

<b>Seat No.</b>	
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**Q.3 Answer the following questions. (Any One)**

- 1) What are the points that you need to keep in mind when you are encoding a message?

**OR**

- 2) Write a message to the principal of your college, explaining to him why you are unable to pay all the fee in one installment. Use proper vocabulary, language and specify the medium.

**Q.4 'Discuss the three 'M' approaches to make effective communication.****10**

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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS)**  
**Examination Oct/Nov-2019**  
**English (Compulsory)**  
**GOLDEN PETAL**

Day & Date: Thursday, 07-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternative given below. 14**

- 1) Charlie Chaplin was of \_\_\_\_\_ years old, when he entered in the film industry.
  - a) 31
  - b) 29
  - c) 35
  - d) 25
- 2) Charlie Chaplin was signed with \_\_\_\_\_ dollars a week by the keystone production company.
  - a) 160
  - b) 150
  - c) 170
  - d) 151
- 3) Charlie Chaplin was born in \_\_\_\_\_.
  - a) 1924
  - b) 1915
  - c) 1914
  - d) 1920
- 4) Shanti Tigga joined the Territorial Army at the age of \_\_\_\_\_.
  - a) 27
  - b) 35
  - c) 28
  - d) 31
- 5) Shanti Tigga was awarded by \_\_\_\_\_ for her extra ordinary achievements.
  - a) Smt. Indira Gandhi
  - b) Smt. Pratibha Patil
  - c) Smt. Sushama Swaraj
  - d) Smt. Sonia Gandhi
- 6) Shanti Tigga was kidnapped on May 29 \_\_\_\_\_.
  - a) 2011
  - b) 2010
  - c) 2012
  - d) 2013
- 7) When the \_\_\_\_\_ dies our soul continues to exists.
  - a) heart
  - b) body
  - c) mind
  - d) voice
- 8) Nachiketa waited at the gates of Yama for \_\_\_\_\_ days without food or water.
  - a) 4
  - b) 2
  - c) 5
  - d) 3
- 9) Vajasrawas told Nachiketa to go to Yama out of \_\_\_\_\_.
  - a) anger and annoyance
  - b) sadness and melancholy
  - c) love and affection
  - d) strength and admiration
- 10) The poem I Find No Peace is written by \_\_\_\_\_.
  - a) Sir Charles
  - b) Sir Thomas Wyatt
  - c) Sir Alfred Wyatt
  - d) Sir Thomas Kyd
- 11) Emily Dickinson is from \_\_\_\_\_.
  - a) Africa
  - b) America
  - c) England
  - d) Ireland

- 12) Are you staying at \_\_\_\_\_ Bristol Hotel?  
a) an    b) in  
c) the     d) a
- 13) Last week, I \_\_\_\_\_ him twice in connection of the purchase of the car.  
a) Met    b) Meet  
c) Meeting    d) Will meet
- 14) Ram has written all the information in his book. What is the tense of the sentence?  
a) Present defect  
b) Past perfect  
c) Present perfect continuous tense  
d) Past perfect continuous tense

**Q.2 Answer any four of the following questions. 16**

- How did Chaplin get his first role in the films?
- Describe the get up of Charlie Chaplin.
- What did Shanti Tigga's relative feel about - her death?
- Describe the first woman Jawan - Shanti Tigga in your words.
- What did Nachiketa learn from Yama Deva?
- What were the three boons that Nachiketa ask of the God of Death?

**Q.3 Answer any two of the following questions. 12**

- What is the theme of the poem - I Find No Peace?
- What is the theme of the poem - Success is counted sweetest?
- Describe in detail what is communication.
- You forgot to do your homework and got scolded by the teacher. State possible causes for it.

**Q.4 Answer any one of the following questions. 14**

Explain where and why the following communication channels are used in making communication effective Email, Video calls, Mobile phones, radio and movies.

**OR**

Why do you think we need language skills and vocabulary to communicate our thoughts to others?

**Q.5** Define communication. What makes communication effective? **14**



**Seat  
No.**

Day & Date: Friday, 08-11-2019  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

14

- 1) \_\_\_\_\_ rocks are formed due to cooling of molten magma or lava.  
a) Sedimentary                      b) Metamorphic  
c) Igneous                          d) Megamorphic
- 2) \_\_\_\_\_ is an obligatory positive interspecific interaction that is strongly beneficial for both species.  
a) Commensalism                      b) Mutualism  
c) Protocooperation                      d) Social parasitism
- 3) \_\_\_\_\_ is edaphic factor.  
a) Air                                  b) Water  
c) Soil                                d) Minerals
- 4) Energy flow in ecosystem is \_\_\_\_\_.  
a) Bidirectional                      b) Unidirectional  
c) Horizontal                          d) Vertical
- 5) Secondary consumers are also known as \_\_\_\_\_.  
a) Producer                          b) Secondary carnivores  
c) Primary carnivores                      d) Saprophytes
- 6) Central Sahara occupied by \_\_\_\_\_ type of ecosystem.  
a) Deciduous forest                      b) Tropical forest  
c) Desert                              d) Grassland
- 7) \_\_\_\_\_ is not type of gaseous cycle.  
a) Carbon cycle                      b) Nitrogen cycle  
c) Sulphur cycle                      d) Oxygen cycle
- 8) \_\_\_\_\_ is included in in-situ biodiversity conservation.  
a) Cryopreservation                      b) National park  
c) Botanical garden                      d) Zoo
- 9) \_\_\_\_\_ is major part atmosphere.  
a) Air                                  b) Water  
c) Soil                                d) Mineral
- 10) The energy source in ecosystem is \_\_\_\_\_.  
a) ATP                                  b) Sunlight  
c) DNA                                d) RNA
- 11) The process of successful adjustment of new species in ecosystem called as \_\_\_\_\_.  
a) Sera                                  b) Climax  
c) Ecesis                                d) Invasion

- 12) International day of biodiversity is celebrated on \_\_\_\_\_.  
a) June 5  
b) February  
c) May 22  
d) August 15
- 13) The largest ecosystem in world is \_\_\_\_\_.  
a) Great lakes  
b) Grassland  
c) Forest  
d) Ocean
- 14) Plants growing in abundant water are called as \_\_\_\_\_.  
a) Mesophytes  
b) Hydrophytes  
c) Xerophytes  
d) Halophytes

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

- 1) Environment
- 2) Biosphere
- 3) Evapotranspiration
- 4) Consumers
- 5) Biogeochemical cycle

**B) Write Notes. (Any Two)** **06**

- 1) Define ecosystem and its types.
- 2) Define genetic conservation and its importance.
- 3) Define hydrosphere and give any two properties of water.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Explain in detail soil profile.
- 2) Define biodiversity and its types.
- 3) Explain water cycle.

**B) Answer the following questions. (Any One)** **06**

- 1) Write a note on atmosphere.
- 2) Explain conservation types of biodiversity.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write a detailed account on ecological succession.
- 2) Give an account on water as natural resource.
- 3) Explain in detail sulphur cycle.

**B) Answer the following questions. (Any One)** **04**

- 1) Write an account on chipko andolan.
- 2) Write an account on save western ghat.

**Q.5 Answer the following questions. (Any Two)** **14**

- Define terrestrial ecosystem and explain in detail forest ecosystem with diagram.
- Describe in detail bio-geographical regions of India.
- Define gaseous cycle and explain in detail nitrogen cycle and its importance.

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## Max. Marks: 70

14

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- 11) \_\_\_\_\_ microorganism shows connecting link between prokaryotes and Eukaryotes.
- a) Viruses                                      b) Mycoplasma  
c) Rickettsia                                  d) Archaeobacteria
- 12) \_\_\_\_\_ bacterium shows pleomorphism type of morphology.
- a) Rhizobium                                b) Bacillus  
c) Streptococcus                          d) Salmonella
- 13) Antiseptic surgery was discovered by \_\_\_\_\_.  
a) Joseph Lister                              b) Ernest Abbe  
c) Pasteur                                      d) Beijerinck
- 14) During conjugation the genetic material will be transferred through \_\_\_\_\_.  
a) Cell wall                                    b) Medium  
c) Pili    d) Capsule

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

- 1) Tyndallization
- 2) Milk
- 3) Pollution
- 4) Peritrichous flagella
- 5) Industrial Microbiology

**B) Write Short Notes. (Any Two)** **06**

- 1) Shapes of Bacteria
- 2) Genetic engineering
- 3) Watson and Crick

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Write in detail different branches of microbiology.
- 2) Write in detail contribution of Louis Pasteur in the microbiology.
- 3) Explain in detail size, shape and arrangement of bacteria with example.

**B) Answer the following questions. (Any One)** **06**

- 1) Describe in detail structure and function of bacterial capsule.
- 2) Write in details general characteristics, classification and cultivation of fungi.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write in detail contribution of Robert Koch in the microbiology.
- 2) Write in detail general characteristics of Chlamydia.
- 3) Explain difference between Prokaryotic cell and Eukaryotic cell.

**B) Answer the following questions. (Any One) 04**

- 1) Explain in detail structure and functions of Pili.
- 2) Write in detail general characteristics of Mycoplasma.

**Q.5 Answer the following questions. (Any Two) 14**

- Explain in detail distribution, beneficial and harmful activities of microbes.
- Write an essay on structure and functions of bacterial cell membrane.
- Explain in detail general characteristics of Actinomycetes.

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## Max. Marks: 70

14

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- 11) Ascaris is belongs to phylum \_\_\_\_\_.
  - a) Platyhelminthes
  - b) Nemathelminthes
  - c) Coelenterata
  - d) Annelida
- 12) Pebrine is disease of Silkworms caused by \_\_\_\_\_.
  - a) *Leishmania donovani*
  - b) *Fasciola hepatica*
  - c) *Trypanosoma brucei*
  - d) *Nosema bombycis*
- 13) \_\_\_\_\_ silkworm is produces yellow colored silk commonly reared in all over India.
  - a) *Antherea assama*
  - b) *Antherea paphia*
  - c) *Bombyx mori*
  - d) *Attacus ricinii*
- 14) \_\_\_\_\_ is a marine water fish.
  - a) *Labeo rohita*
  - b) *Catla catla*
  - c) *Cirrhinus cirrhosus*
  - d) *Sardinella longiceps*

**Q.2 A) Attempt any four of the following questions. 08**

- 1) What is mean by Vermiwash?
- 2) Give economic importance of apiculture.
- 3) Sexual dimorphism in Ascaris.
- 4) Give parasitic adaptations in liver fluke.
- 5) Define Camouflage.
- 6) Write a note on swarming in honey bees.

**B) Attempt any two of the following questions. 06**

- 1) Describe structure of T. S of Spinal cord.
- 2) Give structure of Bowman's capsule.
- 3) Explain types and functions of Blood Corpuscles.

**Q.3 A) Attempt any two of the following questions. 08**

- 1) Describe structure, location and function of nervous tissue.
- 2) Describe life cycle of Liver fluke.
- 3) Explain Nuptial flight and communication in honey bees.

**B) Attempt any one of the following questions. 06**

- 1) Describe life cycle of Malarial parasite.
- 2) Describe life cycle of Ascaris.

**Q.4 A) Attempt any two of the following questions. 10**

- 1) Describe structure, location and function of simple epithelial tissue.
- 2) Describe life cycle of *Tapeworm*.
- 3) Describe process of Vermicompost bed preparation.

**B) Attempt any one of the following questions. 04**

- 1) Write a note on Mimicry with suitable example.
- 2) Describe histology Kidney with neat labelled diagram.

**Q.5 Attempt any two of the following questions. 14**

- Describe histology of liver and stomach with neat labeled diagram.
- Describe types, rearing, life cycle and economic importance of silkworm.
- Describe construction and maintenance of fresh water fish farming.

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Set **P**

**B.Sc. (Semester – I) (Old) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Introduction of Biosciences (Paper – II)**  
**PLANT SCIENCE**

Day & Date: Wednesday, 13-11-2019  
 Time: 3:00 PM To 05:30 PM

Max. Marks: 70

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

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

**14**

- 1) \_\_\_\_\_ used as biofertilizer.
  - a) BGA
  - b) Sargassum
  - c) Spirogyra
  - d) Gracillaria
- 2) The main function of parenchyma is \_\_\_\_\_.
  - a) Storage of food material
  - b) Photosynthesis
  - c) To give strength
  - d) To transport water
- 3) Cell Wall of plants mainly made up of \_\_\_\_\_.
  - a) Lipids
  - b) Cellulose
  - c) Starch
  - d) Nucleic acids
- 4) Example of Complex plant tissue is \_\_\_\_\_.
  - a) Parenchyma
  - b) Airenchyma
  - c) Xylem
  - d) All of these
- 5) The \_\_\_\_\_ are the chlorophyll pigments mainly present in green plants and BGA.
  - a) Chlophyll A and B
  - b) Xanthophyll and carotein
  - c) chlorophyll D and E
  - d) All of these
- 6) \_\_\_\_\_ is the empirical formula for chlorophyll A.
  - a) HCl
  - b) CaCl<sub>2</sub>
  - c) NaCl
  - d) C<sub>55</sub>H<sub>72</sub>O<sub>5</sub>N<sub>4</sub>Mg
- 7) Parallel venation and Adventitious roots are characteristic of \_\_\_\_\_.
  - a) Algae
  - b) Bryophyte
  - c) Monocot
  - d) Dicot
- 8) Meristimatic cells to \_\_\_\_\_ the plant.
  - a) Provide strength
  - b) Protect
  - c) Add minerals to
  - d) By continuous division add new cells
- 9) The pollination occurred by birds is known as \_\_\_\_\_.
  - a) Anemophily
  - b) Chireptophily
  - c) Ornithophily
  - d) None of these
- 10) Female reproductive whorl of flower is called \_\_\_\_\_.
  - a) Gynocium
  - b) Calyx
  - c) Thalamus
  - d) Peduncle

- 11) All fungi are \_\_\_\_\_.
  - a) Photosynthetic
  - b) Autotrophic
  - c) Heterotrophic
  - d) Chemosynthetic
- 12) Formation of fruit without fertilization is known as \_\_\_\_\_.
  - a) Parthenocarpy
  - b) Polyembryony
  - c) Heterogyny
  - d) Allelopathy
- 13) Apical cell theory is proposed by \_\_\_\_\_.
  - a) Hofmeister
  - b) Hanstein
  - c) R. Hook
  - d) None of these
- 14) Presence of vascular bundle is characteristics of \_\_\_\_\_.
  - a) Cryptogams
  - b) Bryophytes
  - c) Phanerogams
  - d) Lower plants

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

- 1) Explain the function of calyx.
- 2) Which are the major classes of tissue present in plants?
- 3) What is pollination?
- 4) What is parthenocarpy?
- 5) Define photosynthesis.

**B) Write short notes. (Any Two)** **06**

- 1) Classification of Meristem on the basis of its position
- 2) Staple crop
- 3) Process of formation and function of periderm

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Give note on simple tissue and explain its type.
- 2) Explain tunica carpous theory.
- 3) Explain the general characters of Pteridophytes.

**B) Answer the following questions. (Any One)** **06**

- 1) Explain the types aggregate fruit.
- 2) Give note characters monocot.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write a note on structure of flower and floral whorls.
- 2) Explain the type of pollination.
- 3) Explain general characters and economic importance of Bryophytes.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain the internal structure of dicot stem.
- 2) Explain the process development of male gametophyte.

**Q.5 Answer the following questions. (Any Two)** **14**

- Explain in detail xylem and its type.
- Explain in detail the process of secondary growth in dicot.
- Explain in detail the general character and economic importance of algae and fungi.



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Set **P**

**B.Sc. (Semester - I) (Old) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Fundamentals of Chemistry and Biophysics (Paper - I)**  
**CHEMICAL SCIENCES**

Day & Date: Thursday, 14-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below.****14**

- 1) \_\_\_\_\_ is unit of dipole moment.
  - a) Debye
  - b) cm
  - c) sec
  - d) min
- 2) pH of solution is less than 7 the solution is \_\_\_\_\_.
  - a) basic
  - b) acidic
  - c) neutral
  - d) alcoholic
- 3) Equivalent weight of oxalic acid ( $C_2H_2O_6$ ) is \_\_\_\_\_ gm.
  - a) 126
  - b) 63
  - c) 90
  - d) 96
- 4) Phenolphthalein shows pink colour in \_\_\_\_\_ Medium.
  - a) basic
  - b) acidic
  - c) neutral
  - d) alcoholic
- 5) Ethylene molecule has \_\_\_\_\_ geometry.
  - a) square planar
  - b) tetrahedral
  - c) trigonal
  - d) octahedral
- 6) \_\_\_\_\_ is unit of rate constant for first order reaction.
  - a)  $min^2$
  - b)  $S^{-1}$
  - c) S
  - d) min
- 7) Equivalent weight is required for preparation of \_\_\_\_\_ solution.
  - a) ppm
  - b) molal
  - c) molar
  - d) normal
- 8) \_\_\_\_\_ is used as indicator in acid-base titration.
  - a) Methyl orange
  - b) Methyl red
  - c) Phenolphthalein
  - d) Starch
- 9) \_\_\_\_\_ is colligative property.
  - a) Mass
  - b) Weight
  - c) Volume
  - d) Osmotic pressure
- 10) In solution, solvent is taken in \_\_\_\_\_ amount.
  - a) small
  - b) large
  - c) medium
  - d) very small
- 11) KCl contains \_\_\_\_\_ bond.
  - a) covalent
  - b) metallic
  - c) ionic
  - d) hydrogen

- 12) Homogeneous catalysis reaction containing \_\_\_\_\_ phase.  
a) same    b) different  
c) two    d) three
- 13)  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \longrightarrow 2\text{HCl}(\text{g})$  is example of \_\_\_\_\_ catalyst.  
a) heterogeneous                                  b) homogeneous  
c) enzyme    d) auto
- 14) Solution is \_\_\_\_\_ Mixture of solute & solvent.  
a) heterogeneous                                  b) homogeneous  
c) homohetero                                     d) auto

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

- 1) Define dipole moment? Give it's unit.
- 2) What is polar & non polar solvent?
- 3) Define elementary enzymes.
- 4) What is positive catalyst?
- 5) Give any two characteristics of first order reaction.

**B) Write Notes. (Any Two)** **06**

- 1) Acid-Base titration
- 2)  $sp^3$  Hybridization
- 3) Types of Catalysis

**Q.3 A) Answer the following questions. (Any Two)** **08**

- 1) Explain types of bonds in bio-molecules.
- 2) What is common ion effect? Explain with suitable example.
- 3) What is a Colligative property? Explain with example.

**B) Answer the following questions. (Any One)** **06**

- 1) What is buffer? Derive Henderson equation for basic buffer.
- 2) Explain concept of hybridization with respect to  $C_2H_2$  molecule.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Derive integrated rate expression for second order reaction.  
(For Equal Concentration)
- 2) Explain formation of ionic & covalent bond with suitable example.
- 3) Explain percentage & ppm solution with 2 suitable examples of each.

**B) Answer the following questions. (Any One)** **04**

- 1) What is dilution? Explain serial dilution method with example.
- 2) Explain - Rate constant, order & molecularity of reaction.

**Q.5 Answer the following questions. (Any One) 14**

- 1) Calculate Equivalent weight & molecular weight of following compound-  
(Atomic wt. C-12, O-16, K-39, H-1, Cl-35.5, Na-23)  
i. Oxalic acid                      ii. Sodium hydroxide                      iii. Potassium chloride
- 2)  $6 \times 10^{-3} \text{ dm}^3$  of methyl acetate were added to flask containing  $100 \times 10^{-3} \text{ dm}^3$  of 0.5M HCL maintained at 300 K.  $5 \times 10^{-3} \text{ dm}^3$  of the reaction mixture were withdrawn at different intervals of time and titrated with 0.1 M NaOH solution.

T (min.)	0	10	20	30	Infinity
ml or $10^{-3} \text{ dm}^3$ of NaOH used	21.0	21.7	22.4	23.1	41.7

From the above data, show that the hydrolysis of methyl acetate is a unimolecular reaction.

