protein.
e) Define glycosidic bond.
f) Define fatty acids.

Q.3 Write short notes on any two of the following. **08**

a) Describe physiological role of water-soluble vitamins.
b) Write a note on forces stabilizing protein structure.
c) Write a note on RNA and its types.

Q.4 Answer any Two of the following. **08**

a) Write a note on Polysaccharide with example.
b) Write a note on secondary structure of protein.
c) Write a note on classification of lipids.

Q.5 Answer any one of the following. **08**

a) Define nucleic acid and add note on composition, structure, and nomenclature of nucleotides.
b) What is Amino Acid? Add a note on its classification of amino acids based on R-group with structure.

SLR-DB-4

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester – I) (New) (CBCS) Examination: Oct/Nov-2023
Biophysics (Paper - I) (BT1104)

Day & Date: Thursday, 23-11-2023 Max. Marks: 40
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 labeled diagrams wherever necessary.

Q.1 Rewrite the sentence by using correct option. **08**

1) Protein hydration is very important for _____.
   a) Three-dimensional structure and activity
   b) Protein destabilization
   c) Protein Denaturation
   d) Protein crystallization

2) The entropy of an isolated system can never _____.
   a) decrease b) increase
   c) be zero d) be understood

3) _____ of the following is not a hydrophobic material.
   a) Waxes b) Fats
   c) Oil d) Sugar

4) _____ of the following ion is a structure breaker.
   a) Na^+ b) F^-
   c) K^+ d) H^+

5) A thermodynamic process where no heat is exchanged with the surroundings is called _____.
   a) Isothermal b) Isobaric
   c) Adiabatic d) Isotropic

6) PPIs stands for _____.
   a) Protein-power interactions b) Protein-protein interactions
   c) Protein-people interactions d) Protein-processes interactions

7) Hydrophilic particles enter or exit the cell through _____.
   a) Facilitated diffusion b) Osmosis
   c) Active diffusion d) Simple passive diffusion

8) The angle between the O-H bonds is around _____.
   a) 0.9584° b) 103°
   c) 104° d) 100°

Q.2 Answer any four of the following. **08**

a) Hydrophobic interactions
b) Free energy
c) Ligand
d) Entropy
e) Scatchard plot
f) Catalyst

Q.3 Write short notes on any two of the following. **08**

a) Write a short note on Molecular structure and function of water.
b) Write a short note on Influence of Ions on water structure making and breaking.
c) Write a short note on the Laws of thermodynamics.

Q.4 Answer any Two of the following. **08**

a) Describe Macromolecular Interactions in detail with example.
b) Explain physicochemical properties of water.
c) Briefly describe the cooperative and anti-cooperative binding of Ligand-receptor.

Q.5 Answer any one of the following. **08**

a) Explain the interaction between oxygen-hemoglobin.
b) Explain hydrophilic and hydrophobic solutes with examples.

SLR-DB-5

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester – I) (New) (CBCS) Examination: Oct/Nov-2023
Cell Biology (Paper – II) (BT1105)

Day & Date: Friday, 24-11-2023 Max. Marks: 40
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 non-storage calculator is allowed.

Q.1 Multiple choice questions: **08**

1) In prokaryotic cells, ribosomes are _____.
   a) 70 S b) 80 S
   c) 60S + 40S d) 50S + 40S

2) Mitochondria is absent in _____.
   a) Muscle fibers b) RBC
   c) Renal tubular cells d) Renal tubular cells

3) Cancer is caused by _____.
   a) uncontrolled mitosis b) uncontrolled meiosis
   c) rupturing of cells d) loss of immunity of the cells

4) Cadherins are the _____ cell - cell adhesion molecule.
   a) Ca^{2+} Independent b) Ca^{2+} Dependent
   c) Mg^{2+} Dependent d) Mg^{2+} independent

5) Spaces In Between Cells Filled With _____.
   a) Blood Related Matrix (BRM) b) Cytoplasm Matrix (CM)
   c) Extra cellular Matrix (ECM) d) cells

6) The fluid mosaic model of plasma membrane was proposed by _____.
   a) Singer and Nicolson b) Meselson and Stahl
   c) Devson d) Robertson

7) UV light is a _____ type of carcinogen.
   a) Chemical b) Physical
   c) Alkaline d) Acidic

8) Extranuclear DNA is found in _____.
   a) Ribosome b) Chloroplast
   c) Golgi apparatus d) endoplasmic reticulum

Q.2 Answer any four of the following. **08**

a) What is cell theory?
b) Write about biogenesis.
c) Role of Cell wall in Bacteria.
d) Write about Significance of Cell senescence.
e) Write on Photosynthetic Bacteria?
f) Write about Extra Cellular Matrix.

Q.3 Write Short Notes. (Any Two) **08**

a) Write about cell fractionation.
b) Explain types of chromosomes based on centromere.
c) Explain Cell organization in Viruses.

Q.4 Answer the following. (Any Two) **08**

a) Add a note on Apoptosis.
b) Explain Characteristics and molecular basis of cancer.
c) Write in detail different Stages in Meiosis.

Q.5 Answer the following. (Any One) **08**

a) Write in detail Structure and function of microtubules.
b) Explain Compartmentalization of eukaryotic cells.

SLR-DB-6

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
Animal Physiology (Paper-I) (BT1106)

Day & Date: Saturday, 25-11-2023 Max. Marks: 40
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 non-storage calculator is allowed.

Q.1 Multiple Choice Questions. (8 out of 8) **08**

1) _____ stimulates the production of gastric juice in the stomach.
a) Gastrin b) Renin
c) Digestin d) Enterokinase

2) _____ are responsible for the exchange of gases oxygen and carbon dioxide.
a) Type I pneumocytes b) Type II pneumocytes
c) Dust Cells d) Macrophages

3) Human heart is derived from _____.
a) Ectoderm b) Mesoderm
c) Endoderm d) Notochord

4) Interstitial cells secrete _____ hormone.
a) Estrogen b) Progesterone
c) Testosterone d) Thyroxine

5) Humans excrete nitrogenous waste product in the form of _____.
a) Urea b) Uric acid
c) Ammonia d) trimethylamine oxide

6) Receptor sites for the neurotransmitters located on _____.
a) axon tips b) nodes on ranvier
c) post-synaptic membrane d) presynaptic membrane

7) _____ cells secrete insulin which regulates blood sugar level.
a) α b) δ
c) β d) γ

8) _____ are responsible for the production and secretion of TSH.
a) Thyrotrophs b) Corticotrophs
c) Somatotrophs d) Gonadotrophs

Q.2 Answer the following. (Any Four) **08**

a) Write a note on trypsin.
b) Define chloride shift.
c) Write a note on platelets.
d) Write a note on seminiferous tubules.
e) Draw neat labeled diagram of Nephron.

Q.3 Write short notes on any Two of the following. **08**

a) Give different types of WBC and its functions.
b) Explain Origin & conduction of heart beat.
c) Write a note on adenohypophysis.

Q.4 Answer the following. (Any Two) **08**

a) Describe structure and function of chemical synapse with neat labeled diagram.
b) Describe human respiratory system with neat labeled diagram.
c) Describe human male reproductive system with neat labeled diagram.

Q.5 Answer the following. (Any One) **08**

a) Describe digestion and absorption of carbohydrates.
b) Describe mechanism of urine formation with neat labeled diagram.

SLR-DB-7

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
Developmental Biology (Paper-II) (BT1107)

Day & Date: Sunday, 26-11-2023 Max. Marks: 40
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.
(At. Wts.: H=1, C=12, O=16, N=14, Na=23, Cl=35.5)

Q.1 Choose the correct alternative from the option. **08**

1) Organogenesis is _____.
a) formation of root and shoots on callus tissue
b) formation of callus tissue
c) both (a) and (b)
d) genesis of organs

2) Embryo sac is located inside the _____.
a) Style b) Ovule
c) Stigma d) Micropyle

3) A membrane helping in digesting the outer surface of the egg, Called as _____.
a) Acrosome b) Tail of Sperm
c) Sperm d) Head of Sperm

4) _____ is the correct sequence in spermatogenesis.
a) Spermatogonia -> Spermatids-> Spermatocytes ->Spermatozoa
b) Spermatocyes ->Spermatogona -> Spermatids -> Spermatozoa
c) Spermatogonia ->Spermatocytes -> Spermatids -> Spermatozoa
d) Spermatocytes -> Spermatids -> Spermatogonia -> Spermatozoa

5) External Fertilization Occurs in _____.
a) Amphibians b) Dogs
c) Humans d) Mammals

6) Seed dormancy allows the plants to _____.
a) reduce viability
b) develop healthy seeds
c) overcome unfavourable climatic conditions
d) prevent deterioration of seeds

7) Discoidal and Superficial Cleavages belong to _____ type of Cleavage.
a) Equal holoblastic b) Unequal holoblastic
c) Both (a) and (b) d) Meroblastic

8) A root grow in length, _____ region of the root responsible for this growth.
a) Region of elongation b) Root cap
c) Region of meristematic activity d) Region of maturation

Q.2 Answer the following (Any four). **08**

a) Define Amphimixis.
b) Draw structure of Sperm.
c) What is fate map construction?
d) Write a note on three germ layers.
e) Explain activation of ovum.
f) Define blastulation.

Q.3 Write Short Notes (Any two). **08**

a) Define oogenesis and explain functions of oogenesis.
b) Discuss in detail about seed formation and germination.
c) Write a note on pollen development.

Q.4 Answer the following (Any two). **08**

a) Explain in detail about External and internal fertilization.
b) Add a note on double fertilization in angiosperm.
c) Discuss in detail about insemination and transport of sperm.

Q.5 Answer the following (Any one). **08**

a) Define spermatogenesis and write a note on its structure and functions
b) What is cleavage and discuss pattern and types of cleavage?

SLR-DB-8

Seat No.		Set	P

B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
Ecology (Paper - I) (BT1108)

Day & Date: Tuesday, 28-11-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicates full marks.
3) Draw neat & well labelled diagram wherever necessary.

Q.1 Fill in the blanks by choosing correct alternatives. **08**

1) A group of individuals belonging to the same species called _____.
a) Community b) Population
c) Order d) Family

2) _____ of the following lake zones has phytoplankton in abundance.
a) Littoral zone b) Benthic zone
c) Limnetic zone d) Profundal zone

3) _____ pyramid is inverted in aquatic ecosystem.
a) Energy b) Biomass
c) Number d) both A and C

4) Synecology is also called as _____ Ecology.
a) Species b) Animal
c) Population d) Community

5) _____ is the study of interactions among two or more species or a population with their environment.
a) Phycology b) Sociology
c) Autecology d) Synecology

6) _____ are tracts of forest which are regenerated around places of worship.
a) Sacred groves b) Hot spot
c) Biodiversity d) Ecosystem

7) _____ occurs when the death of the last individual in a species occurs.
a) Adaptation b) Phylogenic diversity
c) Speciation d) Extinction

8) _____ deals with study of Interaction of living and non living things.
a) Ecosystem b) Ecology
c) Topology d) Environment

Q.2 Answer the following questions briefly. (Any Four) **08**

a) Define ecosystem.
b) Define community.
c) Define Energy.
d) Define terrestrial ecosystem.
e) Define hot spot.
f) Define food chain.

Q.3 Write notes on Any Two of the following. **08**

a) Explain in detail survivorship curve with its types.
b) Introduction and effect of temperature, light, water and soil on animals.
c) Explain in detail ecological succession in ecosystem.

Q.4 Write notes on Any Two of the following. **08**

a) Define biodiversity and enlist significance.
b) Write note on grassland ecosystem.
c) Explain in brief groupism and social behaviour.

Q.5 Answer any one of the following. **08**

a) Define community and explain in detail its characteristics.
b) Explain in detail types of interspecific association.

SLR-DB-9

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester- I) (New) (CBCS) Examination: Oct/Nov-2023
Biotechnology in Human Welfare (Paper – II) (BT1109)

Day & Date: Wednesday, 29-11-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicates full marks.
3) Draw neat diagram wherever necessary.

Q.1 Choose correct alternative for the following **08**

1) _____ was a British chemist and X-ray crystallographer whose work was central to the understanding of the molecular structures of
a) Rosalind Franklin b) J. D. Watson
c) Karry Mullis d) Norman Borlaug

2) _____ is considered the godfather of the Green Revolution.
a) Rosalind Franklin b) J. D. Watson
c) Karry Mullis d) Norman Borlaug

3) _____ is an Indian government department, under the Ministry of Science and Technology responsible for administrating development and commercialisation in the field of modern biology and biotechnology in India.
a) Indian Council of Agricultural Research
b) Department of Biotechnology
c) Indian Council of Medical Research
d) Indian Council of Electronic Research

4) _____ is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance.
a) Remote sensing b) Robotics
c) Physics d) Mathematics

5) _____ are subunit vaccines where the selected genes are expressed into the edible part of plants.
a) Edible vaccines b) Pneumonia
c) Common cold d) Malaria

6) _____ is a laboratory mouse in which one or more genes have been turned off.
a) Clone b) knockout mouse
c) Edible vaccines d) MABs

7) _____ is a type of pregnancy in which a woman carries and gives birth to a baby for a person who is not able to have children.
a) Surrogate motherhood b) In vitro fertilization
c) Infertility d) Nancy

8) _____ is provided when a person is given antibodies to a disease rather than producing them through his or her own immune system.
a) active immunity b) Passive immunity
c) Autoimmunity d) disease

Q.2 Answer any four of the following. **08**

a) What is red biotechnology?
b) Enlist any 2 National Institutes of Biotechnology under DBT in India.
c) Define Nanotechnology.
d) What is vermitechnology?
e) Define Artificial insemination.
f) Define vaccination.

Q.3 Write short notes on any two of the following. **08**

a) Write a note on the contribution of Norman Borlaug.
b) Write a note on White Revolution
c) Biotechnology and Interdisciplinary scope with respect to computer application.

Q.4 Answer any two of the following. **08**

a) Bt cotton
b) In vitro fertilization
c) Malaria

Q.5 Answer any one of the following. **08**

a) Green Revolution
b) Donated sperm - Artificial insemination and Donated uterus - Surrogate motherhood.

SLR-DB-10

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPULSORY ENGLISH
Communication Skill (BT1201)

Day & Date: Saturday, 02-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

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

Q.1 Choose the correct alternative from the given options. **08**

1) A talk must be intermingled with a quantity of _____.
a) anger b) jest
c) tears d) boredom

2) Traditional education kills the very _____ of the budding learners.
a) initiative b) initials
c) intimations d) insecurity

3) To Tagore, "The civilization of the West has in it the spirit of the _____.
a) alcohol b) machine
c) nature d) heaven

4) Niyi Osundare's "Our Earth Will Not Die" breathes a _____ attitude.
a) positive b) negative
c) no d) null

5) Alexander Pope considers simplicity and _____ to be assets of a successful life.
a) indulgence b) crowd
c) loneliness d) greediness

6) 'Gone far away into the silent land'. In this line 'the silent land' symbolizes _____.
a) life b) death
c) earth d) dream

7) They admit their crime. The antonym for 'admit' in this sentence is _____.
a) accept b) own
c) deny d) confess

8) The letter is _____ written by his elder brother.
a) being b) been
c) was d) be

Q.2 Answer the following questions briefly. (Any Four) **12**

a) Why did Francis Bacon give more importance to discretion than eloquence?
b) What was Bertrand Russell's experience with the squirrels?
c) How did Rabindranath Tagore assess the society of America?
d) Describe the central theme of Niyi Osundare's "Our Earth Will Not Die".
e) Bring out the farmer's life as seen in Alexander Pope's "Ode on Solitude".
f) What would happen if the partner of Christina Rossetti became sad after remembering her?