- 3) What is solution? Explain types of solvents.**

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**B.Sc. (Semester - I) (Old) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology (Paper – II)**  
**Fundamentals of Chemistry and Biophysics**  
**BIOPHYSICS**

Day & Date: Friday, 15-11-2019  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

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

14

- 1) The internal restoring force acting per unit area is called \_\_\_\_\_.  
a) Stress  
b) Pressure  
c) Surface tension  
d) Viscosity
- 2) The Poisson ratio is \_\_\_\_\_.  
a)  $\sigma = 1/\beta$   
b)  $\sigma = \beta/\alpha$   
c)  $\sigma = 1/\alpha$   
d) None of the above
- 3) In Helium-Neon laser, type of pumping is \_\_\_\_\_.  
a) Electrical  
b) Chemical  
c) Optical  
d) Mechanical
- 4) Audible range frequency is \_\_\_\_\_.  
a) 10 Hz to 10 KHz  
b) 1 Hz to 2 KHz  
c) 20 Hz to 2000 KHz  
d) 20 Hz to 20 KHz
- 5) The dimensions of viscosity is \_\_\_\_\_.  
a)  $M^2L^1T^{-1}$   
b)  $M^1L^2T^1$   
c)  $M^2L^2T^1$   
d)  $M^1L^1T^{-1}$
- 6) The Viscosity of liquid decreases with the \_\_\_\_\_ in temperature.  
a) Increase  
b) Decrease  
c) Equal  
d) Opposite
- 7) In atomizer fall in pressure due to \_\_\_\_\_ in velocity.  
a) Decrease  
b) Viscosity  
c) Surface Tension.  
d) Increase
- 8) Dimensions of surface tension \_\_\_\_\_.  
a)  $M^1L^1T^2$   
b)  $M^0L^0T^{-1}$   
c)  $M^1L^0T^{-2}$   
d)  $M^2L^1T^{-2}$
- 9) The force of attraction between molecules of a same substance is called \_\_\_\_\_.  
a) Cohesive force  
b) Viscosity  
c) Capillary action  
d) Surface Tension
- 10) Angle of contact between pure water and clean glass is \_\_\_\_\_.  
a) Zero  
b)  $50^\circ$   
c)  $120^\circ$   
d)  $90^\circ$
- 11) Ink rises in a pen due to \_\_\_\_\_.  
a) Strain  
b) Elasticity  
c) stress  
d) Capillary action

- 12) A transverse wave that consists of oscillations occurring \_\_\_\_\_ to the direction of energy transfer.
- a) Opposite                                      b) Perpendicular  
c) Parallel                                        d) Equal
- 13) Young's modulus is the property of \_\_\_\_\_.  
a) Only liquids                                  b) Only in gas  
c) Solids and liquids                         d) Only Solids
- 14) An object part immersed in water looks bent due to \_\_\_\_\_.  
a) Refraction                                    b) Super position  
c) Reflection                                    d) All of the above

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

- 1) Define elasticity?
- 2) State the Bernoulli's theorem.
- 3) What is meant by surface tension and capillary action?
- 4) Define:  
a) Reflection    b) Refraction
- 5) State the Brewster's law?

**Q.2 B) Write Notes on. (Any Two)** **06**

- 1) Advantages of Jaegers method
- 2) Beats
- 3) Doppler effect

**Q.3 A) Answer the following questions. (Any Two)** **08**

- 1) Explain types of stress and strain.
- 2) Explain any two importance of elasticity.
- 3) What are the applications of Surface tension?

**Q.3 B) Answer the following questions. (Any One)** **06**

- 1) Explain the stress-strain curve within and beyond elastic limit.
- 2) Discuss the factor affecting surface tension.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Describe properties of ultrasonic waves and its applications.
- 2) Explain Effect of temperature and pressure on viscosity of liquids.
- 3) Explain applications of capillary action.

**Q.4 B) Answer the following questions. (Any One) 04**

- 1) Explain the concept of population inversion.
- 2) Explain the applications of laser.

**Q.5 Answer the following questions. (Any two)** **14**

- With a neat diagram explain working of Pitot's tube.
- With a neat diagram explain working of Helium-Neon Laser.
- Describe Young's modulus ( $Y$ ), Bulk modulus ( $K$ ) and Modulus of rigidity ( $\mu$ )

Seat No.	
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**B.Sc. (Semester - I) (Old) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Cell Biology and Biostatistics (Paper – I)**  
**CELL BIOLOGY**

Day & Date: Saturday, 16-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

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

**14**

- 1) Ribosomes are known as \_\_\_\_\_ of the cell.
  - a) Protein factory
  - b) Suicide bags
  - c) Heart
  - d) Power house
- 2) \_\_\_\_\_ play important role in the execution of apoptosis.
  - a) Apoptosome
  - b) Orisome
  - c) Primosome
  - d) Replisome
- 3) The gene p53 is an example of \_\_\_\_\_.
  - a) Proto-oncogenes
  - b) oncogenes
  - c) Tumor suppressor
  - d) Luxury genes
- 4) In eukaryotes, initiation codon AUG codes for \_\_\_\_\_.
  - a) Valine
  - b) Methionine
  - c) Formylated Methionine
  - d) Methylated Methionine
- 5) In eukaryotes, F-actin are polymer of \_\_\_\_\_.
  - a) Tubulin dimer
  - b) Globular actin
  - c) Keratin
  - d) Lamin
- 6) The free radicals produced in the cells are removed by \_\_\_\_\_.
  - a) Ribosomes
  - b) Peroxisomes
  - c) Mitochondria
  - d) Lysosomes
- 7) Mammalian telomeric sequences are \_\_\_\_\_.
  - a) AGG AAGU
  - b) TTAGGG
  - c) CTGCTG
  - d) TTTGGGG
- 8) \_\_\_\_\_ are known as communicating junctions.
  - a) Desmosomes
  - b) Hemi-desmosomes
  - c) Gap junctions
  - d) Tight junctions
- 9) \_\_\_\_\_ is act as signaling molecule.
  - a)  $Ca^{++}$
  - b) IP3
  - c) cAMP
  - d) Hormones
- 10) Polytene chromosomes are found \_\_\_\_\_.
  - a) Beetles
  - b) Drosophila
  - c) Maggots
  - d) Monkey

- 11) \_\_\_\_\_ is responsible for acidification of stomach.
  - a) Simple diffusion
  - b) Active transport
  - c) Proton pump
  - d) Na-K ATPase pump
- 12) Total \_\_\_\_\_ haploid cells were produced after 10 diploid germ cells undergo meiosis.
  - a) 10
  - b) 30
  - c) 20
  - d) 40
- 13) The function of proteasome is \_\_\_\_\_.
  - a) protein degradation
  - b) localization proteins in different compartments of the cell
  - c) protein synthesis
  - d) prevention of degradation of proteins
- 14) \_\_\_\_\_ is main component of plasma membrane.
  - a) glycogen
  - b) cellulose
  - c) lipids
  - d) peptidoglycan

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

- 1) What is cell senescence?
- 2) Define centromere and telomere.
- 3) What are centrioles?
- 4) What is wobble hypothesis?
- 5) What is intermediate filaments?
- 6) Distinguish between plant cell and animal cell.

**B) Answer the following questions. (Any Two)** **06**

- 1) What are Desmosomes?
- 2) Write note on cell recognition.
- 3) What are proton pumps?

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Describe cell synchrony and its applications.
- 2) Describe ultra-structure of bacterial cell.
- 3) Explain properties of genetic code.

**B) Answer the following questions. (Any One)** **06**

- 1) Describe different types of passive transport.
- 2) Explain unit membrane model of plasma membrane.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Describe ultra-structure of mitochondria.
- 2) Describe structure and functions of actin filaments.
- 3) Describe different types of cell signaling.

**B) Answer the following questions.(Any One) 04**

- 1) Describe process of meiosis.
- 2) Describe properties of cancer cells.

**Q.5 Answer the following questions. (Any Two)** **14**

- Describe process of protein trafficking in nucleus.
- Explain structure of chloroplast and ribosomes.
- Describe process of apoptosis.

<b>Seat No.</b>	
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- 10) Let A be event of rolling a die. Let B be event of an odd number between 5 to 10, then  $A \cap B$  is \_\_\_\_\_.  
 a) {5} b) {1,3,5}  
 c) {7,9} d) {}
- 11) If A and B are two events, the probability of occurrence of both A and B is given as \_\_\_\_\_.  
 a)  $P(A) + P(B)$  b)  $P(A \cup B)$   
 c)  $P(A \cap B)$  d)  $P(A) \cdot P(B)$
- 12) A sample is \_\_\_\_\_ of population.  
 a) Super set b) Power set  
 c) Sub set d) Complement
- 13) A statement about a population developed for the purpose of testing is called \_\_\_\_\_.  
 a) Hypothesis b) Hypothesis testing  
 c) Level of significance d) Test-static
- 14) The probability of rejecting the null hypothesis when it is true is called \_\_\_\_\_.  
 a) Level of confidence b) Level of significance  
 c) Power of test d) Difficult to tell

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

- 1) Define 'Class Boundary' and give an example.
- 2) The marks obtained by 8 students are 57, 39, 63, 54, 47, 56, 61, 65. Calculate the mean marks.
- 3) If  $b_{yx} = 0.8$  and  $b_{xy} = 0.2$ , then find  $r$
- 4) What is the probability of getting "a prime number" in single throw with die?
- 5) If standard deviation of 10 observations is 7.2, find standard error.

**B) Write Notes. (Any Two)****06**

- 1) Merits of "Mean"
- 2) Weak positive correlation
- 3) Dependent events

**Q.3 A) Answer the following questions. (Any Two)****08**

- 1) Calculate mode marks from the following data.

X	10-20	20-30	30-40	40-50	50-60
F	9	11	26	19	5

- 2) Find the Mean deviation from the following data.

X	5	6	7	8	9
F	4	11	18	13	4

- 3) A single card is drawn from a pack of 30 cards, numbered from 11 to 40. Find the probability that it is a multiple of 2 or a multiple of 3.

**B) Answer the following questions.(Any One)****06**

- 1) Find the mean using step deviation method for the following data.

X	10-20	20-30	30-40	40-50	50-60
F	14	18	34	20	14

- 2) A coin is tossed 70 times of which head comes 45 times. Use Chi-square test to test the hypothesis that the coin is normal, having no bias for either head or tail. (Table value:3.84)



**Q.4 A) Answer the following questions. (Any Two)****10**

- 1) Find median for the following data.

X	10-20	20-30	30-40	40-50	50-60
F	20	25	36	21	18

- 2) Find the coefficient of correlation (
- $r$
- ) from the following data

X	6	7	8	9	10
F	8	8	11	11	12

- 3) Find the standard deviation (
- $\sigma$
- ) from the following data

Class	10	11	12	13	14
Frequency	9	12	8	6	5

**B) Answer the following questions.(Any One)****04**

- 1) Draw histogram for the following data.

X	0-10	10-20	20-30	30-40	40-50	50-60
F	10	20	24	25	25	6

- 2) For the two events A and B,
- $P(A) = 0.5$
- ,
- $P(B) = 0.4$
- and
- $P(A \cup B) = 0.6$
- Find
- $P(A/B)$
- and
- $P(B/A)$
- .

**Q.5 Answer the following questions. (Any Two)****14**

- a)**
- Draw less than & more than type O gives for the following data.

X	10-20	20-30	30-40	40-50	50-60
F	8	11	16	15	10

- b)**
- Find the regression equation X on Y from the following data.

X	5	3	7	4	8	2	10	6	8	7
Y	8	6	8	5	9	6	8	5	11	4

- c)**
- Write the properties of the normal distribution.

<b>Seat No.</b>	
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- 12) There are so many \_\_\_\_\_ are going on television.  
a) Cereals  
b) Serials  
c) Cerials  
d) Syrials
- 13) The India's victory over Australia, the team spirit had \_\_\_\_\_.  
a) a lion's share  
b) up and moves  
c) bitter to swallow  
d) a goat's share
- 14) The custom of having two wives is \_\_\_\_\_.  
a) polygamy  
b) bigamy  
c) bygamy  
d) beygamy

**Q.2 Attempt any four of the following questions.**

16

- 1) How does the student writer prove that his teachers know very little about actual life?
- 2) How is the school different from the student's home?
- 3) Why does the author feel he has been a bad townsman?
- 4) Why is there an element of patronage in the idea of social service?
- 5) How was the narrator able to cough in the presence of a tiger?
- 6) Why did Jim Corbett feel guilty after killing the tiger?

**Q.3 Attempt any two of the following questions.**

12

- 1) What do you learn about the work of weavers from the poem 'Indian Weavers'?
- 2) What is the country of no return?
- 3) What are the benefits of blogs?
- 4) What is an email? What are the principles of email writing?

**Q.4 Attempt any one of the following question.**

14

- a) Write the script of an interview for the post of a clerk in Eureka Borbes Company.

**OR**

- b)** Write the script of group discussion on the topic – Importance of Cleanliness involving various participants.

**Q.5** You are the secretary of an NGO - Global Society. You have arranged annual meeting of all members. Draft an agenda and minutes of the meeting held on 25 January 2019.

14

<b>Seat No.</b>	
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- Q.3 Answer the following questions. (Any Two)** **08**
- 1) Discuss the importance of ascorbic acid.
  - 2) Explain the concepts of activation energy and transition state in enzyme catalysis.
  - 3) Write a note disaccharide. Explain with two examples.
- Q.4 Answer the following questions. (Any Two)** **08**
- 1) Explain in detail different forces involved in protein structure stability.
  - 2) Define protein denaturation and add a note on physical and chemical denaturation agents.
  - 3) Short note on deficiency symptoms of niacin.
- Q.5 Answer the following questions. (Any One)** **08**
- 1) Explain in detail Watson and crick double helical structure of B form of DNA.
  - 2) Write a note on properties of fatty acids and its classification.

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**B.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Environmental Pollution and Environmental Pollution Techniques**  
**(Paper –I)**  
**ENVIRONMENTAL POLLUTION**

Day & Date: Monday, 07-10-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct given below.**

**14**

- 1) Acid rain produced by excess \_\_\_\_\_.  
 a)  $\text{NO}_2$  and  $\text{SO}_2$  from burning fissile fuel  
 b) production of  $\text{NH}_3$  by industry  
 c) release of CO by incomplete combustion  
 d) formation of  $\text{CO}_2$  by respiration
- 2) \_\_\_\_\_ is not pollutant normally.  
 a) Hydrocarbon  
 b) Sulphur dioxide  
 c) Carbon dioxide  
 d) Carbon monoxide
- 3) \_\_\_\_\_ is released during Bhopal gas tragedy.  
 a) Methyl isocyanate  
 b) Sodium isothiocyanate  
 c) Pottassium isothiocynte  
 d) Methyl isothiocyanate
- 4) A non renewable is \_\_\_\_\_.  
 a) Non renewable non conventional energy source  
 b) Non renewable conventional energy source  
 c) Renewable non conventional energy source  
 d) Renewable conventional energy source
- 5) Most hazardous metal pollutant of automobile exhaust is \_\_\_\_\_.  
 a) Mercury  
 b) Cadmium  
 c) Lead  
 d) Cupper
- 6) Petroleum is a \_\_\_\_\_.  
 a) Synthetic product  
 b) Renewable resource  
 c) Non renewable resource  
 d) Inconvenient resource
- 7) Ultraviolet radiation from sunlight causes reaction that produce \_\_\_\_\_.  
 a) Fluroids  
 b) Sulphur dioxide  
 c) Carbon Monoxide  
 d) Ozone
- 8) \_\_\_\_\_ is soil best suited for plant growth.  
 a) Clay  
 b) Loam  
 c) Sandy  
 d) Gravel
- 9) \_\_\_\_\_ dB sound considered as noise pollution.  
 a) above 80  
 b) above 30  
 c) above 120  
 d) above 150
- 10) The consumption of mercury pollutes aquatic food results in \_\_\_\_\_.  
 a) Osterosclerosis  
 b) hashimoto's oxidase  
 c) Bright's disease  
 d) Minamata disease

- 11) When huge amount of sewage dumped in river, its BOD will \_\_\_\_\_.  
 a) Slightly decreases                      b) Remain unchanged  
 c) Increases                                      d) Decreases
- 12) The Taj Mahal threatened due to effect of \_\_\_\_\_.  
 a) Oxygen                                      b) Hydrogen  
 c) Chlorine                                      d) Sulphur dioxide
- 13) The D.D.T. is \_\_\_\_\_.  
 a) Not a pollutant                              b) An antibiotic  
 c) Biodegradable pollutant                      d) Non degradable pollutant
- 14) \_\_\_\_\_ is secondary pollutant.  
 a) PAN    b) Aerosol  
 c) Carbon monoxide                              d) Carbon dioxide

- Q.2 A) Answer the following questions. (Any Four) 08**  
 1) Define Pollution.  
 2) Define Global warming.  
 3) Define Noise pollution.  
 4) Define Enlist water pollutant.  
 5) Define Eutrophication.
- B) Write Notes on (Any Two) 06**  
 1) Define smog and its effect on environment.  
 2) Define ozone and its importance.  
 3) Define isotopes and its role in nuclear pollution.
- Q.3 A) Answer the following questions. (Any two) 08**  
 1) Explain in detail air pollution act.  
 2) Define soil pollution and its sources.  
 3) Explain Minamata episode.
- B) Answer the following questions. (Any One) 06**  
 1) Write a note on nuclear fission.  
 2) Explain marine pollution.
- Q.4 A) Answer the following questions. (Any Two) 10**  
 1) Write a detailed account on molasses fermentation for alcohol.  
 2) Give an account on thermal pollution.  
 3) Explain in detail soil formation.
- B) Answer the following question. (Any One) 04**  
 1) Write an account on Chernobyl nuclear disaster.  
 2) Write an account on global impact of pollution.
- Q.5 Answer the following questions. (Any Two) 14**  
 a) Define water pollution and explain in detail its sources and effect on human health.  
 b) Describe in detail non conventional energy types.  
 c) Write note on nuclear pollution.

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## Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) A chemical agent that kills the microorganisms and is commonly applied to substances used on inanimate objects are \_\_\_\_\_.  
a) Antiseptics                      b) Antibiotics  
c) Disinfectants                  d) Sanitizer
- 2) The most common form of non-ionizing radiation is \_\_\_\_\_.  
a) Ultraviolet light                b) X-ray  
c) Gamma rays                     d) None of these
- 3) \_\_\_\_\_ is the example of living media.  
a) Nutrient agar                    b) Peptone water  
c) Embryonated egg                d) NaCl
- 4) Pure culture technique is discovered by scientist \_\_\_\_\_.  
a) Robert Koch                    b) Joseph Lister  
c) Louis Pasteur                    d) Watson
- 5) Volutin granules are stained by \_\_\_\_\_ method.  
a) Chance                          b) Albert's  
c) Manvel's                        d) Gram
- 6) \_\_\_\_\_ is a primary stain used in acid fast staining method.  
a) Crystal violet                    b) Methylene blue  
c) ZNCF                            d) Malachite green
- 7) \_\_\_\_\_ is a soluble protein formed in the early stage of protein breakdown during digestion.  
a) Meat extract                    b) Agar  
c) Peptone                         d) Bile salt
- 8) \_\_\_\_\_ are organisms that obtain energy by the oxidation of organic compound (electron donors) in their environment.  
a) Chemotrophs                    b) Heterotrophs  
c) Autotrophs                      d) Phototrophs
- 9) In Gram-staining, iodine is used as a \_\_\_\_\_.  
a) fixative                         b) solublizer  
c) stain                             d) mordant
- 10) \_\_\_\_\_ indicator mainly used in MacConkeys agar.  
a) Bromothymol blue              b) Neutral red  
c) Crystal violet                    d) Safranin



- 11) An agent that prevents the growth of bacteria are known as \_\_\_\_\_.
  - a) Bactericide
  - b) Antibiotic
  - c) Antimicrobial
  - d) Bacteriostatic
- 12) Lag phase is also known as \_\_\_\_\_.
  - a) transitional period
  - b) period of initial adjustment
  - c) generation time
  - d) period of rapid growth
- 13) The Gas Pak system is suitable for cultivation of \_\_\_\_\_ bacteria.
  - a) Aerobic
  - b) Anaerobic
  - c) Facultatively anaerobic
  - d) Microaerophilic
- 14) The organisms which can use reduced inorganic compounds as electron donors are known as \_\_\_\_\_.
  - a) Phototrophs
  - b) chemotrophs
  - c) lithotrophs
  - d) organotrophs

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

- 1) Antimicrobial agents
- 2) Sodium taurocholate
- 3) Diauxic growth
- 4) Lyophilization
- 5) NaCl

**B) Write the Notes on (Any Two)** **06**

- 1) Describe in detail nutritional requirement of microorganism.
- 2) Write in detail cell wall staining.
- 3) Describe in detail growth phases of bacteria in a batch culture.

**Q.3 A) Answer the following questions. (Any two)** **08**

- 1) Explain in detail Living media.
- 2) Write in detail anaerobic culture methods.
- 3) Describe in detail common indicators used in media & their functions.

**B) Answer the following questions. (Any One)** **06**

- 1) Describe in detail monochrome staining.
- 2) Write in detail synchronous growth.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write in detail methods of Sterilization.
- 2) Write in detail classification of stains.
- 3) Acid fast staining

**B) Answer the following questions. (Any One) 04**

- 1) Write in detail capsule staining.
- 2) Describe in detail nonliving media.

**Q.5 Answer the following questions. (Any two)** **14**

- a) Describe in detail Gram staining.
- b) Explain in detail pure culture technique.
- c) Describe in detail classification of microorganism on the basis of carbon end energy source.