Q.3 Answer the following questions. (Any One) **10**

a) Write a letter of complaint to Sony TV Shop in Solapur about a television set you bought recently and was not functioning well. Address your letter to the Manager of the Shop.

OR

b) Write a letter inviting a famous local writer to attend the Annual Prize Distribution Function to be held in your college.

Q.4 Write an elaborate note on the interpersonal intelligence and its significance. **10**

SLR-DB-11

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
Metabolism (Paper - I) (BT1202)

Day & Date: Sunday, 03-12-2023 Max. Marks: 40
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.

Q.1 Multiple choice questions. **08**

1) In _____ glucose is converted into pyruvate.
a) TCA cycle b) Gluconeogenesis
c) Glycolysis d) Glycogenolysis

2) Nitrogen at position 3 of pyrimidine nucleotide comes from _____.
a) Glutamine b) Glutamate
c) Glycine d) Aspartate

3) The combined action amino transferase and glutamate dehydrogenase is referred as _____.
a) Oxidative deamination b) Transamination
c) Reductive deamination d) Trans deamination

4) Molecular formula of cholesterol is _____.
a) $C_{27}H_{45}OH$ b) $C_{29}H_{47}OH$
c) $C_{29}H_{45}OH$ d) $C_{23}H_{41}OH$

5) The TCA cycle occurs in _____.
a) Mitochondrial matrix b) Cytosol
c) Nucleus d) Ribosomes

6) When one acetyl-CoA is Oxidized through TCA cycle _____ NADH molecules are produced.
a) 2 b) 3
c) 4 d) 5

7) Pentose phosphate pathway is also known as _____.
a) Glycolysis
b) Gluconeogenesis
c) Phosphogluconate pathway
d) Citric acid cycle

8) _____ is the terminal electron acceptor in ETC.
a) O_2 b) H_2O
c) NAD+ d) FAD^+

Q.2 Answer the following (Any Four) **08**

a) Draw the structure of ATP synthase complex.
b) Define redox reactions with one example.
c) What is the function of transaminase enzyme?
d) What is the role of PRPP?
e) Give the significance of NADPH.
f) Define anabolism and catabolism.

Q.3 Write short notes (Any Two) **08**

a) Inhibitors and uncouplers of electron transport chain
b) Glycogen breakdown
c) Sources of atoms of purine structure

Q.4 Answer the following (Any Two) **08**

a) Write a note on regulation and energetics of TCA cycle.
b) Give an account on laws of thermodynamics.
c) Describe in brief urea cycle.

Q.5 Answer the following (Any One) **08**

a) Illustrate in detail the fatty acid biosynthesis.
b) Explain the enzymatic reaction involved in breakdown of glucose into pyruvate.

SLR-DB-12

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester – II) (New) (CBCS) Examination: Oct/Nov-2023
Enzymology (Paper – II) (BT1203)

Day & Date: Monday, 04-12-2023 Max. Marks: 40
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 right indicate full marks.

Q.1 Choose the correct alternative from the options. **08**

1) LDH has _____ isoenzymes.
a) 5 b) 6
c) 4 d) 7

2) Enzymes are divided into _____ major classes.
a) six b) four
c) five d) seven

3) _____ Enzymes involved in oxidation-reduction reactions.
a) Transferase b) lyase
c) ligase d) oxidoreductase

4) Most Enzymes Are _____ in nature.
a) carbohydrate b) lipids
c) proteins d) vitamins

5) Lock and key hypothesis was proposed by _____.
a) Emil Fischer b) Polanyi
c) Haldane d) Pauling

6) The term _____ is referred to the inorganic cofactor necessary to enhance enzyme activity.
a) inhibitor b) repressor
c) activator d) terminator

7) _____ reaction is catalyzed by Lyase.
a) Breaking of bonds
b) Formation of bonds
c) Intramolecular rearrangement of bond
d) Transfer of group

8) The surface of the matrix on which an enzyme is immobilized is called _____.
a) enzyme immobilization b) adsorbant
c) carrier matrix d) Ligand

Q.2 Answer any four of the following **08**

1) Define coenzyme and give its one example.
2) Write a note on enzyme commission number.
3) Define enzyme activity and give its unit.
4) Define Km and Vmax.
5) Write a note on support matrix for enzyme immobilization.
6) Enlist any two reasons for existence of isoenzyme.

Q.3 Write short notes on any two of the following. **08**

1) Define enzyme immobilization and enlist advantages of enzyme immobilization.

2) Write a note on effect of temperature on enzyme activity.

3) Explain in detail steady state reaction.

Q.4 Answer any two of the following. **08**

1) Explain in detail principle of catalysis.

2) Write a note on activator and inhibitors with two examples of each.

3) Describe applications of LDH in disease diagnosis.

Q.5 Answer any one of the following **08**

1) Give a brief account on different types of enzyme immobilization.

2) Describe effect of substrate and enzyme concentration on enzyme activity.

SLR-DB-13

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS)
Examination: Oct/Nov-2023
Cell Physiology (Paper - I) (BT1204)

Day & Date: Tuesday, 05-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams and give equations wherever necessary.
3) Figures to right indicate full marks.
4) Use of logarithmic table and calculator is allowed.

Q.1 Multiple choice questions. **08**

1) Fluid mosaic model of plasma membrane is discovered by _____.
a) Singer & Nicholson b) Watson & Crick
c) Wilkins & Franklin d) Tatum & Lederberg

2) _____ is not a secondary messenger molecule.
a) Ca++ b) IP3
c) cAMP d) insulin

3) _____ in not an example of calcium-independent CAM.
a) Cadherins b) Selectins
c) Integrins d) IgSF CAMs

4) Chemotaxis is described as the directed migration of cells towards a _____.
a) metal ions b) UV light
c) visible light d) chemoattractant molecule

5) _____ is example of passive transport.
a) simple diffusion b) calcium pump
c) Proton pump d) Na-K ATPase pump

6) Prominent function of neurons is _____.
a) secretion b) excretion
c) absorption d) conduction of nerve impulse

7) In gap junctions each connexon is formed by _____ connexin proteins.
a) Two b) Four
c) Six d) Eight

8) Secretory vesicles moving molecules outside of the cell, through a process called _____.
a) phagocytosis b) pinocytosis
c) receptor mediated endocytosis d) exocytosis

Q.2 Answers any four of the following. **08**

a) Define synaptic cleft.
b) What is secondary messenger molecule?
c) What is enterocyte?
d) Define proton pump.
e) Enlist functions of golgi apparatus.
f) Define quorum sensing in bacteria.

Q.3 Write short notes on any two of the following. **08**

a) Describe mechanism of signal transduction with suitable example.
b) Write a note on stress response in bacterial cells.
c) Explain structure and functions of cells in nervous system.

Q.4 Answers any two of the following. **08**

a) Write about exocytosis with neat labeled diagram.
b) Describe various types of passive transport mechanisms across cell membrane.
c) Describe process chemotaxis in bacterial cells.

Q.5 Answers any one of the following. **08**

a) Describe process of excitation and conduction of nerve impulse.
b) Describe structure and function of calcium dependent CAMs.

SLR-DB-14

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023

Bioinstrumentation (Paper - II) (BT1205)

Day & Date: Wednesday, 06-12-2023 Max. Marks: 40
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 & well labeled diagram wherever necessary.

Q.1 Fill in the blanks by choosing correct alternatives. **08**

1) According to lamberts law light absorbed is directly proportional to _____.
a) path length b) concentration
c) viscosity d) density

2) _____ is physical method for separation of compounds.
a) Warm trypsinization b) Chromatography
c) Dialysis d) Osmosis

3) β mercaptoethanol digests _____.
a) H_2 bond b) O_2 bond
c) disulphide linkage d) methylene bond

4) Wavelength range used for UV spectrophotometer is _____ To _____.
a) 700,900 b) 900, 1000
c) 400, 700 d) 180, 399

5) Western blotting is also known as _____ blotting.
a) Protein b) DNA
c) RNA d) Lipid

6) pH of stacking gel is _____.
a) 2.3 b) 6.3
c) 8.3 d) 7.3

7) During autoclave temperature used is _____.
a) 100 °C b) 90 °C
c) 121 °C d) 95 °C

8) _____ fluorescent dye used for detection of nucleic acid during electrophoresis.
a) ANS b) Riboflavin
c) CBB d) EtBr

Q.2 Answer any four of the following. **08**

a) Define autoradiography.
b) Enlist the applications of visible spectroscopy.
c) Enlist the applications of ECG.
d) Enlist the applications of centrifugation.
e) Define spectrophotometer.
f) Define Beers law.

Q.3 Write notes on any two of the following. **08**

a) Explain northern blotting.
b) Discuss maintenance of incubator.
c) Describe gel documentation.

Q.4 Write notes on any two of the following. **08**

a) Describe SDS PAGE.
b) Describe principle of CT SCAN.
c) Give a brief account on electrochemical biosensors.

Q.5 Answer any one of the following. **08**

a) Explain in detail flow cytometry.
b) Explain instrumentation of UV spectroscopy.

SLR-DB-15

Set No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
Plant Physiology (Paper - I) (BT1206)

Day & Date: Thursday, 07-12-2023 Max. Marks: 40
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 & well labelled diagram wherever necessary.

Q.1 Fill in the blanks by choosing correct alternatives. **08**

1) Photosynthesis occurs in _____.
   a) Chloroplast b) Golgi body
   c) Endoplasmic reticulum d) Nucleus

2) The optimum temperature for photosynthesis is _____ degree.
   a) 25-35 b) 10-15
   c) 35-40 d) 20-25

3) _____ is the maximum wavelength of light photosystem II can absorb.
   a) 680nm b) 450nm
   c) 700nm d) 230nm

4) Reduction of NADP occurs in _____.
   a) Oxidative photophosphorylation
   b) Cyclic photophosphorylation
   c) Non-cyclic photophosphorylation
   d) Reductive photophosporylation

5) Kranz anatomy is found in the leaves of _____.
   a) Wheat b) Mustard
   c) Potato d) Sugarcane

6) Peroxisomes are involved in which type of reactions _____.
   a) Calvin cycle b) Glyoxylate cycle
   c) Glycolate cycle d) Bacterial photosynthesis

7) Photorespiration involves oxidation of _____.
   a) PGA b) RuBP
   c) Chlorophyll a d) Both a and b

8) The primary function of auxin is _____.
   a) Cell division b) Cell elongation
   c) Flowering d) Ripaning

Q.2 Answer the following questions briefly. (Any Four) **08**

1) Define permanent tissue.
2) Define protoplast.
3) Define diffusion.
4) Define transpiration.
5) Define differentiation.
6) Define seed dormancy

Q.3 Write Notes (Any Two) **08**

1) Explain in detail nitrogen fixation.
2) Explain in detail symplastic and apoplastic pathway of water absorption.
3) Explain in detail criteria for identification of essentiality of nutrients.

Q.4 Write Notes (Any Two) **08**

1) Explain in detail mode of action and physiological role of ethylene.
2) Write note on types and function of photosynthetic pigments.
3) Explain in Calvin cycle.

Q.5 Answer the following (Any One) **08**

1) Define cell and explain in detail plant cell with neat labelled diagram.
2) Explain in detail cyclic and non-cyclic photophosphorylation with its significance.

SLR-DB-16

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
Tissue Culture (Paper - II) (BT1207)

Day & Date: Friday, 08-12-2023 Max. Marks: 40
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 & well labelled diagrams wherever necessary.

Q.1 Fill in the blanks by choosing correct alternatives. **08**

1) Cells which have undergone transformation frequently become _____.
   a) anchorage independent b) anchorage dependent
   c) stable d) unstable

2) Range of optimum glucose concentration present in the culture media is ____.
   a) 5.5 - 55 mmol/litre b) 55 - 75 mmol/litre
   c) 75 - 105 mmol/lilre d) 105 - 150 mmol/lilre

3) The cell lines with limited culture life spans arc referred to as _____.
   a) Infinite cell line b) Growing cell line
   c) Counting cell line d) Finite cell line

4) _____ is the full form of MEM in Eagle's cell culture medium.
   a) Maximum evaporating medium b) Maximum essential medium
   c) Minimum essential medium d) Minimum evaporating medium

5) _____ can be used to separate cells in different phases of the cell cycle based on their size and sedimentation velocity.
   a) Flow cytometry b) Centrifugal elutriation
   c) Chemical blocking d) FTIR

6) Cell culture technique in 2 dimensions was first discovered by _____.
   a) Wilhelm Roux b) Alexander Fleming
   c) Francis Crick d) Kari Mullis

7) Viral contamination is removed from the media by _____ filter.
   a) 0.12 micron b) 0.2 micron
   c) 0.65 micron d) 0.04 micron

8) From _____ organism first cell line was observed.
   a) *E.coli* b) Sheep
   c) Mouse d) Drosophila

Q.2 Answer the following questions briefly. (any four) **08**

1) Define substrate.
2) Define tissue.
3) Define primary cell culture.
4) Define serum.
5) Define sterilization.
6) Define trypsinization

Q.3 Write notes on any two of the following. **08**

1) Explain in detail history of animal tissue culture.
2) Explain in detail physiochemical properties of media.
3) Explain in detail measurement of viability (Evans blue).

Q.4 Write notes on any two of the following. **08**

1) Explain about Cell line selection.
2) Explain in detail Tritiated thymidine pulse method.
3) Explain mechanical separation of cell.

Q.5 Answer any one of the following. **08**

1) Explain in detail methods of organ culture.
2) Explain in detail types of animal culture media.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
Computer Science (Paper – I) (BT1208)

Day & Date: Saturday, 09-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat & well labeled diagram wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Rewrite the sentence by using correct option. **08**

1) The _____ Unit performs the mathematical operations for CPU.
a) Control unit b) ALU
c) Storage unit d) Input unit

2) The two kinds of main memory are _____.
a) CDs and DVDs b) RAM and ROM
c) Primary and Secondary d) Direct and Sequential

3) The application used for creating presentations _____.
a) MS Access b) MS Word
c) MS Excel d) MS PowerPoint

4) ENIAC stands for _____.
a) Electronic Numbers Integer and Calculator
b) Electronic Numerical Integrator and Calculator
c) Electrical Numerical Integer and Computation
d) Electrical Numerical Integer and Computation

5) _____ is the father of Modern digital computer.
a) Charles Newman b) Charles Babbage
c) Henry Babbage d) Henry luce

6) In _____ generation of computer used CD ROM for the first time.
a) Second Generation b) Third Generation
c) Fourth Generation d) Fifth Generation

7) _____ is an example of pointing device.
a) Mouse b) Pointer
c) Cursor d) HDMI port

8) The physical components of a computer are called _____.
a) Software b) Hardware
c) ALU d) CPU

Q.2 Answer the following questions. (any four) **08**

a) Define Bits and Bytes
b) Define Data and Information
c) Function of Central Processing Unit.
d) Give any four examples of Input devices.
e) Define Hardware and Software
f) What is Netiquettes?