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- 12) \_\_\_\_\_ mammals lack hair, sweat glands and sebaceous gland.  
a) Aerial    b) Arboreal  
c) Terrestrial                                      d) Aquatic
- 13) Replacement of lost part is called \_\_\_\_\_.  
a) Reproduction                                b) Regeneration  
c) metamorphosis                              d) Parthenogenesis
- 14) Malpighian tubules in insects meant for \_\_\_\_\_.  
a) digestion                                      b) reproduction  
c) excretion                                      d) respiration

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

- 1) Define Phylum.
- 2) Define Eukaryotes.
- 3) Define Symbiotic interaction.
- 4) Define Budding.
- 5) Define Chemosynthesis.

**B) Write Notes on (Any Two) 06**

- 1) Give classification of phylum Cnidaria upto classes.
- 2) Write demerit of two kingdom classification.
- 3) Give economical importance of algae.

**Q.3 A) Answer the following questions. (Any two)** **08**

- 1) Write general characters of protista.
- 2) Give economical importance of bryophytes.
- 3) Explain vegetative reproduction in pteridophytes.

**B) Answer the following questions. (Any One)** **06**

- 1) Give general characters of phylum Arthropoda.
- 2) Explain life cycle of gymnosperms with diagram.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write a detailed account on silent features of coelenterate.
- 2) Give an account on economical importance of fungi.
- 3) Explain in detail Bentham and Hooker classification.

**B) Answer the following questions. (Any One)** **04**

- 1) Write short note on phonetic and phylogene classification.
- 2) Explain in brief general characters of reptiles.

**Q.5 Answer the following questions. (Any Two)** **14**

- Enlist difference between angiosperm and gymnosperm.
- Describe in detail five kingdom classifications.
- Write note on Numerical taxonomy.

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- 11) \_\_\_\_\_ get after disaggregation & then culturing of animal cells.
  - a) Secondary culture
  - b) Clumps of cells
  - c) Primary culture
  - d) Continuous cell line
- 12) \_\_\_\_\_ of the cells represents the capability of their existence.
  - a) Toxicity
  - b) Consistency
  - c) Vitality
  - d) Viability
- 13) Ability of plant cell to form entire plant is known as \_\_\_\_\_.
  - a) Totipotency
  - b) Pleuripotency
  - c) Integrity
  - d) Continuity
- 14) Most common measurement of viability is based on \_\_\_\_\_.
  - a) Dye exclusion assay
  - b) Membrane Integrity
  - c) Dye uptake assay
  - d) Metabolic assay

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

- 1) Write a note on media room in PTC.
- 2) Describe in brief gelling agent.
- 3) Define continuous cell line.
- 4) Explain in brief function of CO<sub>2</sub> incubator.
- 5) Define organ culture.

**B) Write short notes (Any Two) 06**

- 1) Write a note on artificial seed.
- 2) Write a note on Natural media.
- 3) Write a note on role of inverted microscope.

**Q.3 A) Answer the following questions. (Any two) 08**

- 1) Explain different methods of isolation of protoplast.
- 2) Discuss somatic embryogenesis.
- 3) Explain warm trypsinization.

**B) Answer the following questions. (Any One) 06**

- 1) Explain the concept of cytodifferentiation with respect to callus formation.
- 2) Write a note on instruments used in ATC laboratory.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Give details of tissue culture technique to produce novel plants.
- 2) Discuss laboratory design for animal tissue culture.
- 3) Explain the role of different constituents of serum.

**B) Answer the following questions. (Any One) 04**

- 1) Write a note on growth room in PTC.
- 2) Rapid clonal propagation.

**Q.5 Answer the following questions. (Any two) 14**

- a) Give details of synthetic media for animal tissue culture.
- b) Describe callus culture.
- c) How will you produce haploid plants by anther culture?

**B.Sc. (Semester – II) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Biochemistry and Cell Physiology (Paper - I)**  
**BIOCHEMISTRY**

Max. Marks: 70

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

14

- Page 1 of 2

- 12) \_\_\_\_\_ are the example of aromatic amino acid.
- a) Histidine                                      b) Glycine  
c) Tyrosine                                        d) Proline
- 13) Guanine and Cytosine bind by forming \_\_\_\_\_ double bonds during double helix formation of DNA.
- a) 2     b) 3  
c) 4     d) 5
- 14) Lactose is an example of \_\_\_\_\_ sugar.
- a) Reducing disaccharide                      b) Reducing monosaccharide  
c) nonreducing monosaccharide          d) nonreducing disaccharide

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

- 1) Define Vitamins.
- 2) Draw the structure glycine and alanine.
- 3) What are zwitterions?
- 4) Define DNA and enlist its types.
- 5) Draw the neat labeled diagram of t-RNA.

**B) Write notes. (Any Two)** **06**

- 1) Give the function of triglycerides and phospholipids.
- 2) What are roles of fat soluble vitamins?
- 3) Formation of peptide bond

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Distinguish between DNA and RNA.
- 2) Draw primary structure of insulin and explain it.
- 3) Write note on titration curve of amino acid.

**B) Answer the following questions. (Any One)** **06**

- 1) Explain forces involved in stabilization of protein structure.
- 2) Describe classification on fatty acids with examples.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Describe derivatives of monosaccharides.
- 2) Write a note on classification of proteins.
- 3) Write source, requirement and biochemical role of retinol and thiamine.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain Glycosidic linkages in sugars with examples.
- 2) Define nucleic acids add a note on components of nucleic acids.

**Q.5 Answer the following questions. (Any two) 14**

- Describe in detail fluid mosaic model of plasma membrane.
- Write a note on Watson and crick model of DNA. Add a note on types of DNA.
- Define protein. Describe Structural levels of protein with examples.

Seat No.	
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Set **P**

**B.Sc. (Semester – II) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Biochemistry and Cell Physiology (Paper – II)**  
**CELL PHYSIOLOGY**

Day & Date: Monday, 14-10-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

**Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Neat and labeled diagrams must be drawn wherever necessary.

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) Neurohypophysis stores and secretes oxytocin hormone which play important role in \_\_\_\_\_.  
 a) promotes reabsorption of water  
 b) childbirth and breast feeding  
 c) growth of ovarian follicles  
 d) metabolism, growth and development of the human body
- 2) \_\_\_\_\_ cells secrete histamine and other substances during inflammatory and allergic reactions.  
 a) Fibroblast  
 b) Adipose  
 c) Muscle  
 d) Mast
- 3) \_\_\_\_\_ cells in blood responsible for rapid exchange of O<sub>2</sub> and CO<sub>2</sub> in the lungs.  
 a) Leucocytes  
 b) Erythrocytes  
 c) Thrombocytes  
 d) Blood platelets
- 4) \_\_\_\_\_ hormone involved in the production of milk in mammals.  
 a) Luteotropin  
 b) Thyroxine  
 c) GTH  
 d) Somatotrophin
- 5) The impulse starts in a small bundle of specialized cells located in the right atrium is called \_\_\_\_\_.  
 a) AV node  
 b) Brain  
 c) SA node  
 d) Spinal cord
- 6) Sarcomeres are produced by specific contractile proteins known as \_\_\_\_\_.  
 a) Actin and myosin  
 b) Tubulin and myosin  
 c) Globulin and myosin  
 d) Lamins and keratins
- 7) Bones and muscles arise from the \_\_\_\_\_ germinal layer during development.  
 a) Ectoderm  
 b) Mesoderm  
 c) Endoderm  
 d) Meso-ectoderm
- 8) \_\_\_\_\_ is the developmental response of plants to the relative lengths of light and dark periods.  
 a) Vernalization  
 b) Shooting  
 c) Rooting  
 d) Photoperiodism
- 9) Microvilli are meant for \_\_\_\_\_ food material found in small intestine.  
 a) Absorption  
 b) Digestion  
 c) Assimilation  
 d) Excretion



- 10) Pneumotaxic center is located in \_\_\_\_\_.  
 a) Medulla oblongata                      b) Cerebrum  
 c) Spinal cord                                d) Cerebellum
- 11) \_\_\_\_\_ is an example of symbiotic nitrogen fixing bacteria.  
 a) Rhizobium                                b) Azotobacter  
 c) *E. coli*                                      d) Azolla
- 12) \_\_\_\_\_ is a condition in which leaves produces insufficient chlorophyll.  
 a) Fluorosis                                  b) Chlorosis  
 c) Necrosis                                    d) Variegation
- 13) \_\_\_\_\_ play important role to induce parthenocarpy in fruits.  
 a) Auxin                                        b) ABA  
 c) Jasmonic acids                          d) Ethylene
- 14) Different stress conditions such as water, drought, cold, light and temperature result in increased amounts of \_\_\_\_\_.  
 a) IAA    b) GA  
 c) ABA    d) Florigen

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

- 1) Define transpiration.
- 2) Write a note on reflex action.
- 3) Write a note on Sarcomere.
- 4) Define plant macronutrients.
- 5) Write a note on breathing.
- 6) Define Vernalization.

**B) Answer the following questions. (Any Two) 06**

- 1) Write a note structure of nephron
- 2) Write about types of joints
- 3) Regulation of cardiac activity.

**Q.3 A) Answer the following questions. (Any two) 08**

- 1) Describe different types of seed dormancy methods.
- 2) Describe process of absorption of food materials with suitable examples.
- 3) Explain structure and physiological role of Jasmonic acids.

**B) Answer the following question. (Any One) 06**

- 1) Describe central nervous system with neat labeled diagram.
- 2) Describe structure and function of peptide hormones.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Describe stomatal and lenticular transpiration.
- 2) Describe mechanism of translocation of solutes in plants.
- 3) Write a note on seed viability

**B) Answer the following question. (Any One) 04**

- 1) Describe structure of pituitary gland with neat labeled diagram.
- 2) Describe composition of blood with neat labeled diagram.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Explain structure and physiological role of ethylene and brassinoids.
- b) Describe process phloem transport.
- c) Describe mechanism of urine formation.

**B.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**Biometry and Computer Science (Paper - I)**  
**BIOMETRY**

Max. Marks: 70

**Instructions:**

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of basic calculator is allowed.
- 4) Use of graph paper wherever necessary.

14

- 11) A function  $f$  is decreasing at  $a$ , if \_\_\_\_\_.  
 a)  $f'(a) > 0$  b)  $f(a) > 0$   
 c)  $f(a) < 0$  d)  $f'(a) < 0$
- 12)  $f(x) = \frac{6}{x-2}$  is discontinuous at  $x =$  \_\_\_\_\_.  
 a) 0 b) -2  
 c) 2 d) 6
- 13)  $\lim_{n \rightarrow 0} \left( x + \frac{\sin x}{x} \right) =$  \_\_\_\_\_.  
 a) 0 b) 1  
 c) 2 d) -1
- 14) If  $A = \{5, 7, 8, 4\}$  and  $B = \{5, 2, 3, 4\}$  then \_\_\_\_\_.  
 a)  $\{2, 3\}$  b)  $\{7, 8\}$   
 c)  $\{ \}$  d)  $\{0, -5\}$

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

- Find the value of  $3i^{15} + i^{14} - 3i^{16} - i^{17}$
- If  $f(x) = 4x - 1$  and  $g(x) = 2x$  then find  $f \cdot g$ .
- If  $y = 7x^3 3^x$ , then find  $\frac{dy}{dx}$
- If  $\lim_{n \rightarrow a} \frac{x^5 - a^5}{x - a} = 80$  find  $a$
- Evaluate  $\int 0' e^x dx$

**B) Answer the following questions. (Any Two)****06**

- Evaluate  $\int 3 \sec^2 x - 4 \operatorname{cosec}^2 x dx$
- If  $y = \sin x \log x$ , then find  $\frac{dy}{dx}$
- Solve the differential equation  $\frac{y}{x} = \frac{dx}{dy}$

**Q.3 A) Answer the following questions. (Any Two)****08**

- Evaluate  $\int 4x^2 \sin x dx$
- Differentiate  $\frac{\operatorname{cosec} x}{6+5x}$  with respect to ' $x$ '
- Evaluate  $\lim_{n \rightarrow 2} \frac{4x^2 + 5x - 15}{x^2 + 3x - 10}$

**B) Answer the following questions. (Any One)****06**

- If  $z_1 = 3 + i$ ,  $z_2 = 2 - 3i$ ,  $z_3 = i$  &  $z_4 = 7 - 6i$  then find  $\frac{z_1 + z_2}{z_4 + z_3}$
- Find the maximum and minimum value of the function  
 $f(x) = 3x^3 - 10x^2 + 13x + 5$

**Q.4 A) Answer the following questions. (Any Two)****10**

- If  $A = \begin{bmatrix} 2 & 3 & -2 \\ 1 & 1 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 1 \\ 3 & -5 \\ 4 & 6 \end{bmatrix}$  then find  $AB$
- Evaluate  $\int 6x^2 \tan x dx$
- Differentiate  $\frac{\sin x}{1+x^2}$  with respect to ' $x$ '

**B) Answer the following questions. (Any One)****04**

- Evaluate  $\int 3x^4 \sin x dx$
- If  $P = \begin{bmatrix} 4 & 1 \\ 3 & 2 \\ 2 & -5 \end{bmatrix}$  and  $Q = \begin{bmatrix} 2 & 4 & 6 \\ 8 & 9 & 5 \end{bmatrix}$  then find  $PQ$

**Q.5 Answer the following questions. (Any Two)**

- a) Draw the graph of linear function  $y = f(x) = 5x - 3$
- b) Solve the equation  $x + 4y + 4z = 15$ ,  $2x + y + 4z = 18$ ,  $x + 3y + 4z = 13$  using reduction method or Gaussian Elimination method of matrix.
- c) If  $x = \{1,2,3,4,5,6,7,8,9,10\}$ ,  $A = \{3,4,5,6,7\}$ ,  $B = \{1,2,5,6\}$ ,  $C = \{6,7,8,9\}$  then verify  $A' \cap (B \cup C) = (A' \cap B) \cup (A' \cap C)$

<b>Seat No.</b>	
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- 12) The protocol that is used to transfer file is \_\_\_\_\_.
  - a) FTP
  - b) HTML
  - c) HTTP
  - d) SMTP
- 13) For DBMS, \_\_\_\_\_ software is used.
  - a) MS Word
  - b) MS Excel
  - c) MS PowerPoint
  - d) MS Access
- 14) Rearranging the data in a sequence is called \_\_\_\_\_.
  - a) Updating
  - b) Editing
  - c) Batching
  - d) Sorting

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

- 1) Explain Application Software with example.
- 2) Explain how you will change font and font style in word.
- 3) Enlist any four input devices.
- 4) Explain ALU & Control unit.
- 5) Define the following terms-
  - i) Information
  - ii) Data

**B) Write short notes. (Any Two)** **06**

- 1) Explain use of Modem in networking.
- 2) Explain Wide Area Network.
- 3) Explain the need of database.

**Q.3 A) Answer the following questions. (Any Two)** **08**

- 1) Explain the use of Internet.
- 2) Explain how will you prepare chart in excel?
- 3) Explain Basic Components of Digital Computer.

**B) Answer the following questions. (Any One)** **06**

- 1) Write a note on Data Communication.
- 2) Explain any three methods to calculate total in excel.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) What is Computer? Explain types of computer.
- 2) Explain Network Topology and its types.
- 3) Define the term Flow chart and Explain different symbols of flow chart.

**B) Answer the following questions. (Any One)** **04**

- 1) Write a note on hexadecimal number system with example.
- 2) Write a note on octal number system with example.

**Q.5 Answer the following questions. (Any Two)** **14**

- 1) What do you mean by Algorithm? Write an algorithm to find greatest number among two numbers.
- 2) Explain modem and its different types in detail.
- 3) Explain Intranet and Extranet in detail.

<b>Seat No.</b>	
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**B.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**INHERITANCE BIOLOGY**

Day & Date: Saturday,05-10-2019  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) \_\_\_\_\_ studied extra-nuclear inheritance in Four 'o' clock plant.  
a) E. Tatum                                      b) B. Ephrussi  
c) Carl Correns                                  d) T. H. Morgan
- 2) \_\_\_\_\_ is called royal disease.  
a) Hemophilia  
b) Colorblindness  
c) Congenital hypertrichosis lanuginosa  
d) Night blindness
- 3) In *Mirabilis jalapa*, formation of green, pale or white and variegated leaves on same plant in a cross between \_\_\_\_\_.  
a) Variegated × Variegated                  b) Green × Variegated  
c) Pale or White × Variegated                d) Green × Green
- 4) Holandric genes are also called as \_\_\_\_\_.  
a) autosomal                                      b) X-linked  
c) Y linked genes                                d) none of these
- 5) Typical dihybrid ratio is modified as \_\_\_\_\_ in complementary gene actions.  
a) 9:3:3:1                                         b) 9:7  
c) 9:3:4     d) 13:3
- 6) Typical Mendelian monohybrid phenotypic ratio in the F<sub>2</sub> generation is \_\_\_\_\_.  
a) 9:3:3:1                                         b) 1:1:1:1  
c) 9:3:4     d) 3:1
- 7) \_\_\_\_\_ 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
- 8) Virulent phages responsible for \_\_\_\_\_ type of life cycle in the host cell. 01  
a) Lysogenic                                        b) Lysolytic  
c) Lysolytic & Lysogenic                      d) None of the above
- 9) The *tra* genes were responsible for formation of \_\_\_\_\_ bridge during transfer of 'F' plasmids in bacterial cells.  
a) Transduction                                  b) Conjugation  
c) Transformation                                d) Transcription

- 10) X chromosome of father is transferred to \_\_\_\_\_.  
a) Son                                      b) Grandson  
c) Daughter                                d) both son & daughter
- 11) In co-dominance both alleles are \_\_\_\_\_ expressed.  
a) partially                                  b) alternately  
c) equally                                     d) simultaneously
- 12) Cytoplasmic genes are located on the \_\_\_\_\_ DNA.  
a) Chromosomal                            b) Mitochondria  
c) Nuclear                                     d) X & Y chromosomal
- 13) In physical mapping, the distance between two genes is measured in terms of \_\_\_\_\_.  
a) Centimorgan                              b) base pairs  
c) Metre                                        d) nanometer
- 14) T. H. Morgan used \_\_\_\_\_ as experimental model to study genetic linkage.  
a) Garden pea                                b) Drosophila  
c) House flies                                 d) Bacteriophage

**Q.2 A) Attempt any four of the following questions. 08**

- 1) What are plasmids?
- 2) What are pseudo alleles?
- 3) Give sex determination in birds.
- 4) What are Hfr strains?
- 5) What is back cross?

**B) Attempt any two of the following questions. 06**

- 1) What is epistatic gene?
- 2) What are temperate phages?
- 3) Significance of linkage.

**Q.3 A) Attempt any two of the following questions. 08**

- 1) Prove law of segregation with suitable example.
- 2) Explain process of specialized transduction in bacteria.
- 3) Explain complete and incomplete sex linked genes with suitable examples.

**B) Attempt any one of the following question. 06**

- 1) Describe multiple alleles with suitable example.
- 2) Describe process of mapping by tetrad analysis.

**Q.4 A) Attempt any two of the following questions. 10**

- 1) Describe structure of Fertility plasmids.
- 2) Describe incomplete and co-dominance with suitable examples.
- 3) Explain incomplete linkage with suitable example.

**B) Attempt any one of the following question. 04**

- 1) Describe extra nuclear inheritance with any two suitable examples.
- 2) Give structure of folded fiber model of bacterial DNA.

**Q.5 Attempt any two of the following questions. 14**

- Explain process of crossing over with neat labeled diagram.
- Describe process of conjugation with neat labeled diagram.
- Describe X & Y linked inheritance with any one suitable example.



Seat No.	
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Set **P**

**B.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**BASICS OF MOLECULAR BIOLOGY**

Day & Date: Monday, 07-10-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below.****14**

- 1) Nucleic acid play vital role in \_\_\_\_\_.  
 a) Amino Acid synthesis                      b) protein synthesis  
 c) RNA synthesis                                d) Fatty acid synthesis
- 2) Triplet code phenomenon was observed by FHC Crick by using \_\_\_\_\_.  
 dye.  
 a) Acridine                                        b) Feuelgen  
 c) Acetocarmine                                d) Evans Blue
- 3) The Four stranded DNA contain High proportion of \_\_\_\_\_.  
 a) Guanosine                                    b) Adenosine  
 c) Thymidine                                    d) Cytidine
- 4) In photoreactivation the enzyme photolyase cleave \_\_\_\_\_ dimmers.  
 a) G-G    b) G-C  
 c) T-T    d) A-A
- 5) Arthur Korenberg identified the enzyme \_\_\_\_\_ induced in replication.  
 a) DNA polymerase III                      b) DNA Polymerase I  
 c) DNA Ligase                                  d) DNA primase
- 6) Genes representing specialized function for specific tissue development are called \_\_\_\_\_.  
 a) Guide Gene                                    b) Luxury Gene  
 c) Slave gene                                    d) Xist gene
- 7) The antibiotic ciprofloxacin inhibits \_\_\_\_\_ enzymes.  
 a) Bacterial gyrase                            b) Bacterial polymerase  
 c) Bacterial ligase                              d) Bacterial Helicase
- 8) In SOS Repair the two genes which inhibit cell division are \_\_\_\_\_.  
 a) Lex A and Rec A                            b) Sul A and Sul B  
 c) Mut S and Mut H                            d) Uvr BluVrD
- 9) Bent DNA structure can be produced by antitumor drug \_\_\_\_\_.  
 a) Ciprofloxacin                                b) Novobiocin  
 c) Nalidixic acid                                d) Cisplastin
- 10) The number of base pairs per complete turn in Z DNA is \_\_\_\_\_.  
 a) 10    b) 11  
 c) 12    d) 16

- 11) Okazaki fragment are joined together into a continuous strand by the enzyme \_\_\_\_\_.
  - a) DNA polymerase I
  - b) DNA polymerase II
  - c) DNA Ligase
  - d) DNA Helicase
- 12) M. Messelson and F W Stahl verified semiconservative nature of DNA replication by using \_\_\_\_\_.
  - a) Autoradiography
  - b) Fluorescent labelling
  - c) Electron microscopy
  - d) Isotopic labelling
- 13) Mitochondrial DNA Mutation leads to the decline of \_\_\_\_\_.
  - a) Glycolysis
  - b) Photosynthesis
  - c) Gluconeogenesis
  - d) Oxidative phosphorylation
- 14) Rolling circle mode of Replication occurs in the E Coli chromosome during \_\_\_\_\_.
  - a) Transformation
  - b) Conjugation
  - c) Transduction
  - d) Replication

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

- 1) Define supercoiling.
- 2) Define solenoid.
- 3) What are Orazaki fragments?
- 4) Write the Role of RNA primers.
- 5) Define packing Ratio.

**B) Write the Notes on (Any Two)** **06**

- 1) Solenoid model of chromatin fibre
- 2) Degeneracy in Genetic code
- 3) Conservative Mode Replication

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Explain Clover leaf Model of t-RNA with neat diagram.
- 2) Explain Griffiths Experiment of transformation.
- 3) Discuss the formation of solenoid during Eukaryotic genome organization.

**B) Answer the following questions. (Any One)** **06**

- 1) Write in detail about different types of DNA.
- 2) Explain Excision Repair Mechanism in DNA.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write about the salient feature of double Helix of DNA with neat labelled diagram.
- 2) Explain in detail about the cot curve analysis during renaturation process.
- 3) Write in detail about the enzymes involved in DNA Replication.

**B) Answer the following questions. (Any One) 04**

- 1) Explain about the Mitochondrial DNA.
- 2) Write in detail about the Hershey chase Experiment.

**Q.5 Answer the following questions. (Any Two) 14**

- Write in detail the process of Replication in prokaryote with neat labelled diagram.
- Describe in brief organization of DNA in Eukaryotes with neat labelled diagram.
- Write in detail about rolling circle Model of Replication.

**Seat  
No.**

Day & Date: Saturday, 09-11-2019  
Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

**Q.1 Select the correct alternatives from the following and rewrite the sentence. 08**

- 1) Main source of energy during prolonged starvation is derived from \_\_\_\_\_.  
a) Triglycerides                      b) Hemoglobin  
c) Lipoprotein                        d) Antibodies
- 2) The \_\_\_\_\_ glands of the body deliver their secretions directly in the blood stream.  
a) Endocrine                          b) Tertiary  
c) Exocrine                          d) Quaternary
- 3) Secretion of epinephrine by adrenal medulla stimulates  
a) Glycogen synthesis              b) Glycogen breakdown  
c) Protein breakdown              d) Photosynthesis
- 4) ATP synthesis takes place in \_\_\_\_\_ subunit of ATP synthase enzyme.  
a)  $\beta$                                       b)  $\alpha$   
c)  $\gamma$                                       d)  $\delta$
- 5) Salvage pathway is used in the synthesis of \_\_\_\_\_.  
a) Amino acid                         b) Carbohydrate  
c) Nucleotide                         d) Fatty acid
- 6) The common pyrimidine ribonucleotides are \_\_\_\_\_.  
a) Cytidine monophosphate and uridine monophosphate  
b) Adenine monophosphate and thymine monophosphate  
c) Thymine monophosphate and niacin monophosphate  
d) Alanine monophosphate and guanine monophosphate
- 7) Net gain of ATP under aerobic condition from one glucose molecule is \_\_\_\_\_.  
a) 7                                        b) 12.5  
c) 25                                      d) 32
- 8) De novo synthesis of pyrimidine nucleotides occurs in \_\_\_\_\_.  
a) Mitochondria                      b) Cytosol  
c) ER                                      d) Ribosomes

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

- 1) Explain the carboxylation reaction of acetyl CoA required for fatty acid synthesis.
- 2) Enlist the two enzymes located in mitochondria required for urea cycle.
- 3) Give long form of NADP, FAD.
- 4) Give the origin of four nitrogen atoms in purine ring
- 5) What is the role of pyridoxal phosphate in transamination reaction?
- 6) Distinguish between fatty acid synthesis and  $\beta$ -oxidation.

- Q.3 Answer the following questions. (Any Two)** **08**
- 1) Write a note on enzymes used in  $\beta$ -oxidation of fatty acid.
  - 2) Write an account on structure of purines with example.
  - 3) Describe important properties of hormones.
- Q.4 Answer the following questions. (Any Two)** **08**
- 1) Write a note decarboxylation reaction of amino acids with one example.
  - 2) Write an account on biosynthesis GMP.
  - 3) Write a note on hydrolysis of Triacylglycerol.
- Q.5 Answer the following questions. (Any One)** **08**
- 1) Discuss in detail about reaction of glycolysis.
  - 2) Explain in brief ATP synthase complex and ATP generation.

**Seat  
No.**

Day & Date: Wednesday, 09-10-2019  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

14

- 1) In electron microscopy the source of illumination is \_\_\_\_\_.  
a) Light  
b) Tungsten filament  
c) Nichrome wire  
d) Black Rod
- 2) Beers law states that the amount of light absorbed by a material is directly proportional to the \_\_\_\_\_.  
a) Concentration of the material  
b) Intensity of light  
c) Thickness of the material  
d) None of these
- 3) In \_\_\_\_\_ technique, the cells are suspended in a stream of fluid and passed through electronic detection apparatus for detection.  
a) Nephelometry  
b) Flow cytometry  
c) NMR  
d) AAS
- 4) A \_\_\_\_\_ meter can determine the intensity of scattered light at the right angles to the direction of incident light.  
a) pH  
b) dosi  
c) turbido  
d) nephlo
- 5) Isopycnic centrifugation is a technique used to separate molecules on the basis of their \_\_\_\_\_.  
a) Buoyant density  
b) Conductivity  
c) Redox potential  
d) Surface tension
- 6) Phase contrast microscopy can show the differences in \_\_\_\_\_ as difference in contrast.  
a) Darkness  
b) brightness  
c) numerical aperture  
d) refractive index
- 7) Density gradient of \_\_\_\_\_ is used for the density based separation of DNA molecules.  
a) Casium chloride  
b) Sucrose  
c) Glycerol  
d) Agarose
- 8) In \_\_\_\_\_ microscope, the light source and condenser are situated on the top above the stage, pointing downwards.  
a) compound  
b) inverted  
c) dark field  
d) phase contrast
- 9) In GM counter, the Geiger Muller tube is used as a sensing element for detection of \_\_\_\_\_ radiation.  
a) mutagenic  
b) emerging  
c) ionizing  
d) scintillating

- 10) For the spectroscopic analysis of UV region of an electromagnetic spectrum, the \_\_\_\_\_ is generally used as a detector.
  - a) Photomultiplier
  - b) Photovoltaic cell
  - c) Monochromator
  - d) Thermocoupler
- 11) The frequency of molecular vibrations range from \_\_\_\_\_.
  - a)  $10^5$  to  $10^8$  Hz
  - b)  $10^8$  to  $10^{11}$  Hz
  - c)  $10^{12}$  to  $10^{14}$  Hz
  - d)  $10^6$  to  $10^9$  Hz
- 12) Variations in the optical rotation of a substance with changing light wavelength are analyzed in \_\_\_\_\_.
  - a) XRD
  - b) FACS
  - c) GM counting
  - d) CD-ORD
- 13) The pH meter measures the potential difference between pH glass electrode and a \_\_\_\_\_ reference electrode.
  - a) zinc
  - b) cadmium
  - c) cobalt
  - d) calomel
- 14) The \_\_\_\_\_ rays emitted by radioactive isotopes have least penetrating power.
  - a) UV
  - b) alpha
  - c) beta
  - d) gamma

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

- 1) Write any two biological applications of radioisotopes.
- 2) State different wavelength ranges of an electromagnetic spectrum.
- 3) State Beer & Lambert's law.
- 4) Give examples of indicators for pH measurement.
- 5) Draw a neat labeled diagram of image formation in light microscopy.

**B) Write Notes on: (Any Two)** **06**

- 1) Electromagnetic spectrum
- 2) Radioactive decay and its types
- 3) Rate zonal centrifugation

**Q.3 A) Answer the following questions. (Any two)** **08**

- 1) Describe measurement of pH by pH meter.
- 2) Describe construction and use of compound microscope.
- 3) Describe the nature of radioactivity.

**B) Describe in detail any one of the following techniques.** **06**

- 1) X ray diffraction
- 2) Flow cytometry

**Q.4 A) Describe in detail any two of the following.** **10**

- 1) Types of microscopy and their principles.
- 2) Instrumentation and applications of colorimetry.
- 3) Biohazards and safety measures for handling of radioisotopes.

**B) Describe any one of the following.** **04**

- 1) Molecular energy levels.
- 2) Types of rotors for centrifugation.

**Q.5 Write a detailed account on any two of the following.** **14**

- a) Working principle, instrumentation & applications of IR spectroscopy.
- b) Electron microscopy and its types.
- c) Molecular characterization by NMR.

Seat No.	
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**B.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**ANIMAL TISSUE CULTURE**

Day & Date: Thursday, 10-10-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) \_\_\_\_\_ cells have finite life span.
  - a) Tumor
  - b) Cancerous
  - c) Transformed
  - d) Normal
- 2) Plasma clot technique is also known as \_\_\_\_\_ technique.
  - a) Watch glass
  - b) Grid
  - c) Raft
  - d) Cyclic exposure
- 3) In natural media most widely used biological fluid as media is \_\_\_\_\_.
  - a) Plasma clot
  - b) Serum
  - c) Coconut milk
  - d) Clots
- 4) When all the cells in culture are in same phase of growth; the process is known as \_\_\_\_\_.
  - a) Trypsinization
  - b) Primary cell culture
  - c) Cell synchronization
  - d) Apoptosis
- 5) Most cell lines grow well at pH \_\_\_\_\_.
  - a) 7.1
  - b) 7.2
  - c) 7.3
  - d) 7.4
- 6) \_\_\_\_\_ portion of skin is used to produce artificial skin.
  - a) Epidermis
  - b) Dermis
  - c) Epithelial
  - d) Endothelial
- 7) \_\_\_\_\_ is often added to the cell suspension before viable counting,
  - a) Gram stain
  - b) Trypan blue
  - c) Crystal violet
  - d) Fluorescein
- 8) The \_\_\_\_\_ content of diploid cells is usually constant, although variations can occur in other content of cells through the cell cycle.
  - a) Protein
  - b) Lipid
  - c) DNA
  - d) Carbohydrates
- 9) A colorimetric assay for viable cells has been developed by using \_\_\_\_\_.
  - a) CTT
  - b) GTT
  - c) MTT
  - d) None of these
- 10) \_\_\_\_\_ technique is well known in forensic science but is gradually adopted as a standard reference technique for cell line identity in culture collection.
  - a) DNA fingerprinting
  - b) Karyotyping
  - c) LDH assay
  - d) Lowry assay

- 11) \_\_\_\_\_ involves the exposure of the cell suspension to a high voltage electrical impulse.
  - a) Encapsulation
  - b) Electroporation
  - c) Liposome
  - d) Protoplast
- 12) Cells removed from animal tissue will continue to grow if supplied with nutrients & growth factors. Process is known as \_\_\_\_\_.
  - a) Animal cell culture
  - b) Plant cell culture
  - c) Yeast cell culture
  - d) Fungus cell culture
- 13) Hela cell line is derived from \_\_\_\_\_ cell line.
  - a) Stomach cancer
  - b) Cervical cancer
  - c) Lung cancer
  - d) Blood cancer
- 14) Which of the following behavior not shown by normal cell in culture?
  - a) Contact inhibition
  - b) Monolayer formation
  - c) Uncontrolled cell division
  - d) Anchorage dependent

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

- 1) Define cell growth.
- 2) Define sterilization.
- 3) Define synthetic media.
- 4) Define primary cell culture.
- 5) Define karyotyping.

**B) Write Notes (Any Two)** **06**

- 1) Cell synchronization.
- 2) Serum and its importance
- 3) Isozymes

**Q.3 A) Answer the following questions (Any Two) 08**

- 1) Explain mechanical cell separation methodology.
- 2) Write an account on sterilization of glassware.
- 3) Explain principle of flow cytometry.

**B) Answer the following question(Any One) 06**

- 1) Write a note on DNA transfer using viruses.
- 2) Write an account on types of organ culture.

**Q.4 A) Answer the following questions (Any Two) 10**

- 1) Define animal tissue culture and its importance.
- 2) Explain importance of pH, temperature and osmolality in media.
- 3) Write account on viral vaccine.

**B) Answer the following question (Any One) 04**

- 1) Explain balanced salt solution and its role in animal tissue culture media.
- 2) Write an account on DNA fingerprinting.

**Q.5 Answer the following questions (Any Two) 14**

- Give detailed account on laboratory design.
- Explain indirect methods of cell determination.
- Write an account on production and application of monoclonal antibodies.



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Set **P**

**B.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**BIOENERGETICS AND ENZYMOLOGY**

Day & Date: Friday, 11-10-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) The \_\_\_\_\_ factor is responsible for inhibition of enzymatic reaction during feedback inhibition.
  - a) enzyme
  - b) end product
  - c) temperature
  - d) substrate
- 2) Epimerase is class of \_\_\_\_\_ enzyme.
  - a) Oxidoreductase
  - b) Ligase
  - c) Transferase
  - d) Isomerase
- 3) In an open system, the process should be \_\_\_\_\_.
  - a) Reversible
  - b) irreversible
  - c) dependant of enthalpy
  - d) exergonic
- 4) Bond specificity is also called \_\_\_\_\_.
  - a) Relative specificity
  - b) size specificity
  - c) group specificity
  - d) structural specificity
- 5) Optimal temperature for enzyme to work in human body is \_\_\_\_\_.
  - a) 30°C
  - b) 32°C
  - c) 35°C
  - d) 37°C
- 6) According to lock and key model substrate act as a \_\_\_\_\_.
  - a) Key
  - b) lock
  - c) activator
  - d) inhibitor
- 7) In non competitive inhibition \_\_\_\_\_ remains constant as reaction proceeds.
  - a) V<sub>max</sub>
  - b) K<sub>m</sub>
  - c) V<sub>0</sub>
  - d) ½ V<sub>max</sub>
- 8) Pancreatic zymogens are only activated when they reach \_\_\_\_\_.
  - a) Stomach
  - b) pancreas
  - c) small intestine
  - d) large intestine
- 9) The metal ion \_\_\_\_\_ works as an activator of trypsinase.
  - a) Iron
  - b) Copper
  - c) Potassium
  - d) Calcium
- 10) Abzyme is an \_\_\_\_\_.
  - a) Isoenzyme
  - b) allosteric enzyme
  - c) proenzyme
  - d) antibody with catalytic activity

- 11) \_\_\_\_\_ is example of proteolytic enzyme.
  - a) Papain
  - b) Cellulose
  - c) phosphatase
  - d) dehydratase
- 12) The \_\_\_\_\_ is example of enzyme inhibitor.
  - a) Sodium
  - b) hydrogen
  - c) Cyanide
  - d) sulfur
- 13) In equilibrium constant expression, concentration of product is taken on \_\_\_\_\_.
  - a) Right side
  - b) left side
  - c) numerator
  - d) Denominator
- 14) The molecule which acts directly on an enzyme to lower its catalytic rate is \_\_\_\_\_.
  - a) Repressor
  - b) inhibitor
  - c) modulator
  - d) regulator

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

- 1) Define cofactor and give two examples.
- 2) Explain IUB nomenclature system.
- 3) What is catalytic triad?
- 4) Write a note on ribozymes.
- 5) Define allosteric modulators.

**B) Write short notes (Any Two)** **06**

- 1) Measurement of redox potential
- 2) Biological standard state
- 3) Lineweaver burk plot and its limitations

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Explain lock and key mechanism.
- 2) Describe biological role of enzymes.
- 3) Write a note on isoenzymes of LDH.

**B) Answer the following questions. (Any One)** **06**

- 1) Define isomerization. Explain its reaction mechanism with an example.
- 2) Describe reaction carried out by lactate dehydrogenase enzyme.

**Q.4 A) Answer the following questions. (Any Two)** **10**

- 1) Write a note on group transfer reactions.
- 2) Explain concept of free energy change. Add a note on standard free energy change.
- 3) Write a note on ATP hydrolysis & explain use of ATP as energy currency.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain effect of pH on enzyme activity with any one example.
- 2) Write a note on redox reactions. What is redox potential?

**Q.5 Answer the following questions. (Any Two)** **14**

- Explain types of enzyme regulation in detail.
- Derive Michaelis Menten equation. Give significance of  $V_{max}$  &  $K_m$ .
- Explain in detail reversible and irreversible enzyme inhibition with their kinetics.

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**B.Sc.(Semester–III) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**FUNDAMENTALS OF IMMUNOLOGY**

Day & Date: Saturday, 12-10-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Neat and labeled diagrams must be drawn wherever necessary.

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) In the adult, normal blood-cell count has shows \_\_\_\_\_ RBCs.  
 a)  $2.5 \times 10^5$  cells/mm<sup>3</sup>                      b)  $5.0 \times 10^6$  cells/mm<sup>3</sup>  
 c)  $7.3 \times 10^3$  cells/mm<sup>3</sup>                      d)  $4.5 \times 10^4$  cells/mm<sup>3</sup>
- 2) Macrophage-like cells present in liver are called as \_\_\_\_\_.  
 a) Langerhan                                      b) Kuffer  
 c) Microglial                                      d) Alveolar
- 3) Tonsils and appendix are the examples of \_\_\_\_\_ associated lymphoid tissues.  
 a) Gut    b) Bronchus  
 c) Peyer's    d) Spleen
- 4) Horny outer layer of the skin called stratum corneum is made up of \_\_\_\_\_.  
 a) sebum    b) fatty acid  
 c) cartilage    d) keratin
- 5) Spermine and \_\_\_\_\_ present in the semen carry out antibacterial activity.  
 a) cobalt    b) copper  
 c) zinc    d) nickel
- 6) Spread of viral infection is avoided by \_\_\_\_\_ as a member of innate immunity.  
 a) interleukin                                      b) interferon  
 c) chemokine                                      d) tumor necrosis factor
- 7) Two or more cytokines that mediate similar functions are called \_\_\_\_\_.  
 a) redundant                                      b) pleiotropic  
 c) synergetic                                      d) antagonist
- 8) In the class I MHC  $\alpha$ -chain is encoded by \_\_\_\_\_ structure gene/s.  
 a) A    b) B  
 c) C    d) all of these
- 9) Antigen showing immunogenicity and immunological reactivity are \_\_\_\_\_.  
 a) Incomplete antigens                      b) Complete antigens  
 c) Haptens    d) Adjuvants
- 10) \_\_\_\_\_ shows monomeric type of antibody structure.  
 a) IgD    b) IgA  
 c) IgG    d) all of these

- 11) \_\_\_\_\_ antibody can pass the placenta.  
a) IgG  
b) IgD  
c) IgA  
d) IgM
- 12) \_\_\_\_\_ is the example of secretory antibody.  
a) IgG  
b) IgD  
c) IgA  
d) IgM
- 13) End products of enzyme-substrate reaction are analyzed in \_\_\_\_\_ test.  
a) Radioimmunoassay  
b) Immunofluorescence  
c) Precipitation  
d) ELISA
- 14) Lissamine rhodamine is used in \_\_\_\_\_ antigen – antibody test.  
a) ELISA  
b) immune-fluorescence  
c) RIA  
d) Complement fixation

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

- 1) Apoptosis.
- 2) Inflammation.
- 3) Racial immunity.
- 4) Paratope.
- 5) Affinity of interaction.

**B) Write short notes (Any Two)** **06**

- 1) Titre.
- 2) B cell epitope.
- 3) T cells.

**Q.3 A) Answer the following questions. (Any two) 08**

- 1) Explain the role of Dendritic cells in immunity.
- 2) Describe in detail chemical barriers of innate immunity.
- 3) Write in detail on structure of Class II MHC.

**B) Answer the following questions. (Any One)** **06**

- 1) Describe in detail on structure and functions of IgA.
- 2) Explain in detail immune-diffusion tests.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) What is adjuvant? Explain various examples with its functions.
- 2) Describe the structure and functions of thymus.
- 3) Explain in detail properties and functions of cytokines.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain the history of antibody discovery.
- 2) Describe in brief immunofluorescence test.