Q.3 Solve. (any two) **08**

a) Explain in detail MS Word?

b) Write a note on History and Types of Computers?

c) Write a note on Basics of electronic mail, creation and accessing the e-mail?

Q.4 Write note on. (any two) **08**

a) MS-Office PowerPoint

b) Internet with its Uses

c) Various number systems in Computer.

Q.5 Answer any one of the following. **08**

a) Explain in detail Computer Organization with suitable diagram.

b) Describe in detail Operating System (OS).

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Seat No.		Set	P

B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
Biostatistics (Paper-II) (BT1209)

Day & Date: Sunday, 10-12-2023 Max. Marks: 40
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 & well labeled diagrams wherever necessary.

Q.1 Choose the correct alternatives from the options. **08**

1) _____ is obtained by adding all the values and by dividing the total number of items.
a) Mean b) Mode
c) Median d) Correction

2) _____ is the value of the variable which occurs most frequently in a distribution.
a) Mean b) Outcomes
c) Mode d) Data

3) _____ is the measure of the variation of the items.
a) Central Tendency b) Histogram
c) Score d) Dispersion

4) The highest and the lowest value of variable in series known as _____.
a) Deviation b) Range
c) Mean d) S.D.

5) Standard Deviation is represented as _____.
a) Sigma b) Beta
c) Lambda d) Alpha

6) _____ introduced the concept of standard deviation in 1893.
a) Newton b) Fisher
c) Karl Pearson d) William S. Gosset

7) The values recorded in an experiment or observation is called _____.
a) Analysis b) Accuracy
c) Data d) Report

8) _____ may be defined as the logical and systematic arrangement of statistical data in rows and columns.
a) Tabulation b) Presentation
c) Graph d) Structure

Q.2 Answer the following question briefly. (Any Four) **08**

a) Write any four applications of Biostatistics.
b) Write advantages of Tabulation.
c) Compute the coefficient of range for data 36, 19, 75, 61, 71, 35, 23, 8, 54.
d) Define 'Class mark' and give an example.
e) Define Mean. Give an example.
f) Write merits of Median.

Q.3 Write notes (Any Two) **08**

a) Explain parts of table in detail.
b) Write a short note on measures of central tendency.
c) Define ANOVA and explain its types.

Q.4 Write notes (Any Two) **08**

a) Write and explain Diagrammatic and Graphical representation of data.
b) Describe brief account on Hypothesis testing.
c) Define probability and explain related terms.

Q.5 Answers the following (Any One) **08**

a) A coin is tossed six times. What is the probability of obtaining?
1) 4 Heads
2) 5 Heads
3) 6 Heads
4) 4 or more heads
Use Binomial Distribution.

b) Find the coefficient of correlation between the age of husbands (X) and age of wives(Y).

X	23	27	28	28	29	30	31	33	35	36
Y	18	20	22	27	21	29	27	29	28	29

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
ENGLISH (Comp.)
Literary Voyage (BT201) (BT20201)

Day & Date: Saturday, 02-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

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

Q.1 Choose the correct alternative from the option. **08**

1) _____ is the memorable part of discourse.
a) To give opportunity b) To talk
c) To listen d) To lead

2) According to Bertrand Russell, _____ had only one year of schooling.
a) Earnest Barker b) John D. Rockefeller
c) Jay Gould d) Vanderbilt Commodore

3) _____ plays a huge role and affects to an entire country.
a) Intrigue b) Monarchy
c) Hope d) Dismay

4) _____ release the arsenic urine.
a) Chemicals b) Profit factories
c) Infected waste d) The earth

5) Alexandra Pope wrote in _____ era.
a) Anglo-Saxon b) Modern
c) Augustan d) Romantic

6) The poet wishes to hear _____ from the lover.
a) marriage plans b) future plans
c) about the work d) about the family

7) Identify the correct synonym.
Amazing
a) Inquire b) Special
c) Incredible d) Idea

8) I saw a brown bird when I _____ the window.
a) opened b) was open
c) will open d) have open

Q.2 Answer the following questions (Any Four) **12**

a) How is humour and jest important of discourse?
b) What opinions does the author have of education system of his time?
c) What is the true sense of freedom?
d) Discuss the theme of the poem – 'Our Earth Will Not Die.'
e) What picture of a farmer does Alaxander Pope present in the poem – Ode On Solitude?
f) What are Rossetti's thoughts about remembering the dead person?

Q.3 Answer the following questions (Any One) **10**

a) Describe the process of making chapattis. Write the process step by step and use different linkers while writing the process.

b) Prepare a presentation on your favourite Cricketer / Film Hero / Heroine / National Leader, describing all the important details of them.

Q.4 Read the following advertisement and write an application letter for the post of a teacher based on the advertisement, giving all the details as required by it. **10**

Army Public School
Nigdi - Pune
Wanted
Teacher

Educational Qualification: BSc, BEd and as per CBSE by laws

Experience: Minimum 2 yrs. of experience, teaching to high school level

Interested candidates may forward their application letter along with their CV's, certificates at the email address: armypublicschool@gmail.com within 15 days of publishing the advertisement.

SLR-DB-20

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Mammalian Physiology - I (Paper - I) (BT202)

Day & Date: Sunday, 03-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled 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. **08**

1) _____ stimulates the secretion of pancreatic juice.
a) Epinephrine b) Cholecystokinin
c) Enterokinase d) Acetylcholine

2) Enterokinase enzyme responsible for the conversion of inactive _____.
a) Lactose to Sucrose b) Pepsinogen into pepsin
c) Trypsinogen into trypsin d) Proteins into polypeptide

3) _____ enzyme responsible for breaks down of starch.
a) Sucrase b) Maltase
c) Lactase d) Amylase

4) _____ are responsible for phagocytosis of microorganisms in alveoli.
a) Type I pneumocytes b) Type II pneumocytes
c) Dust cells d) Endothelial cells

5) Patients inability to digest lactose sugar is leads to _____.
a) Gastroesophageal reflux disease
b) Irritable bowel syndrome
c) Lactose intolerance
d) Peptic Ulcer disease

6) _____ is required for formation of RBCs.
a) Thrombopoietin b) Lymphokines
c) Cytokine d) Erythropoietin

7) Human heart is derived from _____.
a) Ectoderm b) Mesoderm
c) Endoderm d) Notochord

8) Skull in human adult comprises _____ number of bones.
a) 22 b) 32
c) 25 d) 27

Q.2 Answer the following (Any Four) **08**

a) Define salivary amylase.
b) What are granulocytes?
c) What is chloride shift?
d) Define pepsin.
e) Define gliding joint.
f) Define tricuspid valve.

Q.3 Write short notes (Any Two) **08**

a) Describe mechanism of digestion of nucleic acids.
b) Describe composition of human saliva.
c) Describe mechanism of coagulation of blood.

Q.4 Answer the following (Any Two) **08**

a) Write about oxygen dissociation curve.
b) Describe mechanism of cardiac cycle.
c) Write a note on ball and socket joint.

Q.5 Answer the following (Any One) **08**

a) Describe mechanism of digestion of proteins.
b) Write an essay on axillary skeletal system.

SLR-DB-21

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Mammalian Physiology - II (Paper - II) (BT203)

Day & Date: Monday, 04-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat & well labeled diagram wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Fill in the blanks by choosing correct alternatives: **08**

1) _____ take away blood from Bowman's capsule in humans.
a) afferent arteriole b) efferent arteriole
c) coronary sinus d) coronary vein

2) Humans beings excrete nitrogenous waste product in the form of _____.
a) urea b) uric acid
c) ammonia d) trimethylamine oxide

3) _____ is act as signaling molecule in chemical synapse.
a) hormone b) neurotransmitter
c) vitamin d) secondary messenger

4) _____ cells of islets of Langerhans secretes somatostatin hormone.
a) α b) δ
c) β d) γ

5) _____ cells responsible for secretion of GTH.
a) Thyrotrophs b) Corticotrophs
c) Somatotrophs d) Gonadotrophs

6) _____ receptors responsible detection of smell.
a) Olfactory b) Gustatory
c) Somatosensory d) Baroreceptors

7) Graves disease is caused due to _____.
a) hyposecretion of thyrocalcitonin
b) hyposecretion of TSH
c) hypersecretion of TSH
d) hypersecretion of thyroxine

8) _____ is hypoglycemic hormone in humans.
a) Insulin b) Glucagon
c) ADH d) TSH

Q.2 Answer the following questions briefly (Any Four) **08**

a) Give structure of nerve cell.
b) Define ammonotelism.
c) Define chemical synapse.
d) Enlist names and functions of peptide hormones.
e) Write a note on TSH.
f) Give account on gustatory receptors.

Q.3 Write notes on any two of the following. **08**

a) Describe mechanism of urine formation with neat labeled diagram.
b) Describe mechanism of action of steroid hormone.
c) Describe structure and function of pituitary gland.

Q.4 Write notes on any two of the following. **08**

a) Explain sliding filament theory of muscle contraction and relaxation.
b) Give account on structure and function of thymus gland.
c) Give an account on pancreatic hormones and its regulation.

Q.5 Answer any one of the following. **08**

a) Describe structure and function of human ear.
b) Explain mechanism of transmission of nerve impulse in humans.

SLR-DB-22

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Plant Physiology - I (Paper - I) (BT204)

Day & Date: Tuesday, 05-12-2023 Max. Marks: 40
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 question. **08**

1) Meristem helps in the _____.
a) Absorption of water b) Absorption of minerals
c) Translocation of food d) Growth of plant

2) In which permanent tissue nucleus is absent?
a) Parenchyma b) Collenchyma
c) Sclerenchyma d) All of the Above

3) Spring wood (early wood) differs with Autumn wood (late wood) in _____.
a) Size of vessels and tracheids b) Thickness of cell wall
c) Amount of wood d) All of the Above

4) The amount of water lost by plants due to cuticular transpiration _____.
a) 10 - 15 % b) 5- 10%
c) 20 -25% d) 90 - 95 %

5) The Unit of Water potential is _____.
a) Delta b) Pascal
c) Psi d) mole/kg

6) Which among the following is an internal factor affecting transpiration?
a) Temperature b) Humidity
c) Open stomata d) wind speed

7) Identify a macronutrient for plants among the following.
a) Potassium b) Iron
c) Zink d) Calcium

8) Transport of food material in higher plants occur through _____.
a) Xylem b) Phloem
c) Stomata d) All of the Above

Q.2 Answer any Four of the following. **08**

a) Write types of permanent tissue.
b) Draw diagram of dorsi-ventral leaf anatomy.
c) Write importance of water for plant life.
d) Define “Guttation”.
e) Write role of Nitrogen in plant.
f) Define the term source to sink transport.

Q.3 Write short notes on any Two of the following. **08**

a) Describe types of simple and complex permanent tissue.
b) Write detail note on plasmolysis.
c) Describe Secondary growth of root and shoot.

Q.4 Answer any Two of the following. **08**

a) Write detail note on Root Apical meristem.
b) Describe the anatomy of isobilateral leaf.
c) Write role of N, Mg, Phosphorus, Calcium in plant.

Q.5 Answer any One of the following. **08**

a) Write detail Mechanism of food transport with diagram.
b) Write detail histological organization of Shoot Apical Meristem.

SLR-DB-23

Seat No.		Set	P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Plant Physiology-II (Paper - II) (BT205)

Day & Date: Wednesday, 06-12-2023 Max. Marks: 40
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.

Q.1 Fill in the blanks by choosing correct alternatives (eight): 08

1) _____ is a system of photoreactions that absorbs maximally red light (680 nm), oxidizes water and reduces plastoquinone.
a) Photosystem I b) Photosystem II
c) Phyllotaxy d) Phytate

2) _____ is the chlorophyll of the photosystem I reaction center that absorbs maximally at 700 nm in its neutral state.
a) P700 b) P100
c) P200 d) P300

3) _____ is the biochemical pathway for the reduction of CO2 to carbohydrate.
a) Calvin cycle b) Nitrogen fixation
c) Transpiration d) Perspiration

4) _____ is an Enzyme located in the cytosol that reduces nitrate to nitrite.
a) Glucose oxidase b) Catalase
c) Peroxidase d) nitrate reductase

5) Short-day plant (SDP) is that _____ only in short days.
a) Flowers b) Germinates
c) Pollinates d) Dies

6) _____ is a group of light absorbing green pigments active in photosynthesis.
a) Complements b) Cytokines
c) Chlorophylls d) Cytoskeletons

7) _____ is the organelle that is the site of photosynthesis in eukaryotic photosynthetic organisms.
a) Chloroplast b) Mitochondria
c) Golgi d) ER

8) _____ is the CO2 concentration at which the rate of respiration balances the photosynthetic rate.
a) Photoperiodism b) Vernalization
c) nitrogen fixation d) CO2 compensation point

Q.2 Answer the following questions briefly. (any four) **08**

a) Define photosynthesis.
b) What is nitrogen fixation?
c) Define photorespiration.
d) Define growth.
e) Enlist photosynthetic pigments.
f) Define seed germination.

Q.3 Write notes on any two of the following. **08**

a) The Calvin-Benson Cycle.
b) Photosystem I
c) Photophosphorylation

Q.4 Write notes on any two of the following. **08**

a) growth curve.
b) nitrate reduction and ammonium assimilation in plants.
c) Seed dormancy and its causes.

Q.5 Answer any one of the following. **08**

a) Give a detailed account on Crassulacean acid metabolism.
b) Discuss in brief Physiological role and mode of action plant growth hormones.

SLR-DB-24

Set No.		Set	P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Computer (Paper – I) (BT206)

Day & Date: Thursday, 07-12-2023 Max. Marks: 40
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 diagrams and give equations wherever necessary.

Q.1 Multiple choice question. **08**

1) From which menu you can insert Header and Footer?
   a) Insert Menu b) View Menu
   c) Format menu d) Tools Menu

2) Which of the following is an absolute cell reference?
   a) !A!1 b) A1
   c) #a#1 d) A1

3) Which of the following is not a Valid IP address?
   a) 192.168.1.1 b) 222.123.33.45
   c) 192.256.67.23 d) 129.22.22.22

4) What is the full form of HTTP?
   a) Hyper text transfer protocol
   b) Hyper text transfer package
   c) Hyphenation text test program
   d) None of the above

5) Which of the following is not a type of computer code?
   a) EDIC b) ASCII
   c) BCD d) EBCDIC

6) An optical input device that interprets pencil marks on paper media is _____.
   a) Punch Card Reader b) O.M.R
   c) Optical Scanners d) Magnetic Tape

7) What is the responsibility of the logical unit in the CPU of a computer?
   a) Top reduce result b) To compute results
   c) To control flow of information d) None of the above

8) The term gigabyte refers to _____.
   a) 1024 bytes b) 1024 kilobytes
   c) 1024 megabytes d) 1024 gigabyte

Q.2 Explain the following concepts (Any Four) **08**

a) What is an url?
b) Define Application Software?
c) Clip Arts
d) Cell Address
e) Inflibnet
f) Protocol

Q.3 Write short notes. (Any Two) **08**

1) Explain the process to convert Decimal number to Hexadecimal number.
2) Defined Operating System and explain its functions?
3) Define Computer memory. Explain different types of computer memory.