**Q.5 Answer the following questions. (Any two)** **14**

- Write in detail on factors affecting antigenicity.
- Describe in detail on structure and functions of IgG.
- Explain in detail on immune-electrophoresis with suitable examples.

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## Max. Marks: 70

14

- Page 1 of 2

- 12) Polytene chromosome are permanently \_\_\_\_\_ Chromosome.  
a) Telophase                                      b) Anaphase  
c) Prophase                                        d) Metaphase
- 13) Chomonemal fibrils which can be easily separable from their coil is called \_\_\_\_\_.  
a) Paranemic                                      b) Plectonemic  
c) Supercoil                                        d) Double helix coil
- 14) The fluctuation in gene frequency is called \_\_\_\_\_.  
a) Gene pool                                        b) Allele frequency  
c) Genetic Drift                                    d) Random drift.

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

- 1) Define Euploidy.
- 2) Define Transposition.
- 3) Define Migration.
- 4) Define Mean.
- 5) Define Holandric Genes.

**B) Write short notes. (Any Two)** **06**

- 1) Role of Chromosome in heredity.
- 2) Sex chromosome.
- 3) Minisatellites.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Write in detail about Karyotyping
- 2) Write in detail about Chemical Mutagen.
- 3) Write in detail about LINES.

**B) Answer the following questions. (Any One)** **06**

- 1) Write in detail about the process of mitosis.
- 2) Write in detail about the Structural changes in chromosome.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write in detail about Replicative and Non Replicative Transposons.
- 2) Write in detail about Heterochromatin.
- 3) Write in detail about Polyploidy.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain the quantitative data Range.
- 2) Explain in detail the evolution of crop plant Wheat.

**Q.5 Answer the following questions. (Any Two)** **14**

- 1) Describe the structure of chromosome with neat labeled diagram.
- 2) Write in detail about the different types of bacterial transposons.
- 3) Explain in detail about Hardy Weinberg law and factors affecting the gene frequency.

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**B.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**MECHANISMS IN MOLECULAR BIOLOGY**

Day & Date: Saturday, 02-11-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

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

**14**

- 1) \_\_\_\_\_ is responsible for transcribing tRNA in eukaryotes.
  - a) RNA Polymerase  $\alpha$
  - b) RNA polymerase II
  - c) RNA Polymerase III
  - d) RNA polymerase I
- 2) In prokaryotes, transcription process is terminated by \_\_\_\_\_.
  - a) Sigma factor
  - b) Rho factor
  - c) Pol-  $\alpha$
  - d) Core enzyme
- 3) \_\_\_\_\_ molecule is used for tagging the proteins in proteasome mediated degradation.
  - a) Polysaccharides
  - b) Ubiquitin
  - c) Phosphates
  - d) Sulfur
- 4) In prokaryotes \_\_\_\_\_ sequences are also known as ribosome binding site.
  - a) Consensus
  - b) Promoter
  - c) Shine-Dalgarno
  - d) Enhancer
- 5) In *trp* operon, *trpA* gene encodes \_\_\_\_\_ enzyme.
  - a) Anthranilate synthetase component I
  - b) Tryptophan synthetase  $\beta$
  - c) Tryptophan synthetase  $\alpha$
  - d) Anthranilate synthetase component II
- 6) \_\_\_\_\_ is act as initiator tRNA molecule in eukaryotes.
  - a) tRNA<sup>met</sup>
  - b) tRNA<sup>fmet</sup>
  - c) tRNA<sup>pro</sup>
  - d) tRNA<sup>val</sup>
- 7) In translation process \_\_\_\_\_ is responsible for charging of tRNA molecules.
  - a) Aminoacyl tRNA synthetase
  - b) DNA glycosylase
  - c) Peptidyl disulphide isomerase
  - d) Peptidyl transfersae
- 8) \_\_\_\_\_ proposed the Hairpin model of tRNA molecule.
  - a) Robertson
  - b) Robert Holly
  - c) Hoagland
  - d) W. M. Nirenberg
- 9) \_\_\_\_\_ is act as initiation codon may specify amino acid methionine.
  - a) UAA
  - b) UGA
  - c) UAG
  - d) AUG
- 10) Heat shock genes are expressed in response to an exposure to elevated temperatures in *E. Coli* and encodes \_\_\_\_\_.
  - a) Chaperons
  - b) Histones
  - c) Nucleases
  - d) Proteases

- 11) \_\_\_\_\_ is used in splicing of introns in eukaryotes.
  - a) Editosome
  - b) snRNP
  - c) Centrosome
  - d) Lysosome
- 12) During RNA editing process guide RNA is used for addition of \_\_\_\_\_.
  - a) poly-G stretch
  - b) poly-A stretch
  - c) poly-U stretch
  - d) poly-C stretch
- 13) In *lac* operon, lactose is act as \_\_\_\_\_.
  - a) Repressor
  - b) Holorepressor
  - c) Inducer
  - d) Adaptor
- 14) In eukaryotes, promoter sequences provide binding site for \_\_\_\_\_.
  - a) Transcription factors
  - b) Activators
  - c) Repressors
  - d) Co-activators

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

- 1) What are promoter sequences?
- 2) What are introns?
- 3) Define sigma factor and rho protein.
- 4) Define interrupted genes.
- 5) What are snRNPs?
- 6) What are chaperons?

**B) Answer the following questions. (Any Two) 06**

- 1) Write a note on transcription factors.
- 2) Give an account on glycosylation of proteins.
- 3) Explain fidelity of translation.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Give RNA editing with suitable examples.
- 2) Explain regulation of *trp* operon.
- 3) Describe regulatory sequences in prokaryotes.

**B) Answer the following questions. (Any One) 06**

- 1) Regulation of transcription by signal integration in eukaryotes.
- 2) Explain regulation of translation with suitable examples.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain mechanism of transcription in prokaryotes.
- 2) Explain exon shuffling with suitable examples.
- 3) Describe the regulation of lactose operon with neat labeled diagram.

**B) Answer the following questions. (Any One) 04**

- 1) Describe mRNA processing in eukaryotes.
- 2) Explain myristoylation and palmitoylation with neat labeled diagram.

**Q.5 Answer the following questions. (Any Two) 14**

- 1) Describe alternative splicing mechanisms with suitable examples.
- 2) Explain mechanism of translation in prokaryotes.
- 3) Explain regulation of transcription in eukaryotes by signal transduction.



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**B.Sc.(Semester - IV) (CBCS) Examination Oct/Nov-2019**

**Biotechnology**

**PLANT TISSUE CULTURE**

Day & Date: Monday, 04-11-2019

Max. Marks: 70

Time: 11:30 AM To 02:00 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 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) \_\_\_\_\_ had used culture filtrate of the fungus *Myrothecium verrucaria* and thereby introduced the concept of enzymatic isolation of plant protoplasts.
  - a) Murashige
  - b) Cocking
  - c) Skoog
  - d) Nisch
- 2) The temperature of greenhouse for plant hardening in Plant Tissue culture is maintained at \_\_\_\_\_<sup>0</sup>C.
  - a) 37
  - b) 27
  - c) 121
  - d) 4
- 3) Thermostable materials in tissue culture laboratory can be sterilized by \_\_\_\_\_.
  - a) autoclaving
  - b) UV irradiation
  - c) filtration
  - d) drying
- 4) \_\_\_\_\_ is a most potent surface sterilizing agent used in tissue culture.
  - a) Sterile water
  - b) sodium hypochlorite
  - c) Teepol
  - d) Dettol
- 5) Highest concentration of auxin exist at the \_\_\_\_\_.
  - a) growing tips of plants
  - b) leaves
  - c) in xylem
  - d) base of any plant organ
- 6) \_\_\_\_\_ culture technique is used for obtaining hybrid plants.
  - a) Micropropagation
  - b) Somatic hybridization
  - c) Anther
  - d) Protoplast
- 7) The phenomenon of suppression of growth of an axillary bud in the presence of the terminal bud on the branch is known as \_\_\_\_\_.
  - a) apical dominance
  - b) lateral dominance
  - c) organogenesis
  - d) differentiation
- 8) Growing cells, tissues, plant organs, or whole plants in nutrient medium, under aseptic conditions is called as \_\_\_\_\_.
  - a) maintenance
  - b) culture
  - c) storage
  - d) transport
- 9) A cell or plant with nucleus of both parents arises by the fusion of protoplasts is known as \_\_\_\_\_.
  - a) hybrid
  - b) protoplast
  - c) cytoplasm
  - d) cybrid
- 10) \_\_\_\_\_ is preservation and storage of cells, tissues and organs by immersion into liquid nitrogen.
  - a) Cryopreservation
  - b) Autoclaving
  - c) Sterilization
  - d) Culturing



**Seat  
No.**

Day & Date: Wednesday, 23-10-2019  
Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

14

- 1) Electrophoresis in acrylamide gel is referred as \_\_\_\_\_.  
a) PAGE.  
b) Blotting  
c) Hybridization  
d) Separation
- 2) Paper used for paper electrophoresis consists of 95% \_\_\_\_\_.  
a) Glucose  
b) Cellulose  
c) Lignin  
d) Dextrose
- 3) \_\_\_\_\_ rate under unit potential gradient is called as Mobility Of ions.  
a) Sedimentation  
b) Precipitation  
c) Migration  
d) Osmotic
- 4) Salting out is the process of precipitation of proteins in solution by the \_\_\_\_\_ of large amount of inorganic salt.  
a) Deletion  
b) Removal  
c) conversion  
d) Addition
- 5) Dialysis is a \_\_\_\_\_ purification technique than Ultrafiltration.  
a) Ultrafiltration  
b) Immobilization  
c) Centrifugation  
d) Cell Disruption
- 6) Osmotic Shock is the \_\_\_\_\_ method of cell disruption.  
a) Chemical  
b) Physical  
c) Electrical  
d) Alkali
- 7) \_\_\_\_\_ defined as Volume of Mobile phase per unite time.  
a) Sedimentation rate  
b) Precipitation rate  
c) Flow rate  
d) Slurry
- 8) \_\_\_\_\_ is usually used as stationary phase in paper chromatography.  
a) Acid  
b) Aldehyde  
c) Ketone  
d) Water
- 9) Chromatography is \_\_\_\_\_ method for separation of compounds.  
a) Physical  
b) Electrical  
c) Biological  
d) Chemical
- 10) Base composition of nucleic acid is determined by using \_\_\_\_\_ chromatographic technique.  
a) TLC  
b) Ion Exchange  
c) Affinity  
d) Gel filtration
- 11) \_\_\_\_\_ Gives information needed for the synthesis of oligonucleotide.  
a) Blotting  
b) Macro sequencing  
c) Micro sequencing  
d) Centrifugation

- 12) ESI creates ions by holding a liquid at \_\_\_\_\_ potential difference.  
a) Low                                      b) Moderate  
c) Zero                                     d) High
- 13) BCA stands for \_\_\_\_\_.  
a) Burgees Acid Assay                b) Bicinchoninic Acid Assay  
c) Benjamin's Citrates Assay        d) Benjamin's Acid Assay
- 14) Protein Expression Mapping involves \_\_\_\_\_ Study of global changes in protein expression in cell or tissue.  
a) Qualitative                            b) Quantitative  
c) Physical                                d) Chemical

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

- 1) Define isoelectric point.
- 2) Nature of paper in paper chromatography.
- 3) Define Proteome.
- 4) Write the principle of Bradford assay.
- 5) Define proteomics.

**B) Write Notes. (Any Two)** **06**

- 1) Write a note on electrophoresis.
- 2) Write a note on cell disruption by organic solvents.
- 3) Write a note on functional genomics.

**Q.3 A) Answer the following questions. (Any Two)** **08**

- 1) Explain assay used for iodine value.
- 2) Define support media & explain polyacrylamide as support media.
- 3) How will you take Sample in 2-D gel electrophoresis?

**B) Answer the following questions. (Any One)** **06**

- 1) Explain basic principle of electrophoresis.
- 2) Discuss column chromatography.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Discuss protein estimation assay in which folin reagent is used.
- 2) Explain disc gel electrophoretic technique for protein.
- 3) Describe mass spectrometers for proteomics study.

**B) Answer the following questions. (Any One)** **04**

- 1) Describe ammonium sulphate precipitation of protein.
- 2) Explain DPA assay for DNA estimation.

**Q.5 Answer the following questions. (Any Two) 14**

- Describe mechanical methods used for cell disruption.
- Explain Southern blotting technique.
- Discuss affinity chromatography.

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**B.Sc.(Semester - IV) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**MECHANISMS IN IMMUNOLOGY**

Day & Date: Thursday, 24-10-2019  
Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

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

14

- 1) Monoclonal antibodies are produced by \_\_\_\_\_.  
a) Hybridomas                      b) Any lymphocytes  
c) Myeloma                          d) Plasma cells
- 2) Clonal selection theory occurs when a B lymphocyte encounters \_\_\_\_\_.  
a) Cytokines                        b) Antigen  
c) T lymphocytes                  d) Complement
- 3) Cytotoxic T lymphocytes (CTLs) binds to \_\_\_\_\_.  
a) Class I MHC / peptides complexes  
b) The three dimensional structure of pathogen  
c) Class II MHC / peptides complexes  
d) Pathogen associated molecular pattern
- 4) Origin and maturation of B cell takes place at \_\_\_\_\_.  
a) Spleen                             b) Thymus  
c) Bone marrow                    d) Lymph nodes
- 5) In humoral immunity, interaction of CD40 and CD40L, provides second signal, while \_\_\_\_\_ interaction provides co-stimulation to T<sub>H</sub> cells.  
a) MHC - TCR                      b) B7 - CD28  
c) BCR - TCR                        d) BCR - TLR4
- 6) The most common class of antibody involved in type II hypersensitivity is \_\_\_\_\_.  
a) Ig G, Ig M                        b) Ig A  
c) Ig A, Ig D                         d) Ig D
- 7) Allergies to see foods, eggs etc is example of \_\_\_\_\_ hypersensitivity.  
a) Type I                              b) Type II  
c) Type III                            d) Type IV
- 8) \_\_\_\_\_ among the following is not autoimmune disease.  
a) Myasthenia gravis                b) Systemic lupus erythematosus  
c) Graves disease                    d) Sickle cell disease
- 9) The concept of vaccination was first developed by \_\_\_\_\_.  
a) Antonie van Leeuwenhoek      b) Edward Jenner  
c) Carl Landsteiner                  d) Joseph Lister
- 10) \_\_\_\_\_ is example of a polysaccharide vaccine.  
a) Anthrax                            b) Rabies  
c) Hepatitis                          d) Hemophilus influenza type B

- 11) In classical complement pathway is activated by \_\_\_\_\_.
  - a) Antigen
  - b) Antigenic peptides
  - c) Antigens bound to MHC
  - d) Antibody - Antigen complex
- 12) In A blood group individual \_\_\_\_\_ isoantibodies were observed.
  - a) anti - A
  - b) anti - B
  - c) anti - A/B
  - d) None of these
- 13) \_\_\_\_\_ gene is involved in mutation that makes vaccinia virus avirulent.
  - a) Polymerase
  - b) Envelope
  - c) Capsomere
  - d) Thymidine kinase
- 14) \_\_\_\_\_ will be used for fusion of B lymphocytes and Myeloma cells in Hybridoma technique.
  - a) HGPRT
  - b) PEG
  - c) Ig
  - d) HAT

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

- 1) Atopy
- 2) Define antibody.
- 3) T cell dependent and independent antigens
- 4) Rh compatibility
- 5) Clonal selection theory

**B) Answer the following questions. (Any Two)** **06**

- 1) Recombinant vector vaccine
- 2) Explain primary and secondary immune response.
- 3) Explain APCs cells and its function.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Explain Alternative pathway.
- 2) Write an essay on types of traditional vaccines.
- 3) Explain ABO blood group system.

**B) Answer the following questions. (Any One)** **06**

- 1) Explain Maturation, activation and differentiation of B cells.
- 2) Write an essay on monoclonal antibody production.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write an essay on Type I Hypersensitivity.
- 2) Explain any four mechanisms of autoimmunity.
- 3) Explain processing and presentation of exogenous antigen.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain T cell and B cell receptors.
- 2) Graves disease.

**Q.5 Answer the following questions. (Any Two)** **14**

- 1) Explain Maturation activation and differentiation of T cells.
- 2) Write an essay on Type III and IV hypersensitivity.
- 3) Explain processing and presentation of endogenous antigen.

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**B.Sc.(Semester - IV) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**METABOLISM**

Day & Date: Friday, 25-10-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) \_\_\_\_\_enzyme catalyzes the transfer of two carbon fragment from a ketose donor to an aldose acceptor.
 

a) Transaldolase	b) Transketolase
c) Epimerase	d) Isomerase
- 2) The sugar nucleotide \_\_\_\_\_ Donates glucose for glycogen synthesis.
 

a) UMP glucose	b) UDP glucose
c) UTP glucose	d) ADP glucose
- 3) All transaminases require \_\_\_\_\_prosthetic group for activity.
 

a) pyridoxal phosphate	b) TPP
c) NAD	d) Biotin
- 4) The light absorbing pigments of thylakoid arranged in functional arrays are called \_\_\_\_\_.
 

a) photosystem	b) Reaction centre
c) antenna molecules	d) LHC
- 5) The first committed step in glycolysis is formation of \_\_\_\_\_.
 

a) formation of glucose 6 phosphate
b) formation of fructose 6 phosphate
c) formation of fructose 1,6 bisphosphate
d) Pyruvate
- 6) \_\_\_\_\_ Amino acid is synthesized from 3- phosphoglycerate.
 

a) Glutamate	b) Glutamine
c) Serine	d) Lysine
- 7) \_\_\_\_\_ Is the precursor for de novo purine nucleotide biosynthesis.
 

a) aspartate	b) orate
c) PRPP	d) ribose1 phosphate
- 8) Conversion of ADP to dADP is carried out by enzyme \_\_\_\_\_.
 

a) ribonucleotide synthase	b) ribonucleotide reductase
c) kinase.	d) Phosphatase
- 9) The immediate precursor of thymidylate (dTMP) is \_\_\_\_\_.
 

a) dUMP	b) dATP
c) dAMP	d) dCMP
- 10) The double bond is introduced into the fatty acid chain by an oxidative reaction catalyzed by \_\_\_\_\_.
 

a) Mixed function reductase	b) Epimerase
c) Mixed function oxidase	d) Thioxidase

- 11) The formation of malonyl-CoA from acetyl-CoA is an irreversible process, catalyzed by \_\_\_\_\_.  
 a) acetyl-CoA carboxylase                      b) decarboxylase  
 c) dehydrogenase                                d) Acetylase
- 12) During non cyclic photophosphorylation electrons are carried between the two photosystems by the soluble protein \_\_\_\_\_.  
 a) plastoquinone                                  b) pheophytin  
 c) cyt b6f complex                                d) plastocyanin
- 13) The active site of E1 of pyruvate dehydrogenase multiple enzyme system has bound \_\_\_\_\_.  
 a) TPP    b) FAD  
 c) NAD    d) biotin
- 14) In one pass through the  $\beta$ -oxidation sequence, one molecule of acetyl-CoA, and \_\_\_\_\_ protons (H) are removed from the long-chain fatty acyl-CoA.  
 a) 2    b) 3  
 c) 4    d) 5

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

- 1) Give the physiological significance of pentose phosphate pathway.
- 2) Write a note on ketogenic amino acids.
- 3) Draw neat labeled diagram of ATP synthase enzyme.
- 4) Define photosystem I and II.
- 5) Write a note on hydrolysis of triacylglycerols.

**B) Write short notes.(Any Two) 06**

- 1) lactic acid fermentation.
- 2) Components of electron transport chain
- 3) Sources of atoms in purine.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Write a note on transport of fatty acids in mitochondria
- 2) Explain in detail glycogen synthesis pathway.
- 3) Write a note on deamination and decarboxylation reaction of amino acid metabolism.

**B) Answer the following questions. (Any One) 06**

- 1) Write a note on inhibitors of electron transport chain.
- 2) Describe in detail  $\text{CO}_2$  fixation in  $\text{C}_3$  plants.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Describe in detail urea cycle
- 2) Write a note on  $\beta$  oxidation of saturated fatty acids.
- 3) Explain in detail non-cyclic photophosphorylation

**B) Answer the following questions. (Any One) 04**

- 1) Explain cyclic photophosphorylation
- 2) Write a note on uncouplers of oxidative phosphorylation.

**Q.5 Answer the following questions. (Any Two) 14**

- 1) Explain in detail biosynthetic pathway for unsaturated fatty acids.
- 2) Describe biosynthesis of purines.
- 3) Write a note on glycolysis.



**Seat  
No.**

Day & Date: Monday, 11-11-2019  
Time: 03:00 PM To 05:00 PM

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

- 1) Rough Endoplasmic reticulum assists in synthesis of \_\_\_\_\_.
  - a) Carbohydrates
  - b) Proteins
  - c) Fats, glucose, starch
  - d) Lipids
- 2) In RER, ribosomes are located on \_\_\_\_\_.
  - a) The cytoplasmic side
  - b) The luminal side
  - c) Extra cellular matrix
  - d) Membrane
- 3) The nature of membrane lipids is \_\_\_\_\_.
  - a) Zwitterionss
  - b) Hydrophobic
  - c) Amphipathic
  - d) Uncharged
- 4) Microfilaments are made up \_\_\_\_\_.
  - a) Collagen
  - b) Actin
  - c) Keratin
  - d) Glucose
- 5) The carbohydrates content of plasma membrane in eukaryotes is \_\_\_\_\_.
  - a) 2 - 10 % by weight
  - b) 20 - 25 % by weight
  - c) 30 - 50 % by weight
  - d) 60 - 70 % by weight
- 6) The short pair of microtubules involved in cell division is called \_\_\_\_\_.
  - a) Microvilli
  - b) Centriole
  - c) Pili
  - d) Flagella
- 7) Membrane Rafts are enriched in \_\_\_\_\_.
  - a) Cholesterol & Sphingolipids
  - b) Cholesterol & integral membrane proteins
  - c) Glycolipids & phospholipids
  - d) Sphingolipids & phospholipids
- 8) \_\_\_\_\_ is a member of a family of transmembrane proteins that form gap junctions
  - a) Desmosome
  - b) Microfilament
  - c) Cinnexin
  - d) Tubulin

- 1) Define group transport. Give an example it.
- 2) Explain Rough ER.
- 3) Enlist eukaryotic cell organelles.
- 4) Define Protein Segregation.
- 5) Differentiate between symport and antiport.
- 6) Enlist function of SER.

- Q.3 Answer the following questions. (Any Two) 08**
- 1) What are desmosomes and hemidesmosomes? Explain its interaction with extracellular matrix.
  - 2) Explain cytoskeleton with respect to microfilaments.
  - 3) Discuss cell fractionation.
- Q.4 Answer the following questions. (Any Two) 08**
- 1) Explain active transport and add a note on Na-K ATPase.
  - 2) Define cytoskeleton with account of cell motility.
  - 3) Explain in brief Golgi bodies & Lysosomes.
- Q.5 Answer the following questions. (Any One) 08**
- 1) Explain in detailed Peroxisome, Glyoxysome and Glycosome.
  - 2) Give an account on Fluid Mosaic Model.

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- 11) Father Gilligan is humbled by the experience because \_\_\_\_\_.
  - a) he realizes God takes care of everyone
  - b) he feels that the dying man waited for him
  - c) he feels nature soothed him because he was so tired
  - d) God could show his concern for his community
- 12) The priest has understood that God has sent one of his \_\_\_\_\_ to help him.
  - a) Priest
  - b) Father
  - c) Angel
  - d) Adam
- 13) The comparative form of strange is \_\_\_\_\_.
  - a) Strangerly
  - b) Stranger
  - c) More Strange
  - d) Most strange
- 14) The Superlative form of ill is \_\_\_\_\_.
  - a) more ill
  - b) worse
  - c) worst
  - d) most ill

**Q.2 Attempt any four of the following questions.****16**

- 1) What does one gain from being clam according to the poet Grenville Kleiser?
- 2) How has money made the individual nervous, afraid and insecure? What are its long term effects?
- 3) What has science taken away from humans?
- 4) Why is Father Gilligan so weary? Why is he so struck by Grief and Guilt?
- 5) Why does the poet not support the cause of science? Describe in your own words the reasons he gives for this.
- 6) Why does Lawrence say that the present attitude towards money is all wrong? What are the changes he wants to see in society?

**Q.3 Attempt any two of the following questions.****12**

- 1) What are the evils that prevent the advancement of society according to Swami Vivekananda?
- 2) What do we learn from Mother Teresa's life?
- 3) Write the dialogues for the situations:  
Rajesh goes to his friend Ramesh's Birthday Party where in he introduces himself to Ramesh's elder brother.
- 4) Write the dialogue for the situation:  
Smita and Sita are good childhood friends, After a long gap, they meet in a Reception.

**Q.4 Attempt any one of the following question.****14**

Write an argumentation speech on 'Ban of Polythene'.

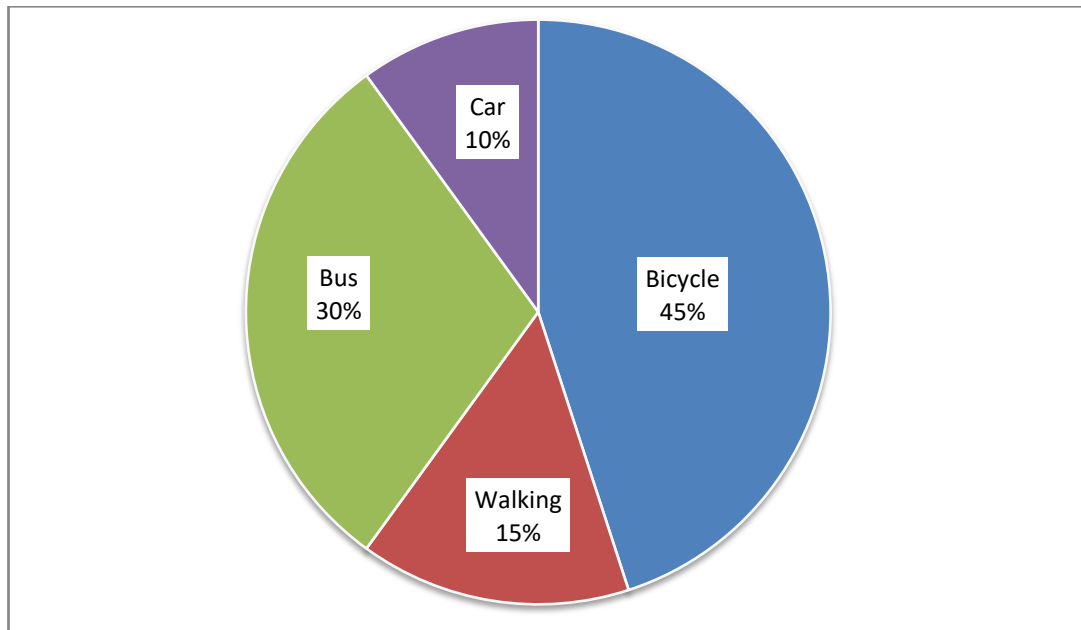
**OR**

Write a debate on 'Should Students Study ethics in colleges'?

**Q.5 Read the following passage and summarize it.****14**

The pie chart below shows the percentages of types of transportation used by 800 students to come to college.

Study the pie chart and answer the questions :



- 1) How many students come to the college by bicycles?
- 2) How many students do not walk to college?
- 3) How many students come to college by bus or car?
- 4) Write in brief, your observation and analyze the pie chart.

**Seat  
No.**

Day & Date: Monday, 07-10-2019  
Time: 11:30 AM To 02:00 PM

**Instructions:**

- 1) Figures to the right indicate full marks.
- 2) Draw a neat, well labeled, complete diagram wherever necessary.
- 3) Use of calculators, cell phones, or any other electronic gadgets is prohibited.
- 4) All questions are compulsory.

14

- 1) In double fertilization of Angiosperms, one of the sperms unite with two polar nuclei to form triploid nucleus, from which \_\_\_\_\_ will develop.  
a) zygote                                      b) embryo  
c) endosperm                                d) seed
- 2) In axial pattern of embryo development, basal cell derivative nearest the embryo is known as \_\_\_\_\_.  
a) hypophysis                                b) Columella  
c) zygote                                        d) quiescent center
- 3) Root and shoot apical meristem formed during embryogenesis are called \_\_\_\_\_ meristem.  
a) primary                                      b) secondary  
c) tertiary                                      d) quaternary
- 4) In microsporangium of Angiosperms, primary sporogenous cells give rise to \_\_\_\_\_ cells.  
a) pollen                                        b) microspore mother  
c) megaspore mother                        d) endosperm
- 5) Endosperm is the main source of food for \_\_\_\_\_.  
a) seed    b) pollen  
c) embryo                                        d) meristem
- 6) \_\_\_\_\_ meristems differ from vegetative meristems in that instead of leaves they produce reproductive organs.  
a) Axillary                                      b) Floral  
c) Inflorescence                                d) Shoot
- 7) The number and order in which leaf primordia form is reflected in the subsequent arrangement of leaves around the stem, known as \_\_\_\_\_.  
a) phyllotaxy                                    b) organogenesis  
c) inflorescence                                d) epipetaly
- 8) \_\_\_\_\_ protects the apical meristem from mechanical injury as the root pushes its way through the soil.  
a) Root hat                                      b) Root cap  
c) Root hair                                      d) quiescent center
- 9) \_\_\_\_\_ elements are the conducting cells in which water and solutes move through the plant.  
a) Tracheary                                    b) Epidermal  
c) Cambium                                      d) Mesophyll



**Q.5 Answer the following questions. (Any Two)**

- a)** Explain in detail - Development of female gametophyte.
- b)** Write a note on - apomixes
- c)** Describe self- incompatibility in plants



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**B.Sc. (Semester - V) (New) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**FERMENTATION TECHNOLOGY**

Day & Date: Wednesday, 09-10-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) Industrial production of amylase by submerged culture is done by using \_\_\_\_\_.  
 a) *Saccharomyces Cerevisiae*      b) *Bacillus subtilis*  
 c) *Bacteriophage*      d) *E. coli*
- 2) Economic fermentation of an industrial product is done by using \_\_\_\_\_.  
 a) Synthetic media      b) Living media  
 c) Semi synthetic media      d) Waste as a raw material
- 3) Phenyl acetic acid is used as precursor in the production of \_\_\_\_\_.  
 a) Penicillin V      b) Vitamin B12  
 c) L-isoleucine      d) Penicillin G
- 4) Primary screening of organic acid producer carried by adding \_\_\_\_\_ in nutrient agar.  
 a) pH indicator dye      b) Calcium carbonate  
 c) Both a & b      d) None of these
- 5) \_\_\_\_\_ is used in diffusion assays.  
 a) Acid      b) Liquid medium  
 c) Paper-disc      d) None of these
- 6) \_\_\_\_\_ of the following is not a product of fermentation.  
 a) Lactate      b) Oxygen  
 c) Ethanol      d) Carbon dioxide
- 7) Stock culture of micro organisms is maintained by \_\_\_\_\_.  
 a) Tyndallization      b) Pasteurization  
 c) Sterilization      d) Lyophilization
- 8) \_\_\_\_\_ is an example of upstream processing.  
 a) product recovery      b) purification  
 c) media preparation      d) drying
- 9) Enzymatic assay is an example of \_\_\_\_\_ type assay.  
 a) Biological      b) Diffusion  
 c) Physical-chemical      d) None of these
- 10) Acetone-butanol fermentation is example of \_\_\_\_\_ fermentation.  
 a) Aerobic      b) Anaerobic  
 c) Surface      d) Submerged
- 11) Alcoholic fermentation is carried by yeast known as \_\_\_\_\_.  
 a) *Lactobacillus*      b) *Bacillus subtilis*  
 c) *Saccharomyces cerevisiae*      d) *Escherichia coli*

- 12) Secondary metabolites are synthesized in \_\_\_\_\_ phase of growth.
  - a) Log
  - b) Death
  - c) Idio
  - d) Lag
- 13) Heat labile fermentation products are separated by using \_\_\_\_\_.
  - a) Crystallization
  - b) Filtration
  - c) Centrifugation
  - d) Cell disruption
- 14) \_\_\_\_\_ Precursors used in vitamin B12 production.
  - a) Sodium hydroxide
  - b) Citric acid
  - c) Cobalt Chloride
  - d) Nitric acid

**Q.2 A) Define and explain any four of the following. 08**

- 1) Crowded plate technique
- 2) Recovery of citric acid
- 3) Scale-up
- 4) Inoculum
- 5) Culture Collection Centers for Microorganisms

**B) Write short notes on (Any Two)** **06**

- 1) Applications of Citric acid
- 2) Characteristics of an ideal fermenter
- 3) Agitation and aeration

**Q.3 A) Answer any two of the following. 08**

- 1) Describe in detail the inoculum preparation.
- 2) Explain in detail primary screening.
- 3) Write in detail fermentation economics.

**B) Answer the following (Any One)** **06**

- 1) Write in detail ethanol fermentation.
- 2) Describe in detail submerged and solid state fermentations.

**Q.4 A) Answer the following (Any Two) 10**

- 1) Explain in detail amylase production.
- 2) Describe in detail computer applications in fermentation technology.
- 3) Explain in detail penicillin production.

**B) Answer the following (Any One)** **04**

- 1) Write in detail bioinsecticide production.
- 2) Explain in detail biological assays.

**Q.5 Answer the following (Any two) 14**

- Explain in detail downstream processing.
- Describe in detail strain improvement and its various methods.
- Explain in detail basic design of a fermentor.

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**B.Sc. (Semester – V) (New) (CBCS) Examination Oct/Nov- 2019**  
**Biotechnology**  
**TOOLS AND TECHNIQUES**

Day & Date: Thursday, 10-10-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) \_\_\_\_\_ of the following cannot be used for the separation of nucleic acids.
  - a) SDS – PAGE
  - b) PAGE
  - c) Northern blotting
  - d) None of these
- 2) The fluorescent dye such Ethidium is used for visualizing DNA. How do ethidium binds to DNA?
  - a) Stacked between histone molecules
  - b) Intercalated between the stacked bases
  - c) Binds to the nucleotide base
  - d) Binds to the phosphodiester backbone
- 3) \_\_\_\_\_ of the following will migrate faster when the molecular weight of the following is equal.
  - a) Single stranded DNA
  - b) Nicked circular DNA
  - c) Supercoiled circular DNA
  - d) Double stranded DNA
- 4) What happens if a DNA molecule is treated by first Exonuclease III and then followed by treatment with S1 nuclease?
  - a) The molecule is shortened only from 3' end
  - b) The molecule is shortened only from 5' end
  - c) Only Exonuclease acts and S1 doesn't acts
  - d) The molecule is shortened from both the ends
- 5) \_\_\_\_\_ classes of restriction enzymes are there?
  - a) 3
  - b) 1
  - c) 2
  - d) 4
- 6) \_\_\_\_\_ will be the transcription product of 3'....AUCCGAGCUAAC....5' when treated with reverse transcriptase.
  - a) 3'....AUCCGAGGAUUG....5'
  - b) 3'....GTTAGCTCGGAT....5'
  - c) 5'...GTTAGCTCGGAT....3'
  - d) 5'....UAGGCUCGAUUG....3'
- 7) The vectors commonly used for sequencing human genome is \_\_\_\_\_.
  - a) Plasmid
  - b) M 13
  - c) YAC
  - d)  $\lambda$  phage
- 8) pBR 322 has \_\_\_\_\_ of the following selection marker.
  - a) Kan<sup>r</sup>
  - b) Str<sup>r</sup>
  - c) Act<sup>r</sup>
  - d) Tet<sup>r</sup>
- 9)  $\lambda_{gt}$  10 vector can propagate cloned fragments up to \_\_\_\_\_.
  - a) 6-7 kb
  - b) 20-25 kb
  - c) 10-20 kb
  - d) 15-20 kb

- 10) The virus mediated gene transfer using genetically modified bacteriophages is called \_\_\_\_\_.  
a) Transfection  
b) Transduction  
c) Transformation  
d) Conjugation
- 11) DNA solution injected directly into the cell using micromanipulator is called \_\_\_\_\_.  
a) Macroinjection  
b) Micromanipulator mediated DNA delivery  
c) Microinjection  
d) Microfection
- 12) All the following are thermostable polymerases except \_\_\_\_\_.  
a) Taq polymerase  
b) Pfu polymerase  
c) vent polymerase  
d) DNA polymerase III
- 13) The set of DNAs generated by using random primers in PCR reaction is called \_\_\_\_\_.  
a) AFLP  
b) RAPD  
c) RFLP  
d) RT PCR
- 14) How many different types of chemical treatments are required in Maxam-Gilbert method?  
a) 2  
b) 4  
c) 1  
d) 3

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

- 1) Give brief account on scope of genetic engineering.
- 2) Define alkaline phosphatases & Kinases.
- 3) Define shuttle vector.
- 4) Define liposomes.
- 5) Define genomic DNA probes.

**B) Write Notes on (Any Two)** **06**

- 1) Write a note on transduction.
- 2) Write a note on PEG mediated gene transfer.
- 3) Write a note on synthesis of C- DNA probes.

**Q.3 A) Answer the following questions. (Any Two)** **08**

- 1) Explain *E.coli* RNA polymerase.
- 2) Describe colony Hybridization technique.
- 3) Discuss DNA fingerprinting.

**B) Answer the following questions. (Any One)** **06**

- 1) Describe in detail automated DNA sequencing.
- 2) Discuss protein blotting technique.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain high voltage electrophoresis technique.
- 2) Discuss inverse PCR.
- 3) Describe microinjection method of gene transfer with its application, advantages & limitations.

**B) Answer the following questions. (Any One) 04**

- 1) Describe Taq DNA polymerase.
- 2) Explain biotin-streptavidin method of labeling the probes.

**Q.5 Answer the following questions. (Any Two) 14**

- Describe in detail AFLP.
- Discuss in detail *E. coli* DNA ligase and T<sub>4</sub> RNA ligase.
- Explain BAC vector.

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**B.Sc. (Semester-V) (New) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**  
**RECENT TRENDS IN BIOTECHNOLOGY**

Day & Date: Friday, 11-10-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

**Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Neat diagrams must be drawn wherever necessary.

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

**14**

- 1) Biotransformation means conversion of \_\_\_\_\_ compounds to more hydrophilic metabolites.
 

a) Halophytic	b) Lipophilic
c) Aromatic	d) Aliphatic
- 2) \_\_\_\_\_ enzyme carry out the process of trans-esterification.
 

a) Aspartase	b) Ligase
c) Lipase	d) Glucose isomerise
- 3) The three major types of ethical issues include except \_\_\_\_\_.
 

a) Communication issues	b) Systemic issues
c) Corporate issues	d) Individual issues
- 4) \_\_\_\_\_ term is use to describe the accumulation of dangerously high levels of toxins inside cells.
 

a) Biomagnification	b) Synergism
c) Persistent organic pollutants	d) Bioaccumulation
- 5) Stem cells are present in \_\_\_\_\_.
 

a) Unicellular organisms	b) Multicellular organisms
c) Non-living things	d) Viruses
- 6) \_\_\_\_\_ functions carried out by Liver.
 

a) Metabolic	b) Excretory
c) Haematological	d) All of these
- 7) The first step of PCR is \_\_\_\_\_.
 

a) Denaturation	b) Annealing
c) Primer extension	d) Ligation
- 8) Molecular scissors are \_\_\_\_\_.
 

a) Ligase	b) Helicase
c) Restriction endonuclease	d) DNA polymerase
- 9) If kidney is completely lost and unable to eliminate nitrogenous waste , it leads to \_\_\_\_\_.
 

a) Chronic renal failure	b) Chronic liver failure
c) Chronic respiratory failure	d) Chronic pancreas failure
- 10) \_\_\_\_\_ is an example of clone.
 

a) Monozygotic identical twins
b) Vegetative reproducing organisms
c) Sexually reproducing organisms
d) All except c

- 11) \_\_\_\_\_ technology is used to purify contaminated air evolved from volatile organic compound by involving microorganisms.
  - a) Bioleaching
  - b) Phytoremediation
  - c) Biofiltration
  - d) Bioremediation
- 12) \_\_\_\_\_ method is used for immobilization of cells.
  - a) Entrapment
  - b) Cross linking
  - c) Covalent binding
  - d) Occlusion
- 13) The primary reason for Environmental Impact Assessment is to \_\_\_\_\_.
  - a) Migrate existing environmental impacts of development
  - b) Predict the size of impacts of development
  - c) Describe proposed developments
  - d) Identify the environmental consequences of development in advance
- 14) A vaccine can be \_\_\_\_\_.
  - a) An antigenic protein
  - b) Weakened pathogen
  - c) Live attenuated pathogen
  - d) All of these

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

- 1) Give the applications of metabolic engineering.
- 2) Bioleaching
- 3) Whole cell immobilization
- 4) Importance of laboratory tests in clinical medicine
- 5) Components of EIA

**B) Write short notes (Any Two) 06**

- 1) Industrial applications of enzyme engineering
- 2) Edible vaccines
- 3) Write a note on Bioaugmentation

**Q.3 A) Answer the following questions. (Any two) 08**

- 1) Discuss in detail integration of genetic engineering in agriculture.
- 2) What are the ideal characteristics of carrier and support material used for immobilization of enzymes.
- 3) Add a note on sampling methods for environmental impact assessment.

**B) Answer the following questions. (Any One) 06**

- 1) Explain the technologies used for treatment of distillery and sugar industrial waste water.
- 2) Write a note on cloning and over expression of heterologous genes.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Write a note on Environmental monitoring for impact assessment.
- 2) Explain the process of phytoremediation technology in wetland system.
- 3) Write in detail the need & example of liver function test.