Q.4 Answer the following. (Any Two) **08**

1) Explain services and uses of internet?
2) Explain different types of computers?
3) Explain basic components of digital computer system.

Q.5 Answer the following. (Any One) **08**

1) Define bits and bytes. Explain different number systems used by Computer System.
2) Define Chart? Explain types of charts in MS-Excel.

SLR-DB-25

Seat No.		Set	P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Biostatistics (Paper - II) (BT207)

Day & Date: Friday, 08-12-2023 Max. Marks: 40
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.

Q.1 Choose the correct alternative. **08**

1) _____ is obtained by adding all the values and by dividing the total number of items.
   a) Mean b) Mode
   c) Median d) Correction

2) _____ is the value of the variable which occurs most frequently in a distribution.
   a) Mean b) Outcomes
   c) Mode d) Data

3) _____ is the measure of the variation of the items.
   a) Central Tendency b) Histogram
   c) Score d) Dispersion

4) The highest and the lowest value of variable in series known as _____.
   a) Deviation b) Range
   c) Mean d) S.D.

5) Standard Deviation is represented as _____.
   a) Sigma b) Beta
   c) Lambda d) Alpha

6) _____ introduced the concept of standard deviation in 1893.
   a) Newton b) Fisher
   c) Karl Pearson d) William S. Gosset

7) The values recorded in an experiment or observation is called _____.
   a) Analysis b) Accuracy
   c) Data d) Report

8) _____ may be defined as the logical and systematic arrangement of statistical data in rows and columns.
   a) Tabulation b) Presentation
   c) Graph d) Structure

Q.2 Answer the following questions briefly (any four): **08**

1) Write any four applications of Biostatistics.
2) Write advantages of Tabulation.
3) Compute the coefficient of range for data 36, 19, 75, 61, 71, 35, 23, 8, 54.
4) Define 'Class mark' and give an example.
5) Define Mean. Give an example.
6) Write merits of Median.

Q.3 Write short notes on any Two of the following. **08**

1) Explain parts of table in detail.

2) Write a short note on measures of central tendency.

3) Define ANOVA and explain its types.

Q.4 Answer any Two of the following. **08**

1) Write and explain Diagrammatic and Graphical representation of data.

2) Describe brief account on Hypothesis testing.

3) Define probability and explain related terms.

Q.5 Answer any one of the following. **08**

1) A coin is tossed six times. What is the probability of obtaining?

a) 4 Heads

b) 5 Heads

c) 6 Heads

d) 4 or more heads.

Use Binomial Distribution.

2) Find the coefficient of correlation between the age of husbands (X) and age of wives(Y).

X	23	27	28	28	29	30	31	33	35	36
Y	18	20	22	27	21	29	27	29	28	29

SLR-DB-26

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Animal Tissue Culture (Paper - I) (BT208)

Day & Date: Saturday, 09-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

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

Q.1 Rewrite the following sentences by choosing the correct alternative: 08

1) Cell lines which divide in limit are called _____.
a) Transformed cell line b) Finite cell line
c) Liver cells d) Continuous cell line

2) The Organ culture was discovered by _____.
a) Rous b) Loeb
c) Haberlandt d) Newton

3) Maximum application of animal cell culture technology today is in the production of _____.
a) Vaccines b) Insulin
c) Edible d) Interferons

4) Indirect methods of cell determination process are _____.
a) protein b) LDH
c) DNA d) All of these

5) The number and appearance of chromosomes in an organism is called a _____.
a) autosome b) karyogram
c) chromosome set d) karyotype

6) In LAF _____ is light used for sterilization.
a) Neon b) UV
c) visible d) Sodium

7) _____ fluorescent dye can be used for red fluorescence.
a) Rhodamine b) Carmine
c) Fluorescein d) DAPI

8) Optimum pH required for the growth of mammalian cells is _____.
a) 7.2-7.4 b) 8.1-8.9
c) 6.5-7.0 d) 5.3-7.0

Q.2 Answer any four of the following. 08

a) Complete Media
b) Organ Culture
c) CO_2 Incubator
d) Cell Synchronization
e) Cell Line Selection
f) Flow Cytometry

Q.3 Write short notes on any two of the following. **08**

a) Explain Indirect Method of cell determination.
b) Write a note on Applications of animal cell culture.
c) Enlist Physiochemical properties of media.

Q.4 Answer any Two of the following. **08**

a) Add a note on Primary Cell culture.
b) Add a note on Serum containing media.
c) Explain Characteristics of animal Cell in Culture.

Q.5 Answer any one of the following. **08**

a) Discuss in detail about Analysis of cell cycle by Tritiated thymidine pulse Method.
b) Write a detailed note on Laboratory Design of Animal Tissue Culture.

SLR-DB-27

Seat No.		Set	P

B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination: Oct/Nov-2023
Plant Tissue Culture (Paper – II) (BT209)

Day & Date: Sunday, 10-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

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

Q.1 Choose the correct alternatives from the options. **08**

1) The formation of embryoids from pollen grains in tissue culture medium is due to _____.
a) Organogenesis b) Test tube
c) Double fertilization d) Cellular totipotancy

2) _____ is callus.
a) Tissue that grows to form an embryoids
b) An unorganized actively dividing the mass of cell maintained in culture
c) An insoluble carbohydrates
d) A tissue that grows on embryos

3) _____ of the following chemical are most widely for the protoplast fusion.
a) Mannitol b) Polyethylene glycol
c) Sorbitol d) Mannol

4) Tissue culture was first practicised by _____.
a) White b) Haberlandth
c) Halperin d) Skoog

5) The variation in vitro culture is called as _____.
a) Invitro variation b) Mutation
c) Soma clonal variation d) All of these

6) Part of plant used for culturing is called _____.
a) Scion b) Explant
c) Stock d) Callus

7) Solidifying agent that used in plant tissue culture.
a) Agar b) Cobalt chloride
c) Nicotinic acid d) EDTA

8) The technique of obtaining large number of plantlets by tissue culture method _____.
a) Organ culture b) Micropropgation
c) Plantlet cultured d) Microinjection

Q.2 Answers the following (Any Four) **08**

a) Culture room.
b) Define Callus.
c) Artificial seeds.
d) Define Hybrids.
e) Name of the cryoprotectant.
f) Protoplast.

Q.3 Write short notes on (Any Two) **08**

a) Write note on Somatic embryogenesis and factors affecting somatic embryogenesis.
b) History and Scope of Plant tissue culture.
c) Define Endosperm culture with its application.

Q.4 Answer the following (Any Two) **08**

a) Write note on Culture media composition with its significance.
b) Define Cryopreservation and its advantages.
c) Schematic representation of Autoclave and its significance.

Q.5 Answers the following (Any One) **08**

a) Describe in Detail Suspension culture, factor affecting and application.
b) Explain in Detail Micro propagation, stages, Factors affecting and applications.

SLR-DB-28

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
Genetics - I (BT1301)

Day & Date: Wednesday, 13-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams and give equations wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Multiple choice question. **08**

1) _____ of the following is homozygous recessive.
a) TT b) Tt
c) tt d) None of these

2) The crossing of F1 to either of the parents is known as _____.
a) Test cross b) Back cross
c) F1 cross d) accurate cross

3) When the activity of one gene is suppressed by the activity of a non-allelic gene, it is known as _____.
a) Pseudo-dominance b) Hypostasis
c) Epistasis d) Incomplete dominance

4) _____ phenotypes can occur in the human blood group ABO with alleles IA and IB.
a) 2 b) 3
c) 4 d) 1

5) According to folded fibre model, the diameter of chromatin fiber is _____.
a) 30A° b) 230 nm
c) 230 A° d) 23 A°

6) _____ bacteriophages are responsible for specialised transduction.
a) T4 phages b) Lysogenic phages
c) Lytic phages d) Both (b) and (c)

7) _____ is called the sex-linked disease.
a) Leukemia b) Alzheimer's
c) Malignancy d) Colour blindness

8) Shell coiling in Limnaea (snail) is an example of _____.
a) Maternal inheritance b) Biparental inheritance
c) Paternal inheritance d) Genomic inheritance

Q.2 Answer any Four of the following. **08**

a) Explain monohybrid cross with example.
b) Define Gene Mapping and give any one application.
c) Define Pseudo alleles.
d) Name any two methods of recombination in bacteria.
e) Name two examples of X linked recessive genes.
f) Write a note on Incomplete dominance.

Q.3 Write short notes on any Two of the following. **08**

a) Give account on gene interaction and explain with example.
b) Explain self-incompatibility in plants.
c) Explain the concept of multiple alleles with example of fur color in rabbits.

Q.4 Answer any Two of the following. **08**

a) Write and account on Complementation test.
b) Explain Bacterial Conjugation.
c) Give an account on sex linked inheritance.

Q.5 Answer any One of the following. **08**

a) Explain folded fiber model.
b) Describe Linkage, types and its significance.

SLR-DB-29

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
Genetics-II (BT1302)

Day & Date: Thursday, 14-12-2023 Max. Marks: 40
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 diagrams and give equations wherever necessary.
4) Use of logarithmic table and calculator is allowed.
(At. Wts.: H=1, C=12, O=16, N= 14, Na =23, Cl = 35.5)

Q.1 Choose the correct alternative. **08**

1) _____ of the following is not a type of mutation.
a) Gene mutation b) Chromosomal aberrations
c) Genomatic mutations d) Colourful mutations

2) Most of the genetic disorders are caused due to _____.
a) Mutation
b) The gender of an individual
c) The gross chromosomal abnormalities
d) Environment

3) Direct repeats in the IS element are present _____.
a) Within the transposon b) Upstream the inverted repeat
c) Within the inverted repeat d) Downstream the inverted repeat

4) The characteristics an individual expresses due to their genetic makeup are called:
a) Alleles b) Genotypes
c) Phenotypes d) Recessive traits

5) Lampbrush chromosome found in the oocytes of amphibians is seen in _____.
a) Leptotene b) Diplotene
c) Pachytene d) Zygotene

6) A sampled "a" population has 36% of homozygous recessive genotype (aa). Then the frequency of allele "a" is _____.
a) 0% b) 20%
c) 60% d) 70%

7) _____ kind of aneuploid gamates will be generated if meiotic non disjunction occurs at first division. (n represents haploid no of chromosomes)
a) Only n+1 and n b) Only n-1 and n
c) Both 2n+1 and 2n-1 d) Both n+1 and n-1

8) _____ of the following features is not a quantitative trait.
a) Characters of degree b) Continuous variation
c) Polygenic control d) Discontinuous variation

Q.2 Answer the following questions. (Any Four) **08**

1) Heterozygotes
2) Natural selection
3) Microtubules
4) Patau syndrome
5) Balbiani rings
6) Recessive Alleles

Q.3 Write short notes on (Any Two) **08**

1) Write short note on Lampbrush chromosom.
2) Describe Eukaryotic transposable elements.
3) Write short note on quantitative trait loci (QTL).

Q.4 Answer the following. (Any Two) **08**

1) Explain aneuploidy and euploidy.
2) Explain the difference between Heterochromatin and euchromatin.
3) What is mutation? Explain different type mutagenic agents.

Q.5 Answer the following (Any One) **08**

1) Explain in detail chromosomal aberrations.
2) Explain in detail the factors affecting gene frequency.

SLR-DB-30

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
General Microbiology – I (BT1303)

Day & Date: Friday, 15-12-2023 Max. Marks: 40
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 diagrams and give equations wherever necessary.

Q.1 Choose the correct alternative. **08**

1) The covalent bond which links the cell walls of many gram-positive bacteria containing two modified sugars N-acetylmuramic acid (NAM)and N- Acetyl glucosamine is _____.
a) glycosidic bond b) 1,4-glycosidic bond
c) 1,6-glycosidic bond d) None of the above

2) The cluster of the polar flagella called _____.
a) Peritrichous b) Monotrichous
c) Amphitrichous d) Lophotrichous

3) Autoclaving is carried by use of _____.
a) dry heat b) filtration
c) moist heat d) desiccation

4) _____ of the following induces dimerization of thymine.
a) X-rays b) U.V. rays
c) gamma rays d) IR rays

5) The portion of the growth curve where rapid growth of bacteria is observed is known as _____.
a) Lag phase b) Log phase
c) Stationary phase d) Decline phase

6) In prokaryotic cell ribosomes are _____.
a) 70S b) 80S
c) 60S+40S d) 50S+40S

7) _____ is the first bacteriologist who discovered *Mycobacterium tuberculosis.*
a) Antony Van Leuwenhoek b) Louis Pasteur
c) Robert Koch d) Joseph Lister

8) _____ bacteria having comma shape.
a) E. coli b) Sarcina
c) Spirilla d) Vibrio

Q.2 Answer the following questions briefly (any four): **08**

1) Contribution of Elie Metchnikoff and Joseph Lister.
2) Give characteristics of Archaebacteria.
3) Define synchronous and Diauxic growth.
4) Define viruses and viriods.
5) Define disinfection and germicide.
6) Define mesosomes and give its function.

Q.3 Write short notes on any Two of the following. **08**

1) Contributions of Louis Pasteur
2) Give structure and function of capsule.
3) Write down distribution and occurrence, morphology, mode of reproduction and Economic importance of algae.

Q.4 Answer any Two of the following. **08**

1) Explain shape and arrangement of bacteria.
2) Explain five kingdom classification systems.
3) Explain nutritional requirement of microorganisms based on carbon and energy source.

Q.5 Answer any one of the following. **08**

1) Explain difference between Prokaryotic and Eukaryotic microorganisms
2) Explain various branches of applied microbiology.

SLR-DB-31

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
General Microbiology-II (BT1304)

Day & Date: Saturday, 16-12-2023 Max. Marks: 40
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 & well labelled diagram wherever necessary.

Q.1 Choose the correct alternative. **08**

1) The resolving power of a microscope depends upon _____.
a) the focal length and aperture of the eye lens
b) the focal length and objective of the eye lens
c) The aperture of the objective and the eye lens
d) The wavelength of light illuminating the object

2) Resolving power of light microscope is _____.
a) 2 mm b) 0.2 mm
c) 0.1 mm d) 1mm

3) Congo red is an example of _____ stain.
a) Acidic b) Neutral
c) basic d) Alkaline

4) The temperature of liquid nitrogen used during preservation of bacteria is _____.
a) -196 degree C b) -150 degree C
c) 0 degree C d) -120 degree C

5) _____ is a rich source of vitamin B
a) Yeast Extract b) Beef Extract
c) peptone d) Agar

6) Nichrome wireloop is used in _____ technique.
a) Pour plate b) spread plate
c) Roll tube d) streak plate

7) Bacteria which produces acid through fermentation of glucose is identified by using _____ test.
a) Indol b) methyl Red
c) Voges Prauskauer d) citric acid

8) Some bacteria have the property to generate indol from _____amino acid.
a) Isoleucine b) Cysteine
c) Tryptophan d) Ascorbic acid

Q.2 Answer the following questions. (any four): **08**

1) Define Magnification power and Numerical aperture
2) Define selective, differential and Indicator media with example
3) Give difference between Scanning and Transmission of electron Microscopes.
4) Give principle of catalase test
5) Explain Indol test
6) Explain cell lines as living media.