**B) Answer the following questions. (Any One) 04**

- 1) What is regenerative medicine? Explain Tissue Engineering.
- 2) Write a note on principles and strategies of metabolic engineering.

**Q.5 Answer the following questions. (Any two) 14**

- a) Give the applications of Immobilized enzymes.
- b) Define Bioremediation. Explain the types of bioremediation in detail.
- c) Discuss metabolic flux analysis and metabolic control analysis.

<b>Seat No.</b>	
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# INTRODUCTION TO BIOTECHNOLOGY BASED INDUSTRIES

Max. Marks: 70

**Instructions:** 1) All questions are compulsory.  
2) Figures to the right indicate full marks.  
3) Neat diagrams must be drawn wherever necessary.

14

- 1) *Azotobacter* and *Bacillus polymyxa* are \_\_\_\_\_.  
a) Decomposers                      b) Nonsymbiotic nitrogen fixers  
c) Symbiotic nitrogen fixers       d) Pathogenic bacteria
- 2) ISO mean \_\_\_\_\_.  
a) International Standards Organization  
b) International Organization of Standards  
c) Indian Standards Organization  
d) Internal Standard Organization
- 3) In fermenter, up to the production of desirable product is termed \_\_\_\_\_.  
a) upstream process                  b) downstream process  
c) fed batch process                 d) continuous process
- 4) Validation at Premise control is based on \_\_\_\_\_.  
a) Buildings                            b) People  
c) Resources                           d) Assumptions
- 5) A free living nitrogen fixing bacterium is \_\_\_\_\_.  
a) Clostridium                         b) Azotobacter  
c) Rhizobium                          d) Anabaena
- 6) Probiotics are \_\_\_\_\_.  
a) Cancer inducing microbes       b) Safe antibiotic  
c) New kind of food allergen        d) Microbial food supplement
- 7) The environmental protection Act was enacted in the year \_\_\_\_\_ in India.  
a) 1980                                  b) 1972  
c) 1974                                  d) 1986
- 8) FSSAI is located in 5 regions with head office located at \_\_\_\_\_.  
a) Hyderabad                          b) Mumbai  
c) Bangalore                          d) New Delhi
- 9) As per the definition for Food under the Food Act in India, Food does not include \_\_\_\_\_.  
a) Alcoholic beverages               b) Chewing tobacco  
c) Caffeinated beverages            d) Chewing gum
- 10) WHO (World Health Organization) was established in \_\_\_\_\_.  
a) 7 October, 1948                    b) 7 April, 1948  
c) 7 July, 1948                        d) 7 June, 1948

- 11) Process control is carried out \_\_\_\_\_.
  - a) during production
  - b) before production
  - c) after production control
  - d) during supply of raw material
- 12) The initials GMP stand for \_\_\_\_\_.
  - a) Good Manufacturing Procedure
  - b) Good Manufacturing Practice
  - c) Great Manufacturing Procedure
  - d) General Manufacturing Process
- 13) API stands for \_\_\_\_\_.
  - a) Active Pharmaceutical Inspection
  - b) Active Pharmaceutical Ingredient
  - c) All Pharmaceutical Ingredients
  - d) Active Product Inspection
- 14) GMP are \_\_\_\_\_.
  - a) Optional
  - b) Applicable only to meats
  - c) Mandated to ensure the safety and wholesomeness of processed food supply
  - d) Applicable only to antibiotics

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

- 1) Give any four functions of HR of company.
- 2) Write down roles and responsibilities of Food Safety and Standards Authority of India.
- 3) Define and Give importance of CAPA.
- 4) Define GMP principles.
- 5) Enlist Biotechnology based companies in India.

**B) Answer the following questions. (Any Two) 06**

- 1) Explain biology and biotechnology based research and development activities of CSIR.
- 2) Write note on industrial safety.
- 3) Write down roles and responsibilities of Environmental Protection Act.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Explain downstream processing in fermentation industry.
- 2) Explain GMP guidelines for raw materials and equipments in industry.
- 3) Write note on quality assurance.

**B) Answer the following questions. (Any One) 06**

- 1) Write down SOP for any two laboratory instruments.
- 2) Store and purchase department of industry.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain V-model of validation programme.
- 2) Write down roles and responsibilities of ICAR.
- 3) Batch manufacturing record of company.

**B) Answer the following questions. (Any One) 04**

- 1) Explain production of any bio-fertilizer and its importance.
- 2) Explain any national fellowship scheme for Biotechnology students.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Explain production and application of probiotics.
- b) Explain general organizational structure of any biotechnology based industry.
- c) Write note on quality control department in industry.



<b>Seat No.</b>	
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- 11) \_\_\_\_\_ is the antonym for 'untidy'.  
a) neat  
b) chaos  
c) tiny  
d) large
- 12) \_\_\_\_\_ is the synonym for 'filthy'.  
a) Good  
b) Cunning  
c) clever  
d) dirty
- 13) \_\_\_\_\_ is the synonym for 'rude'.  
a) polite  
b) impolite  
c) good  
d) intelligent
- 14) \_\_\_\_\_ is the antonym for 'despair'.  
a) hope  
b) hopeless  
c) repair  
d) pair

**Q.2 Attempt any four of the following questions.**

16

- Comment on the theme of love in 'My Grandmother's House'.
- What does the speaker often think about the grandmother's house in the poem 'My Grandmother's House'?
- Why does the speaker ask captain to rise up in the poem 'O Captain! My Captain!'?
- Analyze any two metaphors used in the poem 'O Captain! My Captain!'.
- How does Byron describe the beauty of the woman?
- What is the subject matter of the poem 'Upagupta'?

**Q.3 Attempt any two of the following questions.**

12

- What will the students, whom Kipling is addressing, do when they go out into “the battle of life”?
- Who were the members of the committee formed by the British Broadcasting Corporation and for what purpose it was formed, according to Shaw?
- What are Prefixes? Explain any four prefixes with examples.
- What are Suffixes? Explain any four suffixes with examples.

**Q.4 Attempt any one of the following question.**

14

- a)** What are the characteristics of a good leader?  
**OR**  
**b)** What are the essential qualities required to become an effective team member?

**Q.5** What causes the stress? Write in detail about the ways of coping with the stress.

14

**Seat  
No.**

## Max. Marks: 70

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

14

- 1) An example of tumor suppressor gene is \_\_\_\_\_.  
a) myc                                      b) fos  
c) ras                                        d) Rb
- 2) \_\_\_\_\_ cells is responsible for synthesis of testosterone.  
a) Sertoli                                  b) Intertitial  
c) Hepatocytes                         d) Spermatogonial
- 3) Frog eggs shows \_\_\_\_\_ type of cleavage.  
a) Incomplete                            b) Partially complete  
c) Holoblastic                            d) Meroblastic
- 4) Weismann recognized units of heredity as \_\_\_\_\_.  
a) Genes                                    b) Determinants  
c) Factors                                  d) Particles
- 5) According to Gilchrist (1968), the prospective \_\_\_\_\_ is called "Zone of invagination".  
a) Ectodermal zone                      b) Endodermal zone  
c) Mesodermal zone                      d) Notochordal zone
- 6) Parthenogenesis means \_\_\_\_\_.  
a) development of an egg without fertilization  
b) fusion of male & female gametes  
c) larval form transform into the adult  
d) none of these
- 7) During metamorphosis cells are destroyed through process called \_\_\_\_\_.  
a) Necrosis                                b) Apoptosis  
c) Cell quit                                 d) Cell termination
- 8) Centrolecithal eggs are found in \_\_\_\_\_.  
a) Mammals                                b) Insects  
c) Amphibians                              d) Aves
- 9) Sperm contribute \_\_\_\_\_ to the embryo.  
a) nucleus and microtubules  
b) nucleus and centriole  
c) nucleus and centriole and ribosomes  
d) nucleus and centriole and microtubules
- 10) Sensory organs and nervous system arises from the \_\_\_\_\_.  
a) Ectoderm                                b) Mesoderm  
c) Endoderm                                d) Meso-ectoderm

- 11) If ten oogonia cells undergo oogenesis \_\_\_\_\_ eggs are produced.
  - a) 10
  - b) 20
  - c) 30
  - d) 40
- 12) Cavity present inside the blastula is called as \_\_\_\_\_.
  - a) Blastocoel
  - b) Gastrocoel
  - c) Coelom
  - d) Archenteron
- 13) Cancer develops from muscular tissue is called as \_\_\_\_\_.
  - a) Sarcoma
  - b) Carcinoma
  - c) Osteoma
  - d) Lymphoma
- 14) The hormone involved in the metamorphosis of tadpole is \_\_\_\_\_.
  - a) Prolactin
  - b) Thyroxine
  - c) GTH
  - d) Somatotrophin

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

- 1) Define primordial germ cells.
- 2) Write a note on IVF.
- 3) Write a note on laws of cleavage.
- 4) What is epiboly and emboly?
- 5) Write a note on stem cells.

**B) Answer the following questions. (Any Two) 06**

- 1) Write a note Mosaic theory.
- 2) Give free radical theory of aging?
- 3) Capacitation of sperms

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Describe fate map of frog blastula.
- 2) Describe process of oogenesis.
- 3) Explain different planes of cleavage.

**B) Answer the following question. (Any One) 06**

- 1) Describe blastulation in centrolecithal eggs.
- 2) Describe types of asexual reproduction with suitable examples.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Describe regulative and gradient theory of development.
- 2) Describe process of spermatogenesis.
- 3) Describe different types of cleavage.

**B) Answer the following question. (Any One) 04**

- 1) Describe blastulation in telolecithal eggs.
- 2) Describe metamorphosis in insects.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Describe process of fertilization with neat labeled diagram.
- b) Describe process of gastrulation in chick.
- c) Describe process of regeneration in vertebrates with suitable examples.

**Seat  
No.**

Day & Date: Wednesday, 09-10-2019  
Time: 08:00 AM To 10:30 AM

Max. Marks: 70

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

14

- 1) The commercial production of beer is carried out by using \_\_\_\_\_.  
a) *E.coli*  
b) *Aspergillus niger*  
c) *Lactobacillus plantarum*  
d) *Saccharomyces cerevisiae*
- 2) In LTH method of pasteurization, \_\_\_\_\_ °C temperature is used.  
a) 71.7 °C for 15 min  
b) 62.8 °C for 15 min  
c) 71.7 °C for 30 min  
d) 62.8°C for 30 min
- 3) The father of canning method is \_\_\_\_\_.  
a) Louis Pasteur  
b) Nicholas Appert  
c) Lazzaro Spallanzani  
d) None of these
- 4) The non vegetarian food is denoted by \_\_\_\_\_ color on the food label.  
a) White  
b) Green  
c) Blue  
d) red
- 5) Baired-Parker Agar is used for the enumeration of \_\_\_\_\_.  
a) *E.coli*  
b) *Staphylococcus aureus*  
c) *Bifidobacterium*  
d) *Enterobacter*
- 6) Toxins produced by fungi is called as \_\_\_\_\_.  
a) Mycotoxins  
b) Enterotoxins  
c) Phycotoxins  
d) Virotoxins
- 7) The microbial oxidation of lipids in food material to produce fatty acids and glycerol is called as \_\_\_\_\_.  
a) fermentation  
b) rancidity  
c) rotting  
d) putrefaction
- 8) Indian pickles are preserved due to \_\_\_\_\_.  
a) Isotonic condition  
b) Hypertonic condition  
c) Isoelectric point  
d) Hypotonic condition
- 9) MPN stands for \_\_\_\_\_.  
a) Minimum probable number  
b) Maximum probable number  
c) Most probable number  
d) Multiple probable number
- 10) The undesirable change in food that makes it unsafe for consumption is called as \_\_\_\_\_.  
a) Food poisoning  
b) Food infection  
c) Food spoilage  
d) Food decay
- 11) The most sensitive nutrient factor for food cooking is \_\_\_\_\_.  
a) Carbohydrates  
b) Vitamins  
c) proteins  
d) minerals

- 12) The most lethal wavelength of Ultraviolet radiation is \_\_\_\_\_.  
a) 165nm  
b) 265nm  
c) 165 A<sup>0</sup>  
d) 265 A<sup>0</sup>
- 13) Spoilage of milk by slime producing microbes is called as \_\_\_\_\_.  
a) fermentation  
b) rancidity  
c) ropiness  
d) putrefaction
- 14) Out of the following, \_\_\_\_\_ is not the direct enumeration method.  
a) Membrane filter technique  
b) ATP assay  
c) SPC  
d) Direct microscopic count

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

- 1) Define food preservation.
- 2) Define indicator organism & write 2 examples.
- 3) Define pasteurization.
- 4) Write about spoilage of sugar products.
- 5) Give the starter culture used for cheese production.

**B) Write Notes on (Any Two)** **06**

- 1) Write down composition of milk.
- 2) Differentiate between cheese and yoghurt
- 3) Explain spoilage of cereal products.

**Q.3 A) Answer the following questions (Any Two) 08**

- 1) Describe use of additives for the preservation of food with examples.
- 2) Explain the microbial spoilage of milk & milk products.
- 3) Describe the principle, procedure & application phosphatase test.

**B) Answer the following questions (Any One)** **06**

- 1) Explain direct enumeration test for microbial examination of food.
- 2) Write a note on dairy plant design.

**Q.4 A) Answer the following questions (Any Two) 10**

- 1) Describe contents in nutritional labeling.
- 2) Explain in detail bread production.
- 3) Write the effect of processing on the nutrient retention.

**B) Answer the following questions (Any One)** **04**

- 1) Explain sauerkraut production.
- 2) Describe the use of low temperature for food preservation.

**Q.5 Answer the following questions (Any Two)** **14**

- Explain in detail vinegar production.
- Describe DNA-RNA methods for detection of organisms and toxins in food material.
- Give a brief account of chemical & physical parameters of food affecting microbial growth.

**Seat  
No.**

Day & Date: Thursday, 10-10-2019  
Time: 08:00 AM To 10:30 AM

Max. Marks: 70

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

14

- 1) BLAST sequence alignment tool was designed by \_\_\_\_\_.  
a) Dayhoff                                      b) Altschul  
c) Smith    d) Waterman
- 2) Nanoscience can be studied with the help of \_\_\_\_\_.  
a) Quantum mechanics                      b) Newtonian mechanics  
c) macro-dynamics                          d) geophysics
- 3) International Union of Pure and Applied \_\_\_\_\_ apply the nomenclature of DNA and Protein.  
a) Chemistry                                    b) Chemical  
c) Committee                                  d) Core
- 4) The term nano comes from \_\_\_\_\_.  
a) Hebrew                                        b) Latin  
c) Greek    d) French
- 5) Bioinformatics has been used for \_\_\_\_\_ analysis of biological queries using mathematical and statistical techniques.  
a) *In situ*    b) *In vivo*  
c) *In vitro*                                        d) *In silico*
- 6) Fullerenes is made up of \_\_\_\_\_.  
a) C60    b) C20  
c) C30    d) C50
- 7) GenBank nucleotide sequence database is maintained by \_\_\_\_\_.  
a) DDBJ    b) MIPS  
c) NCBI    d) EMBL
- 8) In \_\_\_\_\_ approach, the atoms and molecules are joined to obtain desired nanostructure.  
a) Top down                                      b) Bottom up  
c) Traditional                                    d) Modern
- 9) The first colloidal gold particles were synthesized by \_\_\_\_\_.  
a) Richard Fynmann                          b) Harold Walter Kroto  
c) Michael Faraday                          d) Richard Smalley
- 10) The primary resource for PROSITE secondary database is \_\_\_\_\_.  
a) OWL    b) Swiss-Prot  
c) SP+TrEMBL                                d) PRINTS
- 11) Synthesis of nanoparticles by spray pyrolysis is called \_\_\_\_\_ method.  
a) Chemical                                      b) Biological  
c) Physical                                        d) automatic

- 12) \_\_\_\_\_ is the study of the evolutionary history and relationships among individuals or groups of organisms.
- a) Taxonomy                                      b) Phylogenetics  
c) Organization                                  d) Nomenclature
- 13) Study and application of fabricating nanometer-scale structures is called \_\_\_\_\_.
- a) Biological                                      b) Nanolithography  
c) Chemical                                        d) Fabrication
- 14) \_\_\_\_\_ is search engine and information retrieval system at NCBI.
- a) PubMed                                         b) PMC  
c) Entrez    d) Blast

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

- 1) What is NanoCAD?
- 2) What is PubMed and PubMed central database?
- 3) What is graphene?
- 4) Define the secondary structure of protein.
- 5) What is sequence submission tool in GenBank database?

**B) Write Notes on (Any Two)** **06**

- 1) Write in detail about phylogenetic tree.
- 2) Write in detail about the DDBJ database in detail.
- 3) Write in detail about CVD.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Write in detail about Scanning electron microscopy.
- 2) Write in detail about BLAST.
- 3) Explain the protein information resources database.

**B) Answer the following questions. (Any One)** **06**

- 1) Write in details about the search engines.
- 2) Write in details properties of the nanomaterials.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain the protein structure database in detail.
- 2) Explain the classification of nanomaterials.
- 3) Explain the methods of characterizing the nanomaterials.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain the application of bioinformatics in details.
- 2) Explain the application of nanotechnology in cleaning environment.

**Q.5 Answer the following questions. (Any Two)** **14**

- Explain the CATH and SCOP structural classification database in detail.
- Explain the tools for measuring nanostructures.
- Explain the multiple sequence alignment in detail.



Seat No.	
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Set	P
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**B.Sc. (Semester - I) (New) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology (Paper - II)**  
**CELL BIOLOGY - II**

Day & Date: Wednesday, 13-11-2019  
 Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

**Q.1 Select the correct alternatives from the following and rewrite the sentence. 08**

- 1) \_\_\_\_\_ was first discovered by Fontana.
 

a) Nucleolus	b) Nucleus
c) Chromatin	d) Chromosome
- 2) \_\_\_\_\_ is a molecule which binds to surface receptors and carry out signal transduction.
 

a) Ligand	b) Receptor
c) Anchor	d) Host molecule
- 3) \_\_\_\_\_ proteins is a transmembrane protein responsible for anchoring the Extra Cellular Matrix (ECM).
 

a) Integrins	b) Laminin
c) Collagen	d) Fibronectin
- 4) Calvin cycle or dark reaction occurs in the \_\_\_\_\_.
 

a) Grana	b) Stroma
c) Thylakoid lumen	d) Outer membrane
- 5) The attachment of amino acids to specific tRNAs is mediated by a group of enzymes called \_\_\_\_\_.
 

a) Transacetylase	b) aminoacyl tRNA synthetases
c) Translocase	d) Aminase
- 6) \_\_\_\_\_ of the following is an active cell death process.
 

a) Apoptosis	b) Necrosis
c) Senescence	d) Lysis
- 7) Oxsomes of  $F_0 - F_1$  particles occur on \_\_\_\_\_.
 

a) Thylakoids	b) Mitochondrial surface
c) Chloroplast surface	d) Inner mitochondrial membrane
- 8) \_\_\_\_\_ are the polysaccharide component of Extra Cellular Matrix.
 

a) Glycosaminoglycans	b) Proteoglycans
c) Cytotactin	d) Serglycin

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

- 1) Define Adhesive Proteins.
- 2) Define structural protein.
- 3) Define Syncytial cells.
- 4) Define chromosome.
- 5) Define Ligand and give one Example.
- 6) Define Chromatin.

- Q.3 Answer the following questions. (Any Two)** **08**
- 1) Explain the process of mitosis.
  - 2) Explain the process of initiation of translation.
  - 3) Write a note on growth curve.
- Q.4 Answer the following questions. (Any Two)** **08**
- 1) Describe the structure of eukaryotic ribosome.
  - 2) Explain the causes of cancer development.
  - 3) Explain the process of meiosis.
- Q.5 Answer the following questions. (Any One)** **08**
- 1) Write short note of Biogenesis of Mitochondria.
  - 2) Define carcinogenesis and explain it.