Q.3 Write short notes on any Two of the following. **08**

1) Explain different components of media used for cultivation of bacteria.
2) Write note on ray diagram to explain working of compound microscope.
3) Explain any two methods of maintenance of pure culture of bacteria.

Q.4 Answer any Two of the following. **08**

1) Explain principle, mechanism, and procedure of cell wall staining.
2) Explain different methods of cultivation of anaerobic bacteria.
3) Explain Direct Microscopic Count method.

Q.5 Answer any one of the following. **08**

1) Explain different methods of isolation of bacteria.
2) Explain working, principle, mechanism and application of Acid fast Staining.

SLR-DB-32

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (New) (CBCS)
Examination: Oct/Nov-2023
Plant Biotechnology-I (BT1305)

Day & Date: Sunday, 17-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams and give equations wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Multiple choice questions. **08**

1) The sterilization by autoclave is done at _____ at 15 lbs pressure.
a) 120°C for 10 min b) 120°C for 15 min
c) 121°C for 10 min d) 121°C for 15 min

2) In plant tissue culture, the Dimethyl sulfoxide is used as _____.
a) gelling agent b) chelating agent
c) alkylating agent d) cryoprotectant

3) The ability of single cells to divide and produce all differentiated cells in the entity is called as _____.
a) Totipotency b) Multipotency
c) Pluripotency d) Unipotency

4) The pair of hormones necessary for callus to differentiate are _____.
a) Ethylene & Auxin b) Auxin & cytokinin
c) Auxin & Abscisic acid d) cytokinin &Gibberellin

5) _____ is defined as external appearance of the cell.
a) Cell division b) cell death
c) cell morphology d) cell growth

6) _____ is father of tissue culture.
a) Gottlieb Haberlandt b) Morel and Martin
c) Xavier Bichat d) Gregor Mendal

7) For cryopreservation, the temperature for storage by liquid _____ cooled at -196°C.
a) oxygen b) neon
c) ammonia d) nitrogen

8) For surface sterilization, _____ % ethanol is used.
a) 100 b) 50
c) 70 d) 10

Q.2 Answer any four of the following. **08**

a) Define callus.
b) Write any two cryo-protecting agents.
c) Define surface sterilization.
d) Define Embryo rescue.
e) Enlist any 2 media used for plant tissue culture.
f) Define Explant.

Q.3 Write short notes on any two of the following. **08**

a) Write a note on Hordeum bulbosum method.
b) Applications of Plant tissue culture.
c) Write a note on advantages of greenhouse.

Q.4 Answer any Two of the following. **08**

a) Write note on Aseptic Manipulation.
b) Explain factors affecting Gynogenesis.
c) Write a note on haploid plant production.

Q.5 Answer any one of the following. **08**

a) Define Greenhouse technology. Explain in detail types of Greenhouse Based on Shape, Utility, Material & Constructions.
b) Define plant tissue culture. Write an assay on various Viability methods used in plant tissue culture.

SLR-DB-33

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (New) (CBCS)
Examination: Oct/Nov-2023
Plant Biotechnology-II (BT1306)

Day & Date: Monday, 18-12-2023 Max. Marks: 40
Time: 09:00 AM To11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams and 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, Cl = 35.5)

Q.1 Multiple choice questions. **08**

1) _____ is NOT secondary metabolite.
a) Carbohydrate b) Alkaloids
c) Terpenes d) Terpenoids

2) *Agrobacterium tumefaciens* is _____.
a) Fungi b) Virus
c) Protozoa d) Bacteria

3) This element plays a key role in the nitrogen fixation is _____.
a) Manganese b) Molybdenum
c) Zinc d) Copper

4) All are plant derived elicitors except _____.
a) chitin b) pectin
c) cellulose d) pectic acid

5) Hairy root cultures for secondary metabolite production are induced by transforming plant cells with _____.
a) Virus b) *Agrobacterium tumefaciens*
c) *Bacillus thuringiensis* d) *Agrobacterium rhizogenes*

6) Texture of oyster mushroom is _____.
a) velvety b) spongy
c) hard d) tough

7) By using the single cell protein the amount of protein that can be produced by algae grown in the ponds (per acer) is _____.
a) 20 tons b) 30 tones
c) 40 tones d) 50 tones

8) Mushrooms are _____ type of fruits.
a) Mold b) Fungus
c) Blackberry d) Cherry

Q.2 Answer the following (Any Four) **08**

a) Plasmid
b) Alkaloid
c) Hygrophonics
d) plant growth promoting bacteria
e) Single cell protein
f) Plantibodies

Q.3 Write short notes on (Any Two) **08**

a) Explain in detail direct gene transfer by electroporation.
b) Explain in detail plant cell culture for production of pigments.
c) Write in brief biofertilizer production using VAM.

Q.4 Answer the following (Any Two) **08**

a) Write short note on vermicomposting technology.
b) Explain in detail floriculture and horticulture methodology.
c) Write note on edible vaccine production by transgenic technology.

Q.5 Answer the following (Any One) **08**

a) Write note on Nitrogen fixation and nodule formation mechanism.
b) Explain in detail development of stress resistant plant varieties with example.

SLR-DB-34

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination: Oct/Nov-2023
Genetics - I (BT301)

Day & Date: Wednesday, 13-12-2023 Max. Marks: 40
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. **08**

1) In _____ the typical Mendelian dihybrid ratio is changed to 9:7.
a) Complementary gene action b) Supplementary gene action
c) Inhibitory gene action d) Mutualistic gene interaction

2) Petite mutants in the _____ has defective respiratory chain pathway.
a) *Arabidopsis thaliana* b) *Saccharomyces cerevisae*
c) *E. coli* d) *Zea mays*

3) _____ is known as blood clotting disorder.
a) Hemophilia b) Colorblindness
c) Hypertrichosis d) Night blindness

4) _____ bacterial strain naturally undergoes transformation.
a) *E. coli* b) *Thermus aquaticus*
c) *D. pneumoniae* d) *Mycobacterium tuberculosis*

5) _____ contains *tra* genes actively involved in conjugation process of bacterial cells.
a) 'Ti' plasmids b) 'F' plasmids
c) pBR322 d) pUC18

6) _____ discovered the process of conjugation in bacteria.
a) A. Hershey and M. Chase b) J. Lederberg and E. Tatum
c) J. Lederberg and N. Zinder d) Avery, MacLeod and McCarthy

7) Cytoplasmic genes are located on organelles like _____.
a) lysosomes & chloroplast b) lysosomes & plasmids
c) Ribosomes & chloroplast d) mitochondria & chloroplast

8) In linkage mapping, the distance between two genes is measured in terms of **_____.**
a) Centimorgan b) base pairs
c) Metre d) kilo base pairs

Q.2 Answer any four of the following. **08**

a) Define epistasis.
b) What is Y liked genes?
c) What is hemophilia?
d) Define supplementary gene action.
e) Define incomplete dominance.
f) Define Complementation test.

Q.3 Write short notes on any two of the following. **08**

a) Describe mechanism of sex determination in animals with suitable examples.
b) Describe mechanism of generalized transduction in bacteria.
c) Write about types and significance of linkage.

Q.4 Answer any two of the following. **08**

a) Explain process of linkage gene mapping with suitable example.
b) Describe law of segregation with suitable example.
c) Describe X linked inheritance with suitable examples.

Q.5 Answer any one of the following. **08**

a) Describe multiple alleles with any two suitable examples.
b) Describe process of transformation in bacteria with neat labeled diagram.

SLR-DB-35

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination: Oct/Nov-2023
Genetics - II (BT302)

Day & Date: Thursday, 14-12-2023 Max. Marks: 40
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 labeled diagrams and give equations wherever necessary.
4) Use of logarithmic table and calculator is allowed.

Q.1 Multiple choice questions: **08**

1) LINES stands for _____.
a) Long interspersed Nuclear sequences
b) Large interspersed Nuclear sequences
c) Long interrelated Nuclear sequences
d) Large interrelated Nuclear sequences

2) Polytene chromosome is also known as _____ chromosome.
a) Lamp-brush b) salivary gland
c) test tube brush d) Polyploidy

3) Jumping genes were first discovered by _____ in 1958.
a) Barbara McClintock b) H. J. Muller
c) T. H. Morgan d) G. J. Mendel

4) In _____ both pairs of homologous chromosomes were lost
a) Nullisomy b) Trisomy
c) Tetrasomy d) Monosomy

5) The “Y” Chromosome is placed in _____ of the Human Karyotype Analysis
a) Group B b) Group E
c) Group G d) Group D

6) _____ is combination of all genes in an interbreeding population.
a) Gene pool b) Gene Frequency
c) Genotype Frequency d) Gemetic pool

7) In _____ female is born with only one sex chromosome.
a) Nightblindness b) Thalassemia
c) Turner syndrome d) Down’s syndrome

8) _____ are the cumulative actions of many genes and the environment.
a) Pleiotropy b) multiple alleles
c) Qualitative traits d) quantitative traits

Q.2 Answer the following questions briefly. (Any Four) **08**

a) Define heterochromatin.
b) What mutation?
c) What is anneuploidy?
d) Define macro satellite DNA.
e) Define Gene frequency.
f) Define range

Q.3 Write notes on any Two of the following. **08**

a) Describe effect of the environment on quantitative traits.
b) Explain mechanism transposition of DNA transposons.
c) Explain numerical aberrations in chromosomes.

Q.4 Write notes on any Two of the following, **08**

a) Describe Hardy-Weinberg law with suitable example.
b) Explain factors affecting gene frequency in Mendelian population.
c) Describe structure and function of X chromosome

Q.5 Answers any One of the following. **08**

a) Describe structural aberrations in chromosomes.
b) Write process of mitosis with neat labeled diagram

SLR-DB-36

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS)
Examination: Oct/Nov-2023
General Microbiology - I (BT303)

Day & Date: Friday, 15-12-2023 Max. Marks: 40
Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Fill in the blanks by choosing correct alternatives. **08**

1) Alexander Fleming discovered _____ antibiotic.
   a) Penicillin b) Streptomycin
   c) Tetracycline d) Methicilin

2) The type of ribosome present in a prokaryotic cell is _____.
   a) 25 S b) 70 S
   c) 100 S d) 120 S

3) Number of chromosome present in a prokaryotic cell is _____.
   a) 1 b) 2
   c) 3 d) 4

4) The organism which uses CO_2 as a carbon source and light as an energy belongs to _____.
   a) Photoautotroph b) Chemoautotroph
   c) Photoheterotroph d) Chemoheterotroph

5) The filterable nature of viruses was first discovered by _____.
   a) Ivanowsky b) Herelle & Twort
   c) Stanley d) Hashimoto

6) Which of the following is not found in bacterial cell?
   a) Cell membrane b) Ribosome
   c) Nucleoid d) Mitochondria

7) The organisms which can grow best in the presence of a low concentration of oxygen are called as _____.
   a) Anaerobes b) Aerobes
   c) Microaerophilic d) Aerophilic

8) The first phase of growth curve is _____.
   a) log b) lag
   c) decline d) stationery

Q.2 Answer the following questions briefly. (Any Four) **08**

1) Write the general characteristics of Archaebacteria.
2) Distinguish between prokaryotic and eukaryotic cell.
3) Explain numerical taxonomy.
4) Define sterilization.
5) What is phonetic classification?
6) Write about the contribution of Louis Pasteur.

Q.3 Write notes on any Two of the following. **08**

1) Structure of Gram-positive cell wall
2) Bacterial nomenclature
3) Pasteurization

Q.4 Write notes on any Two of the following. **08**

1) Radiation method for sterilization
2) Structure and function of flagella
3) Bacterial growth curve

Q.5 Answer any One of the following. **08**

1) Explain structure and general characteristics of viruses.

2) Explain in detail conditions required for growth of microorganisms.

SLR-DB-37

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination: Oct/Nov-2023
General Microbiology-II (BT304)

Day & Date: Saturday, 16-12-2023 Max. Marks: 40
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 diagram wherever necessary.

Q.1 Multiple choice questions. **08**

1) Capsule staining is performed by using _____ method.
a) Chances b) Gram
c) Manvels d) Alberts

2) Oil immersion objective lens has NA value of _____.
a) 0.65 b) 0.85
c) 1.33 d) 1.00

3) _____ water is recommended to prepare culture media.
a) Tap water b) Mineral water
c) Distilled water d) Hot water

4) In pour plate method the medium should be maintained at _____ temperature.
a) 67 b) 37
c) 0 d) 45

5) The temperature of liquid nitrogen is _____.
a) -196 degree C b) -150 degree C
c) 0 degree C d) -20 degree C

6) In Gram staining Iodine is used as _____.
a) Stain b) decolorizer
c) Solubilizer d) mordant

7) Methyl Red test is performed to detect _____ production.
a) Acid b) Indole
c) Citrate d) acetoin

8) Reagent used for indole test is _____.
a) alpha Naphthol b) Methyl red
c) Kovac reagent d) KOH

Q.2 Answer the following questions. (any four): **08**

1) Define Bright field Microscope and dark field microscope.
2) Define magnification power of compound microscope.
3) Define natural media and give its examples.
4) Give applications of Pour plate technique.
5) Define stain and dye.
6) Give Long form of IMViC test.

Q.3 Write short notes on any Two of the following. **08**

1) Give components of Media used for cultivation of bacteria.
2) Explain mechanism of monochrome staining.
3) Explain casein hydrolysis and starch hydrolysis test.

Q.4 Answer any Two of the following. **08**

1) Explain any four methods of preservation of bacteria.
2) Give difference between Scanning and transmission electron microscopy
3) Explain living media

Q.5 Answer any one of the following. **08**

1) Explain principle, components, and application of bright field microscopy.
2) Explain Direct and indirect methods of cell enumeration.

SLR-DB-38

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination: Oct/Nov – 2023
Plant Biotechnology - I (BT305)

Day & Date: Sunday, 17-12-2023 Max. Marks: 80
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.

Q.1 Fill in the blanks by choosing correct alternatives: **08**

1) _____ (1987) have proposed that essential elements can be classified according to their biochemical role and physiological function.
   a) Murashige and Skoog b) Gamborget. al.
   c) Mengel and Kirby d) Nisch and Nisch

2) An organized structure formed following a predetermined mode of development inside the female gametophyte with or without fertilization is known as _____.
   a) Endosperm b) Culture
   c) Zygote d) Embryo

3) Total variability of genetic material of a particular species is known as _____.
   a) germplasm b) genotype
   c) biom d) phenoplasm

4) The terminal portion of a stamen which contains pollen in pollen sacs is called _____.
   a) microspore b) megasporangium
   c) stigma d) anther

5) _____ is an example of auxin.
   a) Indole Acetic Acid b) Isopentenyl-adenine
   c) Thidiazuron d) Zeatin

6) Acclimatization of micropropagated plants on a large scale is generally carried out in _____.
   a) polyhouse b) refrigerator
   c) soil d) water

7) Preservation and storage of cells, tissues and organs at temperatures around -196 oC or by immersion into liquid nitrogen is known as _____.
   a) protoplast culture b) androgenesis
   c) micropropagation d) cryopreservation

8) _____ is an in vitro culture technique used to assist in the development of an immature or weak embryo into a viable plant.
   a) Greenhouse Technology b) Embryo rescue
   c) Algal culture d) Mushroom technology

Q.2 Answer the following questions briefly (Any Four) **08**

a) Define Plant Biotechnology.
b) Explain micronutrients used for plant tissue culture medium.
c) What is embryo rescue?
d) Define anther culture.
e) Define germplasm and enlist methods of germplasm storage.
f) Write significance and uses of haploids.

Q.3 Write notes on any two of the following. **08**

a) Basic Techniques In Plant Tissue Culture.
b) Gynogenic Haploids and Factors Affecting Gynogenesis.
c) Advantages of Greenhouse.

Q.4 Write notes on two of the following. **08**

a) Objectives and applications of Embryo Culture
b) Anther culture
c) Slow Growth Method of germplasm storage

Q.5 Answer any one of the following. **08**

a) Define viability and add a note on Evan's Blue Staining.
b) Discuss Basic Techniques in Plant Tissue Culture.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination: Oct/Nov-2023
Plant Biotechnology – II (BT306)

Day & Date: Monday, 18-12-2023 Max. Marks: 40
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 labeled diagrams wherever necessary.

Q.1 Choose the correct alternative and rewrite the sentences again. **08**

1) _____ bacterium is called as "Natural Genetic Engineer".
a) *Agrobacterium tumefaciens* b) *Agrobacterium radibacter*
c) *Pseudomonas putida* d) *Thermus aquaticus*

2) _____ is not a plant derived alkaloid.
a) Nicotine b) Quinine
c) Codeine d) Menthol

3) The variation *in vitro* culture is called _____.
a) Ex situ variation b) Mutation
c) Somaclonal variation d) Natural variation

4) Vermicompost is used as Biofertilizer because it is rich in _____.
a) Calcium b) Nitrogen
c) Phosphorus d) All of these

5) SCP stands for _____.
a) Single cell protein b) Stress cultivated plants
c) Somatic cultivation of plants d) Somaclonal Plants

6) _____ is a mushroom.
a) Funaria b) Drypteris
c) Agaricus d) Ferns

7) A vaccine is _____.
a) An antigenic protein b) Killed microbe
c) Attenuated microbe d) All of these

8) The process of expression of foreign genes in plant is called _____.
a) Gene expression b) Transgenesis
c) Genetic transformation d) Cell hybridization

Q.2 Answer the following questions (Any Four): **08**

a) Plasmid
b) Metabolites
c) Pathogen
d) Plant growth regulator
e) Single cell protein
f) Vaccine

Q.3 Write notes on any two of the following. **08**

a) Direct gene transfer methods
b) Bio-fertilizers
c) Mushroom cultivation

Q.4 Write notes on any two of the following. **08**

a) Write in brief GM technology' and crop improvement
b) Explain in brief Indirect gene transfer methods.
c) Describe in brief Bio-control agents.

Q.5 Answer any one of the following. **08**

a) Write in detail Edible vaccines and antibiotics using transgenic technology.
b) Write an essay Metabolic engineering.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
Molecular Biology (Paper - I) (BT401)

Day & Date: Wednesday, 13-12-2023 Max. Marks: 40
Time: 12:00 PM To 02:00 PM

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

Q.1 Multiple choice question. **08**

1) Watson and Crick's suggestion of the complementary strand synthesis taking one of the parent strand as template was proposed _____.
a) 1869 b) 1909
c) 1953 d) None of these

2) A codon contain how many nucleotide.
a) 1 b) 2
c) 3 d) 4

3) Which of the following does not take part in gene expression?
a) Replication b) Transcription
c) RNA processing d) Translation

4) If DNA Strand has nitrogenous base sequence ATTGCC, the mRNA will have _____.
a) ATTGCA b) UGGACC
c) UAACGG d) ATCGCC

5) Which of the following enzymes separate the two strands of DNA during replication.
a) Gyrase b) Helicase
c) Topoisomerase d) DNA polymerase

6) DNA polymerase synthesize _____.
a) DNA 5'-3' direction b) DNA 3'-5' direction
c) mRNA 3'-5'direction d) mRNA5'-3'direction

7) _____ is of the following has the self-ripening mechanism.
a) DNA & RNA b) Only DNA
c) DNA, RNA & Protein d) DNA and protein

8) Eukaryotes differ from prokaryotes in mechanism of DNA replication due to _____.
a) Use of DNA primer rather than RNA primer
b) Different enzyme for synthesis of logging and leading strand
c) Discontinuous rather than semi discontinuous replication
d) Undirectional rather than semi discontinuous replication

Q.2 Answer any four of the following. **08**

a) B-DNA.
b) Cot curves.
c) Draw the Structure of DNA.
d) What is mean by Codons?
e) Nucleotide.
f) DNA polymerase.

Q.3 Write short notes on any two of the following. **08**

a) Write note on Denaturation and Renaturation of DNA.
b) Explain in Brief Replication of linear ds -DNA.
c) Write note on Mismatch Repair.

Q.4 Answer Any two of the following. **08**

a) Describe DNA ligase, its structure and function.
b) D-loop (Mitochondria) replication Model.
c) Write note on Base Excision Repair

Q.5 Answer any one of the following. **08**

a) Describe in Detail Genetic code evidences and its properties.
b) Explain in Detail Eukaryotic DNA replication.

SLR-DB-41

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
Molecular Biology (Paper - II) (BT402)

Day & Date: Thursday, 14-12-2023 Max. Marks: 40
Time: 12.00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Draw neat diagrams and give equations wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Rewrite the following sentences by choosing the correct alternative: 08

1) Messenger RNAs are found in the _____.
a) nucleus b) nucleolus
c) lysosome d) cytoplasm

2) Genes with intervening (non-coding) sequences are called _____.
a) axons b) split genes
c) exons d) jumping genes

3) _____ prevents the digestion of mRNA by exonucleases.
a) methyl-guanosine cap b) bromophenol blue
c) poly(A) tail d) methylene blue

4) The first transesterification reaction between the branch point site and the 5' splice site is a _____ reaction.
a) SN1 b) E1
c) SN2 d) E2

5) In protein synthesis, translocation is initiated with the movement of _____.
a) tRNA from P-site to E-site
b) dipeptidyl tRNA from A- site to P-site
c) tRNA from P-site to the A- site
d) tRNA from A-site to P-site

6) The rho protein has _____ subunit.
a) 4 b) 8
c) 6 d) 10

7) The pre-mRNA binding minor splicosome is also known as _____.
a) AT - GC splicosome b) AT - AC splicosome
c) AG - CT splicosome d) AC - AG splicosome

8) All mRNA precursors are synthesized by _____.
a) RNA polymerase I b) RNA polymerase II
c) RNA polymerase III d) RNA polymerase IV

Q.2 Answer Any four of the following: 08

a) Charging of t-RNA.
b) Draw Structure of Ribosome.
c) Transcription Unit
d) Split Genes
e) Operon Concept
f) Exon Shuffling

Q.3 Write short notes on any two of the following. **08**

a) Write a note on Translation in prokaryotes.
b) Discuss in detail about prokaryotic RNA polymerase.
c) Explain in detail about splicing pathways.

Q.4 Answer any two of the following. **08**

a) Write a detailed note on mRNA transport.
b) Explain Inhibitors of protein synthesis.
c) Add a note on Lac operon.

Q.5 Answer any One of the following. **08**

a) Write a detailed note on Transcription in eukaryotes.
b) Define RNA editing and Explain in detail about splicing pathways.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
IMMUNOLOGY (Paper - I) (BT403)

Day & Date: Friday, 15-12-2023 Max. Marks: 40
Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Fill in the blanks by choosing correct alternatives. **08**

1) Horny outer layer of the skin called stratum corneum is made up of _____.
a) fatty acid b) cartilage
c) sebum d) keratin

2) Hematopoietic-Inducing Microenvironment (HIM) is provided by _____.
a) Erythrocytes b) Stromal cells
c) NK cells d) Progenitor cells

3) _____ cells in the skin shows features of macrophages and dendritic cells.
a) Alveolar b) Kuffer
c) Langerhans d) Microglial

4) T cells mature in _____.
a) thymus b) lymph node
c) bone marrow d) spleen

5) Antigen showing immunogenicity and immunological reactivity are _____.
a) Incomplete antigens b) Haptens
c) Adjuvants d) Complete antigens

6) Dimeric form of antibody is _____
a) secretary IgA b) serum IgA
c) IgM d) IgE

7) Antibody mediated complement activation is called _____ pathway.
a) Lectin b) Alternative
c) Classical d) Properdine

8) Two or more cytokines that mediate similar functions are called _____.
a) synergetic b) redundant
c) cascade d) pleiotropic

Q.2 Answer the following questions briefly. (Any four) **08**

a) Inflammation
b) Primary lymphoid organs
c) Antigenicity
d) Fc
e) Antigen presentation
f) Propidine

Q.3 Write notes on any two of the following. **08**

a) Haematopoisis
b) Mononuclear phagocytes
c) Adjuvant

Q.4 Write notes on any two of the following. **08**

a) Write in detail structure and functions of IgA.
b) Explain in detail classical pathway of complement activation.
c) Describe in detail structure of Cytokine receptors.

Q.5 Answer any one of the following. **08**

a) Write in detail structure and functions of MHC molecules.

b) Explain the structure and functions of lymph node and spleen.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
Immunology (Paper-II) (BT404)

Day & Date: Saturday, 16-12-2023 Max. Marks: 40
Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams wherever necessary.
3) Figures to the right indicate full marks.

Q.1 Choose the correct alternative from the option. **08**

1) In primary immune response _____ antibody is predominant.
a) IgE b) IgD
c) IgG d) IgM

2) Ubiquitin linked proteins are degraded by proteosome during the processing of antigen for_____.
a) Exogenous antigen b) phagocytosized antigen
c) Cytosolic pathway d) Endocytic pathway

3) _____ is the example of Hemolytic autoimmune disease.
a) Thrombocytopenia b) Hashimoto's disease
c) Addison's disease d) Myasthenia Gravis

4) Serotonin, primary mediator of Anaphylaxis is formed by decarboxylation of _____.
a) Alanine b) Tryptophan
c) Lysine d) Histidine

5) _____ is the live attenuated vaccine.
a) BCG b) TAB
c) TT d) DT

6) Widal test is example of _____ test.
a) Immune-electrophoresis b) RIA
c) Precipitation d) Agglutination

7) Major changes in the antigenic structure of influenza viruses are celled _____.
a) Antigenic variation b) Signal transduction
c) Antigenic shift d) Attenuation

8) Mature antibody-secreting cells are called _____.
a) T cells b) Plasma cells
c) Neutrophils d) Immunoblasts

Q.2 Answer the following questions briefly. (any four) **08**

a) Activation of B cell
b) Differentiation of T cells
c) Hypersensitivity
d) Avidity
e) Endogenous antigen
f) Non-specific antibodies

Q.3 Write short notes on any two of the following. **08**

a) Precipitation
b) Endocytic pathway
c) Myasthenia Gravis

Q.4 Write notes on any two of the following. **08**

a) Explain the ELISA.
b) Describe in brief Specific and Nonspecific immunity to Viruses.
c) Write in brief on non-organ specific autoimmune disease rheumatoid arthritis.

Q.5 Answer any one of the following. **08**

a) Describe in detail DNA and rDNA vaccines.
b) Explain in detail cell mediated immunity.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS)
Examination: Oct/Nov-2023
Animal Biotechnology (Paper-I) (BT405)

Day & Date: Sunday, 17-12-2023 Max. Marks: 40
Time: 12:00 PM To 02:00 PM

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

Q.1 Choose the correct alternative from the given option. **08**

1) The part cell contains the information that is passed from one generation to the next is _____.
a) Plasma membrane b) Nucleus
c) Peroxisome d) Cytoplasm

2) The international agreement of Cartagena Protocol was established conjunction with _____.
a) Global Summit
b) Convention on Biological Diversity (CBD)
c) Government of India
d) Nagoya

3) The name of the sheep developed by nuclear transfer technique is _____.
a) Elle b) Rosie
c) Mary d) Dolly

4) Induced pluripotent cells can be generated directly from _____.
a) Adult cells b) endometrial cells
c) cancer cells d) epithelial cells

5) Cell differentiation in promoted under _____ conditions.
a) High Ca2+ concentration
b) High cell density
c) Presence of differentiation inducers
d) All of these

6) The full form of GLP is _____.
a) Good Laboratory Promotion b) Good Laboratory Practices
c) Good Leader Practices d) Good Lab Practice

7) Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as _____.
a) transgenic animals b) infected animals
c) Bt animals d) animals

8) The genetically identical copies of living organisms produced are called _____.

a) Twinning
b) Cloning
c) Mating
d) Reproducing

Q.2 Answer the any four of the following. **08**

a) Cytotoxicity
b) Transgenesis
c) Primary Cell culture.
d) Culture efficiency
e) Recombinant retroviruses
f) Cell differentiation

Q.3 Write short note on any two of the following. **08**

a) Define Stem cell and explain types of Stem cells.
b) Write a note on Stem cell culture techniques.
c) Discuss in detail about Characterization of cultured cells.

Q.4 Answer any two of the following. **08**

a) Explain applications of Stem cells.
b) Write a note on Embryo transfer techniques.
c) Add a note on Cartagena protocol on biosafety.

Q.5 Answer any one of the following. **08**

a) Write a note on GMP and GLP.
b) Discuss in detail on nuclear transfer and In Vitro Fertilization.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS)
Examination: Oct/Nov-2023
ANIMAL BIOTECHNOLOGY (Paper-II) (BT406)

Day & Date: Monday, 18-12-2023 Max. Marks: 40
Time: 12:00 PM To 02:00 PM

Instructions: 1) All questions are compulsory.
2) Draw neat labeled diagrams and 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, Cl = 35.5)

Q.1 Choose the correct alternative and rewrite the following sentences. **08**

1) The inserted normal gene takes over the function of _____ gene.
a) functional b) right
c) correct d) non-functional

2) _____ standards are required to evaluate the morality of all human activities.
a) Ethical b) Pathological
c) Psychological d) Social

3) A person with the hereditary disease can be cured with the help of _____.
a) gene therapy b) dialysis
c) chemotherapy d) cloning

4) GEAC makes decisions regarding the validity and the safety of _____ organisms.
a) damaged b) infected
c) genetically modified d) dead

5) A person with the hereditary disease can be cured with the help of _____.
a) dialysis b) gene therapy
c) cloning d) chemotherapy

6) Transgenic animals have _____.
a) Foreign amino acid b) Foreign gene
c) Foreign protein d) Foreign lipid

7) MAbs was modified for delivery of a toxin, radioisotope and _____.
a) Cytokine b) Drugs
c) Enzymes d) Hormones

8) "Trypanosomiasis" is transmitted by _____.
a) Housefly b) Fruit fly
c) Mayfly d) Tse-tse fly

Q.2 Answer any four of the following. **08**

a) Define Coccidiosis.
b) Define Gene Therapy.
c) What is Ethical issue?
d) Define Gene augmentation.
e) Define Transgenic Animals.
f) Enlist applications of Animal Biotechnology.

Q.3 Write short notes on any two of the following. **08**

a) Explain in detail about Theileriosis.
b) Write a note on Use of animals for research and testing.
c) Add a detail note on production of monoclonal antibodies.

Q.4 Answer the following. (Any Two) **08**

a) Discuss in detail about cell culture based vaccines.
b) Write a note on Ethical issues associated with consumptions of genetically modified foods.
c) Explain in detail about Trypanosomiasis.

Q.5 Answer any one of the following. **08**

a) Define Vector and add a note on its role in gene therapy.
b) Write a brief note on Transgenic mice model for tackling human diseases.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination: Oct/Nov-2023
ENGLISH
Business English (BT501)

Day & Date : Saturday, 02-12-2023 Max. Marks: 40
Time: 03:00 PM To 05:00 PM

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

Q.1 Rewrite the sentence by filling the blanks with the correct answer from the given options. **08**

1) What occasion is being celebrated in the story 'The Gift of the Magi'?
a) Easter b) Christmas
c) New Year's d) Della's birthday

2) Who came to visit Phatik's mother?
a) Their grandfather b) Their uncle
c) Their aunt d) Cousin

3) The girl in the poem 'The Solitary Reaper' was _____.
a) reaping and singing b) cutting and bending
c) singing and dancing d) reaping and quarrelling

4) The Queen Gulnaar desires _____.
a) The King's attention b) more jewellary
c) a rival d) more clothes

5) The schoolmaster lives in _____.
a) cottage b) bunglow
c) mansion d) apartment

6) The 'road' in the poem of Robert Frost is the symbol of _____.
a) the difficulties of life b) the fun in life
c) the attractive aspects in life d) the choice in life

7) He has sold his car. (change the voice of this sentence)
a) His car had been sold by him b) His car has been sold by him
c) His car have being sold by him d) His car having been sold by him

8) Don't lose hope. Keep _____ and you will surely succeed. (Fill in the blanks with choosing correct phrasal verb of the following alternatives)
a) going b) going on
c) going with d) going at

Q.2 Answer the following questions. (Any Four) **12**

1) Who are the Magi? Why are Della and Jim called Magi?
2) Why did Phatik suffocated in the big city?
3) Describe the use of nature and harmony in the poem 'The Solitary Reaper.'
4) Why is the Queen Gulnaar unsatisfied and seeks a rival?
5) Describe the character of the village schoolmaster.
6) What is the significance of the two roads in the poem?

Q.3 Answer the following (Any One) **10**

1) What is the importance of 21st Century skill?

OR

2) Explain the types of 21st Century skill.

Q.4 Write down long answer of the following question **10**

What are the most important learning skills of 21st century?

SLR-DB-47

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination: Oct/Nov-2023
Bioprocess Technology (BT502)

Day & Date: Sunday, 03-12-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

Q.1 A) Choose the correct alternative from the options. **10**

1) The commercial production of a fermentation product is carried out by using _____ fermenter.
a) Batch b) Industrial
c) Lab scale d) Pilot plant

2) The fermentation media whose exact chemical composition is known are called as _____ fermentation media.
a) Semisynthetic b) crude
c) complex d) synthetic

3) In bioreactors _____ are used for mixing of fermentation medium & microbial cells.
a) Spargers b) Impellers
c) Baffles d) Probes

4) Out of the following, _____ is a method used for cell lysis.
a) ultra-sonication b) centrifugation
c) agitation d) None of these

5) The first phase of Bacterial growth curve is _____ phase.
a) Lag b) Log
c) Stationary d) Decline

6) Molasses is the waste of _____ industry.
a) Food & dairy b) Alcohol
c) Paper & Pulp d) Sugar refinery

7) In Bioreactor, aeration is achieved by _____.
a) impellers b) Spargers
c) pH sensors d) water jacket

8) After centrifugation the sediment that accumulates at the bottom is called as _____.
a) Supernatant b) Clot
c) Pellet d) Filtrate

9) Process of extracting fermentation product from fermented broth is called as _____.
a) downstream process b) solid liquid extraction
c) solvent recovery d) solvent stabilization

10) Fed-Batch culture is a _____ culture system.
a) open b) closed
c) Isolated d) Semi-closed

B) Define following terms. **06**

1) Centrifugation
2) Formulation
3) Effluent
4) Precursor
5) Batch culture
6) Inoculum

Q.2 Solve the following questions. (Any Eight) **16**

1) Write any two names of fermented products.
2) Give two examples antifoam agents.
3) Write functions of sampling point in bioreactor.
4) Draw a neat labelled diagram of bacterial growth curve
5) Give names of any two examples of growth factors in fermentation medium
6) Give two types of filtration methods.
7) Name any two microbes involved in Lactic acid production.
8) Give any two types of bioreactors.
9) Name any two Amylase producing microbes.
10) What is transformation?

Q.3 A) Attempt the following questions. (Any Two) **10**

1) Describe Computer application in fermentation technology.
2) Write a note on Sterilization of bioreactor.
3) Write a note on Carbon sources in fermentation medium.

B) Describe in detail Fermentation medium. **06**

Q.4 A) Write Short Notes. (Any Two) **08**

1) Air sterilization methods
2) Methods of cell lysis
3) Recovery of Ethanol

B) Give a detailed account of Batch & continuous culture systems. **08**

Q.5 Attempt any Two of the following. **16**

a) Give a detailed account of downstream processing (DSP).
b) Write in detail about the Lactic acid production.
c) Give a detailed account on physical, chemical & biological parameters for bioprocess measurement and control system.

SLR-DB-48

Seat No.		Set	P

B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination: Oct/Nov-2023
Recombinant DNA Technology (BT503)

Day & Date: Monday, 04-12-2023 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) Draw neat labelled diagrams wherever necessary.

Q.1 A) Multiple choice questions. **10**

1) Klenow fragment is the _____ without 5' to 3' exonuclease activity.
   a) DNA polymerase III b) DNA polymerase II
   c) DNA polymerase I d) Reverse transcriptase

2) _____ are short section of DNA or RNA with an additional tagged or labeled chemical entity that are used for detection of candidate nucleic acid molecule.
   a) blots b) target sequences
   c) nicks d) probes

3) In recombinant screening, the mutant requiring an additional nutrient than normal strain is known as _____.
   a) Pleotroph b) pleomorph
   c) an auxotroph d) an oligotroph

4) In _____ technique, organisms may be differentiated by analysis of patterns derived by cleavage of their DNA.
   a) RFLP b) RAPD
   c) RAT d) RTPCR

5) Repetitive addition of deoxyribonucleotides to 3' OH oligodeoxyribonucleotides or DNA strands is catalyzed in presence of _____.
   a) reverse transcriptase
   b) terminal deoxynucleotidyl transferase
   c) ligase
   d) polynucleotide kinase

6) Overwinding or underwinding of DNA is regulated by _____ enzymes.
   a) Helicases b) Gyrases
   c) Polymerases d) Topoisomerases

7) A thermostable Taq polymerase commonly used in PCR is isolated from _____.
   a) Thiobacillus aquatica b) Treponema aquaris
   c) Trichoderma aquatica d) Thermus aquaticus

8) The first human protein produced through recombinant DNA technology is _____.
   a) somatostatin b) interferon
   c) erythropoietin d) insulin

9) Blue white screening of recombinants is based on the use of _____ enzyme.
   a) Alpha amylase b) Beta galactosidase
   c) Alkaline phosphatase d) Invertase

10) The PCR technology was invented by _____.
   a) James Watson b) Fredric Sanger
   c) Robert Koch d) Kary Mulis

B) Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc. **06**

1) Give 2 examples of restriction endonucleases?
2) What is the role of reverse transcriptase?
3) What is the use of transduction in rDNA technology?
4) What is site directed mutagenesis?
5) Enlist names of molecular markers.
6) What are plasmids? Give an example.

Q.2 Answer the followings (Any Eight): **16**

a) Which enzymes are used in rDNA technology?
b) What is the role of ligase enzymes?
c) What are vectors? Give an example.
d) What is RFLP?
e) What are the steps in PCR technology?
f) Give an example of protein engineering technology.
g) What is the difference between exonuclease and endonuclease?
h) What are transgenic plants? Give an example.
i) What is Real Time PCR?

Q.3 A) Attempt any two of the following questions. **10**

1) Describe the concept of mutagenesis with respect to genetic engineering.
2) Write a note on protein engineering.
3) Describe isolation and purification of DNA.

B) Write an account on molecular markers in rDNA technology. **06**

Q.4 A) Attempt any two of the following questions. **08**

1) Describe the Sangers methods of DNA sequencing.
2) Write a note on blue white screening of recombinants.
3) Write a note on DNA transfer techniques in rDNA technology.

B) Describe/Explain/Solve **08**

Write an account Polymerase Chain Reaction.

Q.5 Attempt any two of the following questions. **16**

a) Write an account on enzymes in rDNA technology.
b) Write an account on Vectors in rDNA technology.
c) Write an account on applications of rDNA technology.

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Set No.		Set	P

B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination: Oct/Nov-2023
Bioinformatics (BT504)

Day & Date: Tuesday, 05-12-2023 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) Draw neat and labeled diagrams wherever necessary.

Q.1 A) Rewrite the following sentences by using correct alternative. **10**

1) Smith-waterman algorithm is used for _____ alignment.
   a) Global b) Local
   c) Pairwise d) Multiple

2) _____ is not a protein sequence database.
   a) PIR b) ENA
   c) BLOCKS d) TrEMBL

3) The structural database of nucleic acid is _____.
   a) PDB b) NRL-3D
   c) GenBank d) NDB

4) GenBank was established in _____.
   a) 1998 b) 1990
   c) 1982 d) 1979

5) _____ is a sequence submission tool in GenBank database.
   a) BankIt b) Webin
   c) BankIt & Sequin d) SAKURA

6) Henikoff & Henikoff developed _____ scoring Matrices.
   a) BLOSUM b) PAM
   c) MAP d) ENSEMBL

7) Based on number the sequence alignment is classified in to _____.
   a) 2 b) 3
   c) 4 d) 5

8) Primary protein sequence was analyzed by using _____.
   a) SOPMA b) ProtParam
   c) SWISSMODEL d) RasMol

9) _____ tool is used construct dendrogram to study the evolutionary relationship.
   a) ClustalW b) BLAST
   c) MEGA d) GOR

10) _____ Elements of phylogeny.
   a) Node b) Taxon
   c) Branch d) Bootstrap

B) Definition. **06**

1) GOR
2) REMTrEMBL
3) Random coils
4) MIPSx
5) BLASTx
6) Motif

Q.2 Solve any Eight of the following. **16**

a) What is BLOSUM62?
b) What is ancestor?
c) What is SAKURA?
d) Describe UPGMA method for constructing phylogenetic tree.
e) What is PROSITE? Mention its importance in protein analysis.
f) What is phenogram?
g) What is E-Value? Mention its significance alignment.
h) What is BLASTn? Write its uses.
i) What is FASTA format? Describe its uses.
j) What is OWL? Enlist the databases composed in OWL.

Q.3 A) Attempt any two of the following. **10**

1) Write a note on Entrez and its resources.
2) Write a note on structure classification databases.
3) Write a note on eukaryotic gene prediction tools.

B) Describe the elements of phylogeny. **06**

Q.4 A) Attempt any Two of the following. **08**

1) Describe the PDB and MMDB database.
2) Describe the global and local alignments.
3) Describe the scope and applications of bioinformatics.

B) Explain primary protein sequence databases. **08**

Q.5 Attempt any Two of the following. **16**

a) Explain the principle nucleic acid sequence databases.
b) Explain tertiary structure prediction from protein sequence using Swiss-Model.
c) Explain multiple sequence alignment using Clustal W.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination: Oct/Nov-2023

Intellectual Property Rights (BT505)

Day & Date: Wednesday, 06-12-2023 Max. Marks: 80
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) Multiple choice questions. **10**

1) Intellectual Property Rights protect the use of information and ideas that are of _____.
   a) social value b) commercial value
   c) ethical value d) moral value

2) Intellectual Property Rights in India covers _____.
   a) Patents b) Copyrights
   c) Trademarks d) All of these

3) Rajiv Gandhi School of Intellectual Property Rights Law is located in _____.
   a) Solapur – Maharashtra
   b) Chennai - Tamil Nadu
   c) Kharagpur - West Bengal
   d) Surat – Gujrat

4) The Paris Convention was first signed on the _____ which makes it the first and oldest global treaties on Intellectual Property.
   a) 20th March, 1883 b) 12 February, 1986
   c) 1 May 2000 d) 07 June 2022

5) Section 63 of the Patents Act, 1970 allows a patentee to _____ a patent.
   a) file b) withdraw
   c) cancel d) surrender

6) Full Form of UPOV is _____.
   a) International Union for the Protection of New Varieties of Plants
   b) Union of Patents of Varieties
   c) United Poland of Varieties
   d) Umbrella Patent On Varieties

7) _____ refers to the legal rights given to the inventor or creator to protect his invention or creation for a certain period of time.
   a) Intellectual property rights
   b) Life Insurance Policies
   c) Bioethics
   d) Social Ethics

8) _____ is not a Right of Patentee in India from the following.
   a) Right to exploit the Patent
   b) Right to Grant License
   c) Right to Surrender
   d) Right to Gender Bias

9) Full form of TRIPS is _____.
   a) Transfer Read In Plasma
   b) Trade-Related Aspects of Intellectual Property Rights
   c) Travels Right Indian Postal Service
   d) Technical Right Intellectual Property Rights

10) In the UPOV Convention, _____ enables plant diversity to be available for further breeding activities.
   a) breeder's exemption b) patent
   c) trademark d) trade secrets

B) Write the definition of the following. **06**

1) Infringement
2) Plant Breeders' Rights
3) Trademark
4) Process patent
5) geographical indications
6) Compulsory License Acquisition

Q.2 Solve any Eight of the following. **16**

a) Which are non-patentable inventions?
b) What is the Paris Convention 1883 related to IPR?
c) Enlist types of patenting.
d) What is a utility patent?
e) What do you mean by Revocation?
f) Explain Breeders' exemption.
g) Differentiate between process and product patent.
h) Explain Transfer of patent rights.
i) What is Utility Inventiveness?
j) What is Intellectual Property Protection?

Q.3 A) Attempt any Two of the following. **10**

1) Procedure for granting a patent and obtaining patents in India.
2) Plant variety protection in India.
3) Grounds for opposition Working of Patents.

B) Write a Short note on Types of patenting. **06**

Q.4 A) Attempt any Two of the following. **08**

1) Discuss Advantages and Disadvantages of IPR.
2) Explain Rights of patentee.
3) Write about the TRIPS Agreement. 1994.

B) What are Farmers' rights and Discuss Procedure for its registration? **08**

Q.5 Attempt any Two of the following. **16**

a) Give a detailed account on Intellectual Property Rights.
b) Explain Patenting of biological materials with examples and case studies.
c) Discuss Pharmaceutical product and process patent.

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Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination: Oct/Nov-2023
ENGLISH
Literary Mindscapes - I (BT601)

Day & Date: Monday, 20-11-2023 Max. Marks: 40
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 the correct alternative. **08**

1) _____ are the names of the children in the story 'Growing up'.
   a) Joss and Kady b) Jane and Karli
   c) Jade and Katie d) Jenny and Kate

2) What was Aksionov fond of when he was younger?
   a) dancing b) sleeping
   c) singing d) reading

3) _____ children are listening to the story in the poem 'Sita'.
   a) One b) Two
   c) Three d) Four

4) What was the cause of the death of the duchess?
   a) illness b) accident
   c) drowning d) the duke

5) Complete the following line.
   'A thing of beauty is a _____ forever'.
   a) cheerful b) pleasant
   c) joy d) truth

6) Charlotte Bronte says that _____ possess the golden wings.
   a) Morning dew b) Hope
   c) Butterflies d) None of the above

7) Choose the correct adverb to fill in the bank
   I am _____ tired. I want to sleep for a couple of hours.
   a) extremely b) extreme
   c) insufficiently d) sufficient

8) My teacher often says to me "If you do not work hard, you will fail"
   The correct indirect speech of the above sentence is _____.
   a) My teacher often says to me that If I do not work hard, I will fail.
   b) My teacher told to me that if I do not work hard, I will fail
   c) My teacher said that if I does not work hard, I would fail.
   d) My teacher ordered that if I am not working hard, I would fail.

Q.2 Write short answers of the following questions. (Any Four) **12**

1) What do you know about Robert Quick's wife?
2) Why did Aksionov leave the inn early?
3) What is the tragic story told by the narrator in the poem 'Sita'?
4) Describe the personality of the duchess.
5) What objects of nature does John Keats mention as a source of joy?
6) What is the theme of the poem "Life"?

Q.3 Answer any one of the following. **10**

a) Explain the three most important literacy skills (IMT).

OR

b) Discuss in detail the life skills, known as (FLIPS).

Q.4 There is a spate of motor cycle robberies in your city. Give three steps that you would take as a civically literate person and as a leader. **10**

SLR-DB-52

Set No.		Set	P

B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination: Oct/Nov-2023
Bio-Analytical Tools (BT602)

Day & Date: Tuesday, 21-11-2023 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.

Q.1 A) Multiple choice question. **10**

1) Which membrane is used in blotting?
   a) Agarose b) Sucrose
   c) Polythene d) Nylon

2) _____ is a liquid column chromatographic method of separating solute molecules according to differences in molecular size.
   a) Thin layer chromatography (TLC)
   b) Ion exchange chromatography
   c) Gel filtration
   d) Affinity chromatography

3) Centrifugation is based on?
   a) Patrick's Law b) McLaren's law
   c) Stoke's Law d) Stain's Law

4) The particle sedimentation velocity increases with?
   a) increasing viscosity
   b) decreasing difference in density between the two phases
   c) increasing diameter
   d) All of the above

5) Paper Chromatography is a physical method that is used to separate _____.
   a) Simple mixtures b) Complex mixtures
   c) Viscous mixtures d) Metals

6) What are factors that affect high-speed centrifuges?
   a) Pressure and temperature b) Concentration and speed
   c) Speed and temperature d) Pressure and speed

7) Which force is involved in the Paper Chromatography?
   a) Hydrogen bonding b) London force
   c) Electric static force d) All of the above

8) Which of the following is the function of the Flame or Emission system in Atomic Absorption Spectroscopy?
   a) To split the beam into two
   b) To break the steady light into pulsating light
   c) To filter unwanted components
   d) To reduce the sample into atomic state

9) If proteins are separated according to their electrophoretic mobility then the type of electrophoresis is: _____.
   a) SDS PAGE b) Affinity Electrophoresis
   c) Electro focusing d) Free flow electrophoresis

10) Which of the following is a source used in spectroscopy?
   a) LASER b) Tube light
   c) Sodium vapour lamp d) Tungsten lamp

B) Answer in One sentence. **06**

1) What are Bases?
2) State the principle of Nephelometer.
3) What is the principle of Caloriemeter?
4) Discuss any two uses of turbidometer.
5) State any two applications of chromatography.
6) What is isoelectric focusing?

Q.2 Solve any eight of the following. **16**

a) Draw a neat labeled diagram of pH glass electrode.
b) What is vibrational spectrophotometer?
c) Discuss the principle of chromatography.
d) Name the polymer used in affinity chromatography.
e) What is the function of monochromator in spectrophotometer?
f) What is electromagnetic spectrum?
g) What are the steps of western blotting?
h) What is immuno-electrophoresis.
i) Dot- Blot represents which blot method?

Q.3 A) Attempt any two of the following. **10**

1) Add a note electrophoresis with its applications.
2) What is the principle of column chromatography; mention its use in biotechnology?
3) Add a comment on HPLC.

B) Attempt the following. **06**

1) State the Beer- Lamberts law, with suitable example and application.
2) Discuss in short about pH indicators.
3) Add a note on applications of analytical Ultracentrifugation.

Q.4 A) Attempt any Two of the following. **08**

1) Explain working of Northern blotting.
2) Add a brief note on Column chromatography.
3) What is Dot-Blot technique?

B) Attempt the following. **08**

Describe the principle working and application of Southern blotting.

Q.5 Attempt any Two of the following. **16**

a) Add a brief note construction and working of colorimeter with its application.
b) Discuss the principle, instrument and application of IR spectroscopy.
c) Discuss in detail about native and SDS PAGE electrophoresis its application.

SLR-DB-53

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination: Oct/Nov-2023

Genomics and Proteomics (BT603)

Day & Date: Wednesday, 22-11-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

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

Q.1 A) Multiple choice questions. **10**

1) The term proteomics was coined by _____.
   a) Mark Wilkins b) Tom Roderick
   c) Paulien Hogeweg d) Ben Hesper

2) Sickle cell anemia occurs due to change in amino acids from glutamate to _____.
   a) Leucine b) Serine
   c) Glycine d) Valine

3) In case of 2-D gel electrophoresis, what is the first step _____?
   a) Isoelectric focusing b) SDS-PAGE
   c) Electro focusing d) Both a) and c)

4) In SDS PAGE _____.
   a) Protein are denatured by the SDS
   b) Protein have same charge-to-mass ratio
   c) Smaller protein migrate more rapidly through the cell
   d) All of the above

5) The effects of protein on an entire organism is described in _____.
   a) Phenotypic function b) Cellular function
   c) Molecular function d) Structural genomics

6) What is the range of pH _____.
   a) 0-14 b) 1-14
   c) 0-7 d) 8-14

7) Which of the following is the start date of The Human Genome Project _____.
   a) 1 September 2003 b) 1 October 2003
   c) 1 January 2008 d) 1 October 1990

8) The Encode project identified functional elements in _____.
   a) *Homo sapiens* b) *Mus musculus*
   c) Both a) and b) d) *Arabidopsis thaliana*

9) Hemophilia shows _____.
   a) Y-linked inheritance
   b) Autosomal dominant inheritance
   c) Autosomal recessive inheritance
   d) X-linked inheritance

10) Molecular taxonomy also called as _____.
   a) Molecular phylogeny b) Cladogram
   c) phylogenetic network d) Coral of life

B) Fill in the blanks/Definition/One sentence answer/one-word answer /Give the name/predict the product etc. **06**

1) Genome
2) Scientific name of common fruit fly
3) Mass spectrometry
4) RNA
5) Is *Plasmodium falciparum* a bacteria or protozoan?
6) Proteomics

Q.2 Solve any Eight of the following. **16**

a) Aim of HapMap project
b) Define Genomics.
c) Define Structural genomics.
d) Write full form of MALDI and ESI associated with mass spectrometry.
e) Write applications of genome analysis.
f) Define glycobiology.
g) Explain X-linked inheritance.
h) Which macromolecules are used for phylogenetic analysis?
i) Differentiate DNA and RNA.
j) Define ampholytes.

Q.3 A) Attempt any Two of the following. **10**

1) Define molecular taxonomy and explain its objectives and applications.
2) Write a note on Whole genome-Shot-Gun Sequencing.
3) Analysis of Mouse genome.

B) Short note/Solve. **06**

Describe genome diversity along with its factors responsible.

Q.4 A) Attempt any Two of the following. **08**

1) Explain molecular details of hemophilia.
2) Explain about RNA world.
3) Explain significance of Drosophila genome.

B) Describe/Explain/Solve. **08**

Describe in detail about two-dimensional polyacrylamide gel electrophoresis.

Q.5 Attempt any Two of the following. **16**

a) Explain in detail the use of proteome analysis for drug development and toxicology.
b) Describe in detail about-The 1000 genome project.
c) Explain mass spectrometry method used for protein identification.

Seat No.	

Set **P**

B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination: Oct/Nov-2023
Evolutionary Biology (BT604)

Day & Date: Thursday, 23-11-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.
2) Draw neat labelled diagrams wherever necessary.
3) Figures to right indicate full marks.
4) Use of log table and calculators is allowed.

Q.1 A) Fill in the blanks by choosing correct alternatives (right). 10

1) The term organic evolution coined by _____.
   a) Herbert Spencer b) Charles Darwin
   c) G. J. Mendel d) T. H. Morgan

2) Theory of Biogenesis is proposed by _____.
   a) Charles Waluin b) Lamarck
   c) Louis Pasture d) Thales

3) _____ Condition can be explained by Lamarkism.
   a) How giraffes got long neck
   b) How humans lost their tail
   c) How humans become bipedal
   d) All of the above

4) Palaentological evidences for evolution refers to the _____.
   a) Development of embryo b) Homologous organs
   c) Fossils d) Analogous organs

5) The force that initiates evolution is _____.
   a) Variation b) Mutation
   c) Extinction d) Adaptation

6) The earliest geological time period among the following _____.
   a) Cambrian b) Permian
   c) Jurassic d) Quarternary

7) Observation of species on _____ heavily applied Darvins theory of Evolution.
   a) Guatemala b) Fanoe islands
   c) Isha da quelmada grande d) Galapagos islands

8) _____ Explained " The survival of the fittest but not the arrival of the fittest".
   a) De Vries b) J. B. de Lamarck
   c) Darwin d) H. F. Nuttal

9) The organs which were Functional in the ancestors but non-functional in descendants are called _____.
   a) Analogous organs b) Atavistic organs
   c) Vestigial organs d) Connecting links

10) _____ is the evolution of geographically adjacent populations into distinct species.
   a) Allopatric b) Parapatric speciation
   c) Sympatric Speciation d) Heteropatric

B) Fill in the blanks. **06**

1) Natural selection leads to traits called _____ which improves an organisms ability to survive and reproduce.
2) Closely related species show more _____ in nucleotide sequences than distantly related species.
3) Genetic _____ is critical for Darwins theory of evolution.
4) _____ is common ancestor of apes and men.
5) Oparin Haldane theory of the _____ evolution of the life.
6) _____ represents the unicellular stage in the life of multicellular organism.

Q.2 Solve any eight of the following. **16**

a) Define organic revolution.
b) Lamarkism
c) Universality of genetic code
d) Clines
e) Allopatric speciation
f) Neo-darwinism
g) Geological Time Scale
h) Chemogeny
i) Petrified fossils
j) Gene Flow

Q.3 A) Attempt any two of the following. **10**

1) Explain in detail K-T Mass Extinction.
2) Explain different types of isolating mechanism.
3) Explain about geological time scale.

B) Short notes on following. **06**

J.B.S Haldane and his contribution in Evolution.

Q.4 A) Answer any two of the following. **08**

1) Describe Darwins concept of natural selection and its drawbacks.
2) Briefly explain the contribution of S. Miller.
3) Explain the concept of RNA World.

B) Describe the following. **08**

Process of microevolution.

Q.5 Attempt any two of the following. **16**

a) Briefly explain the role of isolating mechanism an evolution.

b) Define fossil, describe the different types of fossils and the processes of fossilization.

c) Explain the theories of Evolution.

SLR-DB-55

Seat No.	

Set P

B.Sc. (Biotechnology) (Semester -VI) (New) (CBCS) Examination: Oct/Nov-2023
Environmental Biotechnology (BT605)

Day & Date: Friday, 24-11-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.
2) Draw neat labelled diagrams wherever necessary.
3) Figures to right indicate full marks.
4) Use of log table and calculators is allowed.

Q.1 A) Multiple choice questions. **10**

1) Which of the following factors is not responsible for decline or loss of species?
   a) Land conversion
   b) unsustainable harvesting of natural resources
   c) Introduction of exotic species
   d) Afforestation

2) The major cause of environmental degradation is _____.
   a) Biomagnification b) Nitrogen deposition
   c) Quorum quenching d) Lyophilization

3) Which of following is not a process of remediation?
   a) Vitrification b) Thermal
   c) Bioleaching d) Chemical

4) What does physical method of treatment of contaminated materials include?
   a) Micro-organisms b) concentration of excavation
   c) Toxic compound d) Stadium bromide

5) Bio-sensors have the capability to detect samples.
   a) Easily and accurately b) time consuming
   c) Consume lots of energy d) Carbon dioxide emission increasing

6) Which of the following leads to release environmental nuisance?
   a) Oxygen b) Hydrogen
   c) Nitrogen d) Volatile compound

7) Identify the type of waste which can be degraded by compositing, vermicomposting and land fills method.
   a) Plastic b) Tins and metals
   c) Biodegradable d) Non-Biodegradable

8) Which method is best suitable for disposing of plastic wastes and polythene bags?
   a) Burning and incineration b) Digesting
   c) Dumping d) Recycling

9) How much percent of impurities are enough to make domestic sewage unfit for human?
   a) 0.1 % b) 1%
   c) 5% d) 10%

10) The maximum temperature that may reach in the interior dump of copper bioleaching is _____.

a) $120°C$ b) $100°C$
c) $90°C$ d) $70°C$

B) Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc. **06**

1) Herbicides
2) Rhizobium
3) Corn starch
4) Alcohol
5) Slope leaching
6) Glyphosate

Q.2 Solve any Eight of the following. **16**

1) Polyvinyl chloride
2) Soil fertility
3) Names of pesticides
4) Names of petroleum fuel
5) Mycoremediation
6) Conversion of sugar
7) Azatobacter
8) Define gold leaching
9) Heavy metals
10) Conventional fuel

Q.3 A) Attempt any Two of the following. **10**

1) Write a note on biomedical waste management.
2) Write a note on phosphate solubilizing bacteria.
3) A symbiotic nitrogen fixing bacteria in the enrichment of soil.

B) Short note/Solve. **06**

Define bioleaching and types of bioleaching.

Q.4 A) Attempt any Two of the following. **08**

1) Explain the role of algal biofertilizer.
2) Explain agricultural waste to alcohol & gasohol.
3) Explain genetically modified microbes and its role in environmental clean up.

B) Describe/Explain/Solve. **08**

Explain soil and water contaminated with oil spills.

Q.5 Attempt any Two of the following. **16**

a) Describe in detail radioactive waste included nuclear waste, ions exchange resins.
b) Describe in detail insecticides withaldrins, Malathion
c) Describe in detail conventional fuels with their environmental impact, e.g. coal and gas.