Seat No.	
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Set	P
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**B.Sc. (Semester - VI) (New) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology**

**APPLICATIONS OF BIOTECHNOLOGY**

Day & Date: Friday, 11-10-2019  
 Time: 08:00 AM To 10:30 AM

Max. Marks: 70

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

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

**14**

- 1) \_\_\_\_\_ is a genetically engineered tomato variety.
  - a) BT-Tomato
  - b) Pomato
  - c) FLAVR-SAVR
  - d) All of the above
- 2) A genetically engineered microorganism used successfully in Bioremediation of oil spills is a species of \_\_\_\_\_.
  - a) Trichoderma
  - b) Bacillus
  - c) Xanthomonas
  - d) Pseudomonas
- 3) Ripening of fruits is induced by \_\_\_\_\_ a growth regulator.
  - a) IBA
  - b) Ethanol
  - c) Ethylene
  - d) Methylene
- 4) The trigger for activation of toxin of *Bacillus thuringiensis* is \_\_\_\_\_.
  - a) Acidic pH of stomach
  - b) High temperature
  - c) Alkaline pH of gut
  - d) Low temperature
- 5) \_\_\_\_\_ is an environmental friendly herbicide.
  - a) Glyphosate
  - b) Glufosinate
  - c) Cyanamide
  - d) All of the above
- 6) Cimeras can be possibly detected by which technique?
  - a) Hybridization
  - b) Electroporation
  - c) UV radiation
  - d) Spectroscopy
- 7) Alzheimer's disease is a \_\_\_\_\_ degenerative disorder.
  - a) Bone
  - b) Brain
  - c) Liver
  - d) Kidney
- 8) \_\_\_\_\_ is a method of preserving crops like grasses, corn and Alfalfa for animal feed.
  - a) Silage
  - b) Brewing
  - c) Fermentation
  - d) Caking
- 9) Probiotics are \_\_\_\_\_.
  - a) Cancer inducing microbes
  - b) Safe Antibiotics
  - c) New kind of food allergen
  - d) Live microbial supplements
- 10) \_\_\_\_\_ produces an insecticidal protoxin.
  - a) *A. tumefaciens*
  - b) *E. coli*
  - c) *B. thuringiensis*
  - d) *S. aureus*

- 11) Xanthan gum is a bi-product of \_\_\_\_\_.
  - a) *Xanthomonas* spp.
  - b) *Xanthomonas campestris*
  - c) *Xenopus*
  - d) *X. Citri*
- 12) The first human protein produced through recombinant DNA technology is \_\_\_\_\_.
  - a) insulin
  - b) erythropoietin
  - c) Interferon
  - d) somatostatin
- 13) Which type of inhibition can be achieved using antisense RNA?
  - a) Stable
  - b) Unstable
  - c) Transient
  - d) Integrative
- 14) *E. coli* is generally used for gene cloning because \_\_\_\_\_.
  - a) It supports the replication of recombinant DNA
  - b) it is easy to transform
  - c) It is free from elements that interferers with replication and recombination of DNA
  - d) It is easily available

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

08

- 1) What is a Superbug?
- 2) What is a microbial insecticide?
- 3) Define Senescence.
- 4) What is a Monelin?
- 5) Give the role of Antisense RNA.

**B) Write notes. (Any Two)**

06

- 1) Describe the plant as a Bioreactor for production of polymers.
- 2) How are salt stress tolerant plants developed by genetic manipulation?
- 3) Explain the methodology of molecular diagnosis of Cystic Fibrosis.

**Q.3 A) Answer the following questions. (Any Two)**

08

- 1) How can the biotechnology be used to make Nucleic acids as therapeutic agents?
- 2) Define Gene alteration discuss the method of gene manipulation in 4-ethylbenzoate.
- 3) Give the methods of making transgenic animals.

**B) Answer the following questions. (Any One)**

06

- 1) Write a detailed note on methods of manipulation of biodegradation pathways by transfer of plasmids.
- 2) Give the application of Lactic acid bacteria for production of Interleukine-10.

**Q.4 A) Answer the following questions. (Any Two)**

**10**

- 1) Explain the role of DNA vaccines as therapeutic agents.
- 2) Describe the method of nuclear transfer for livestock development.
- 3) How are insect resistant plants made?

**B) Answer the following questions. (Any One)**

04

- 1) Give the method to develop Salt Stress tolerant plants.
- 2) What are the components of Lignocelluloses?

**Q.5 Answer the following questions. (Any Two)**

14

- Discuss in detail how you can increase the enzyme activity of Tyrosyl-tRNA synthetase enzyme.
- How are Antisense RNA used for various applications?
- How can the plants nutritional content be modified for amino acids iron content?

**Seat  
No.**

## QUALITY STANDARD PRACTICES IN BIOTECHNOLOGY

Max. Marks: 70

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

14

- 1) Coliforms that produce acid and gas from lactose at  $44.5 \pm 0.2^\circ\text{C}$  within  $24 \pm 2$  h are specific indicators of fecal pollution and are known as \_\_\_\_\_.  
a) Coliforms  
b) Thermotolerant coliforms  
c) Faecal streptococci  
d) *Clostridium perfringens*
- 2) As per Bureau of Indian Standard (BIS) packaged drinking water should contain \_\_\_\_\_ number of aerobic microbial count.  
a) 80 CFU/ml  
b) 60 CFU/ml  
c) 40 CFU/ml  
d) 20 CFU/ml
- 3) Drinking water should contain \_\_\_\_\_ mg/ml of residual free chlorine.  
a) 0.2  
b) 0.5  
c) 0.7  
d) 0.9
- 4) \_\_\_\_\_ is a food made from the pressed curds of milk, firm and elastic or soft and semi-liquid in texture.  
a) Whey  
b) Butter  
c) Yoghurt  
d) Cheese
- 5) \_\_\_\_\_ is a dairy product obtained by coagulating milk in a process of curdling.  
a) Flavored milk  
b) Cheese  
c) Curd  
d) Ice cream
- 6) Methods of Making Sanitation Ratings (MMSR) is related to \_\_\_\_\_.  
a) vaccine  
b) milk  
c) cell line  
d) drug
- 7) The hazard can be either prevented, eliminated, or reduced to acceptable levels by using \_\_\_\_\_.  
a) Critical Control Points (CCPs)  
b) BIS  
c) BS 5750  
d) ISO 9000
- 8) \_\_\_\_\_ is a written document that lists the instructions, step-by-step, on how to complete a job task or how to handle a specific situation when it arises in the workplace.  
a) DMC  
b) GHP  
c) CCP  
d) SOP
- 9) Hazard Analysis and Critical Control Point (HACCP) systems will possess \_\_\_\_\_.  
a) GHP  
b) SOP  
c) GMP  
d) all of these

- 10) If one material delivery is made up of different batches: \_\_\_\_\_.
  - a) Each batch must be considered as separate for sampling.
  - b) random batch must be considered as separate for sampling
  - c) any one batch must be considered as separate for sampling
  - d) alternative batch must be considered as separate for sampling
- 11) \_\_\_\_\_ are the sterile pharmaceutical product.
  - a) tablet
  - b) Injectable
  - c) Capsule
  - d) Syrup
- 12) \_\_\_\_\_ is the biological product.
  - a) IL-2
  - b) Insulin
  - c) anti snake venom
  - d) all of these
- 13) DNA bar-coding identifies \_\_\_\_\_.
  - a) species
  - b) genus
  - c) family
  - d) order
- 14) Continuous cell lines are \_\_\_\_\_.
  - a) anchorage independent
  - b) makes multilayer
  - c) grows for infinite time
  - d) all of these

**Q.2 A) Define and explain any four of the following. 08**

- 1) Pathogens
- 2) Thermotolerant spore count
- 3) Quality Manual
- 4) Clinical trials
- 5) Class II Biosafety

**B) Write notes. (Any Two)** **06**

- 1) Fecal indicator bacteria
- 2) ISO
- 3) Manufacture of herbal medicines

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Give brief introduction of milk standards.
- 2) Explain in brief Good Hygienic Practices.
- 3) Describe GMP for Pharmaceutical products.

**B) Answer the following questions. (Any One)** **06**

- 1) Write a note on cell banking principle and its importance.
- 2) Explain in detail quality standards of packaged drinking water.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Take an account of various testing methods adopt in dairy products.
- 2) Explain in detail GMP of biological products.
- 3) Describe conventional and modern cell characterization methods.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain microbial contaminants and potential biohazards.
- 2) Define and explain any two dairy products.

**Q.5 Answer the following questions. (Any Two) 14**

- Explain in detail HACCP Food safety Management Systems.
- Describe in detail Chemical hazards in drinking-water.
- Write an essay on water treatment methods.

<b>Seat No.</b>	
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- 9) The speaker in the poem *On Virtue* asks his/her soul to court \_\_\_\_\_ for her promised bliss.  
a) virtue  
b) chastity  
c) Angel  
d) goddess
- 10) In the poem '*In the Bazaars of Hyderabad*', tunics are sold by \_\_\_\_\_.  
a) Merchants  
b) ironsmiths  
c) Goldsmith  
d) magicians
- 11) All that glitters is not gold. The underlined clause is \_\_\_\_\_.  
a) a noun clause  
b) a relative clause  
c) an adverbial clause  
d) a prepositional clause
- 12) 'Who killed Dr. Narendra Dabholkar is still a mystery'. The underlined clause is \_\_\_\_\_.  
a) an adverbial clause  
b) an adjectival clause  
c) a relative clause  
d) a noun clause
- 13) "What I say and what I do are two different things." This sentence is a \_\_\_\_\_.  
a) simple sentence  
b) complex sentence  
c) compound sentence  
d) both complex and compound sentence
- 14) The tag question for the sentence "No one is guilty" is \_\_\_\_\_.  
a) are they?  
b) isn't it?  
c) aren't they?  
d) isn't he?

**Q.2 Attempt any four of the following questions.**

16

- What is the message of the story *Whitewashing the Fence*?
- Comment on the end of the story *The Necklace*.
- How do you relate the tragic story of Pyramus and Thisbe to the modern age?
- What did Mathilde and Loisel do after the loss of the necklace?
- Why did Thisbe end her life?
- What did Tom's friends do when they saw him painting the fence?

**Q.3 Attempt two of the following questions.**

12

- What is Phillis Wheatley's attitude to life on earth?
- Comment on the use of imagery in the poem *In the Bazaars of Hyderabad*.
- Make a list of ways in which you usually waste your time and say how you can manage time better.
- You are a college student and addicted to internet, Facebook, and other social media. You are unable to concentrate on your study. How will you come out of the mire of social media and solve the problem.

**Q.4 Attempt any one of the following questions.**

14

- a) Describe in detail the great scientist Dr. APJ Abdul Kalam. Give the details of his personality.

**OR**

- b)** Describe the south Indian city you visited last year.



**Q.5 Answer the following question**

It is the height of selfishness for men, who fully appreciate in their own case the great advantages of a good education, to deny these advantages to women. There is no valid argument by which the exclusion of the female sex from the privilege of education can be defended. It is argued that women have their domestic duties to perform, and that, if they were educated, they would bury themselves in their books and have little time for attending to the management of their households. Of course it is possible for women, as it is for men, to neglect necessary work in order to spare more time for reading sensational novels. But women are no more liable to this temptation than men, and most women would be able to do their household work all the better for being able to refresh their minds in the intervals of leisure with a little reading. Nay, education would even help them in the performance of the narrowest sphere of womanly duty. For education involves knowledge of the means by which health may be preserved and improved, and enables a mother to consult such modern books as will tell her how to rear up her children into healthy men and women, and skillfully nurse them and her husband when disease attacks her household. Without education she will be not unlikely to listen with fatal results to the advice of superstitious quacks that pretend to work wonders by charms and magic.

But, according to a higher conception of woman's sphere, woman ought to be something more than a household drudge. She ought to be able not merely to nurse her husband in sickness, but also to be his companion in health. For this part of her wifely duty education is necessary, for there cannot well be congenial companionship between an educated man and an uneducated wife, who can converse with her husband on no higher subjects than cookery and servants' wages. Also one of a mother's highest duties is the education of her children at the time when their mind is most amenable to instruction. A child's whole future life, to a large extent, depends on the teaching it receives in early childhood and it needless to say, that this first foundation of education cannot be well laid by an ignorant mother. On all these grounds female education is a vital necessity.

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**B.Sc. (Semester - VI) (Old) (CGPA) Examination Oct/Nov-2019**  
**Biotechnology**  
**TOOL AND TECHNIQUES**

Day & Date: Monday, 07-10-2019  
 Time: 08:00 AM To 10:30 AM

Max. Marks: 70

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

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

**14**

- 1) \_\_\_\_\_ % of cellulose present in paper used for paper electrophoresis.
  - a) 95%
  - b) 23%
  - c) 59%
  - d) 81%
- 2) Stacking gel is to \_\_\_\_\_ Proteins.
  - a) Analyse
  - b) Concentrates
  - c) Distribute
  - d) Separate
- 3) \_\_\_\_\_ DNA polymerase don't have 5' to 3' exonuclease activity.
  - a) Korenberg
  - b) Kornberg
  - c) Klenow
  - d) Klenew
- 4) \_\_\_\_\_ used for characterizing large region of chromosome.
  - a) RFLP
  - b) PCR
  - c) RAPD
  - d) Chromosome walking
- 5) In \_\_\_\_\_ method guanine is methylated by Dimethyl Sulphate.
  - a) Maxam's & Gilbert's
  - b) Automated
  - c) Sangers
  - d) Dideoxy
- 6) Blue-white selection is \_\_\_\_\_ type of screening method.
  - a) Hybridization
  - b) Indirect
  - c) Immunological
  - d) Direct
- 7) \_\_\_\_\_ produces Ribonuclease A.
  - a) *P. Putida*
  - b) *A. Niger*
  - c) Bovine pancreas
  - d) Tiger pancreas
- 8) M. Grustein & D. S. Hogness develops \_\_\_\_\_.
  - a) Southern Hybridization
  - b) Northern Hybridization
  - c) Western Hybridization
  - d) Colony hybridization
- 9) \_\_\_\_\_ vector is used in both prokaryotes & eukaryotes.
  - a) Shuttle
  - b) Phagemid
  - c) Cosmid
  - d) M13
- 10) DNA fingerprinting based on \_\_\_\_\_.
  - a) Difference in patterns of genes between individuals
  - b) Difference in junk DNA patterns between individuals
  - c) Difference in order of genes between individuals
  - d) Differences in amount of DNA
- 11) \_\_\_\_\_ not required for PCR reaction.
  - a) Primer
  - b) Thermostable DNA Polymerase
  - c) ddNTPs
  - d) Template DNA

- 12) What is the natural function of restriction enzymes?
- Protecting bacteria by methylating their own DNA
  - Protecting bacteria by methylating the DNA of infecting viruses
  - Protecting bacteria by cleaving their own DNA
  - Protecting bacteria by cleaving the DNA of infecting viruses
- 13) \_\_\_\_\_ is yeast vector.
- YE<sub>p</sub>
  - λgt<sub>10</sub>
  - λgt<sub>11</sub>
  - pUC 18
- 14) \_\_\_\_\_ is First patented cloning vector.
- pBR<sup>327</sup>
  - pSC<sup>101</sup>
  - pMB<sup>101</sup>
  - pUC<sup>18</sup>

- Q.2 A) Answer the following questions (Any Four) 08**
- Write a note on animal viruses as vector.
  - Enlist the applications of PCR.
  - Draw a neat & labeled diagram of pSC 101
  - Define reverse transcriptase.
  - Define exonucleases.
- B) Write a note on (Any Two) 06**
- Write a note on RNA probes.
  - Write a note on milestones in Genetic Engineering.
  - Write a note on cloning from mRNA.
- Q.3 A) Answer the following questions (Any Two) 08**
- Explain isoelectrofocussing.
  - Describe particle gun method of gene transfer.
  - Discuss YAC vector.
- B) Answer the following questions (Any One) 06**
- Explain RAPD.
  - Discuss agrobacterium mediated gene transfer.
- Q.4 A) Answer the following questions (Any Two) 10**
- Explain in details of DNA polymerases.
  - Describe chemical methods used for direct DNA transfer.
  - Discuss Basic PCR.
- B) Answer the following questions (Any One) 04**
- Write a short note on Dot blot technique.
  - Describe Klenow fragment.
- Q.5 Answer the following (Any Two) 14**
- Discuss Western blotting technique
  - Describe plant viruses as cloning vector.
  - Give details of Maxam Gilbert method of DNA synthesis.

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No.**

## Max. Marks: 70

Page 1 of 2

- 11) Compounds which are foreign to \_\_\_\_\_ exhibiting unnatural structural features are known as Xenobiotics.
  - a) Earth
  - b) Soil
  - c) Life
  - d) Water
- 12) \_\_\_\_\_ family is coded by 13 number of genes.
  - a) Interferon  $\gamma$
  - b) Interferon  $\beta$
  - c) Interferon  $\mu$
  - d) Interferon  $\alpha$
- 13) Malignant glioma is an example of disease which may be cured by \_\_\_\_\_ as therapeutic agent.
  - a) Antisense RNA
  - b) DS DNA
  - c) DS RNA
  - d) Antisense oligonucleotide
- 14) \_\_\_\_\_ is an infectious agent from HSV1 which elicits the antibodies that react against intact form of infectious agent.
  - a) Envelope glycoprotein B
  - b) Envelope glycoprotein D
  - c) Envelope glycoprotein A
  - d) Envelope glycoprotein C

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

- 1) Define antisense RNA.
- 2) Define attenuated vaccine.
- 3) Explain in brief vaccines against bacteria.
- 4) Define Interfering RNA.
- 5) Enlist the applications of transgenic animals.

**B) Write Notes on (Any Two) 06**

- 1) Write note on Xenobiotics.
- 2) Write a note on increase in enzyme activity.
- 3) Write a short note on biosynthesis of rubber.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Discuss synthesis of human growth hormone.
- 2) Explain genetic engineering to increase enzyme stability.
- 3) Describe cloning livestock by nuclear transfer.

**B) Answer the following questions. (Any One) 06**

- 1) Write a short note on edible vaccine.
- 2) Describe synthesis of Human interferon.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Discuss the method which develops herbicide resistant plants.
- 2) Explain in details of transgenic mice.
- 3) How will you develop senescence tolerant plants?

**B) Answer the following question. (Any One) 04**

- 1) How will you increase the sweetness by genetic engineering?
- 2) How will you produce genetically modified interferon?

**Q.5 Answer the following questions. (Any Two) 14**

- a) Explain vector vaccines directed against viruses.
- b) How will you Xenobiotics by using microbes.
- c) Give detail of subunit vaccines against FMD.

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No.**

## Max. Marks: 70

14

- Page 1 of 2

- 12) \_\_\_\_\_ Method is used to separate compounds on the basis of their relative solubilities in two different immiscible liquids.
- a) Filtration                                      b) Liquid-liquid extraction  
c) Centrifugation                                d) Chromatography
- 13) \_\_\_\_\_ Method is used to improve industrially important strains.
- a) Disc diffusion                                  b) Microbial inhibition spectrum  
c) Protoplast fusion                                d) End point determination
- 14) Primary screening of organic acid and organic amine producing organisms identified by use of \_\_\_\_\_.  
a) pH indicating dyes                              b) Dilution method  
c) Gradient plate technique                      d) Crowded plate technique

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

- 1) Give examples Antifoam agents.
- 2) Give function of Aeration and agitation in fermentor.
- 3) Microorganisms involved in amylase production.
- 4) Define synthetic and crude media.
- 5) Define disintegration method.

**B) Answer the following questions. (Any Two)** **06**

- 1) Different methods of Inoculum preparation.
- 2) Solvent recovery method for purification of fermented product.
- 3) Turbid metric and End point Determination assay.

**Q.3 A) Answer the following questions. (Any two) 08**

- 1) Explain Submerged and Solid state Fermentations.
- 2) Explain Fermentation economics.
- 3) Explain Bio-insecticide production.

**B) Answer the following questions. (Any One)** **06**

- 1) Explain Microbial growth Kinetics in batch culture.
- 2) Explain detection of fermented products by using Biological assays.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain characteristics of an ideal fermentation medium.
- 2) Explain Strain Improvement by mutation.
- 3) Explain production of Ethanol.

**B) Answer the following questions. (Any One) 04**

- 1) Explain secondary screening.
- 2) Explain application of computer in fermentation technology.

**Q.5 Answer the following questions. (Any Two)** **14**

- Explain basic functions, components and operation of the fermenter.
- Explain primary screening.
- Explain different methods of purification of fermentation product.

Seat No.	
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- 11) \_\_\_\_\_ Principles are there in HACCP.  
a) 4    b) 5  
c) 6    d) 7
- 12) \_\_\_\_\_ are the categories of food hazards.  
a) Biological, Chemical, Metal          b) Biological, Physical, Allergens  
c) Biological, physical , chemical        d) Biological and chemical
- 13) Shredded cabbage is the starting product for \_\_\_\_\_ of the following fermented food.  
a) Green olives                                b) Sausage  
c) Pickles                                        d) Sauerkraut
- 14) MBRT test determines quality of \_\_\_\_\_ milk.  
a) Pasteurized                                 b) Raw  
c) Boiled                                         d) None of these

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

- 1) Indicator organisms
- 2) Define milk and give Normal flora of milk.
- 3) Define pasteurization.
- 4) Equipment cleaning and disinfection in food industry
- 5) Radiations used for food preservation

**B) Answer the following questions. (Any Two)** **06**

- 1) Phosphatase test
- 2) Spoilage of sugar and sugar products
- 3) Quality Systems: BS 5750 and ISO 9000 series

**Q.3 A) Answer the following questions. (Any Two)** **08**

- 1) Explain Sauerkraut production.
- 2) Explain cultural techniques used for microbiological examination of food.
- 3) Explain Yoghurt production.

**B) Answer the following questions. (Any One)** **06**

- 1) Explain different methods of Pasteurization of milk.
- 2) Explain Cheese production.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain most probable Number Counts.
- 2) Explain Microbial spoilage of different milk products.
- 3) Explain use of high and low temperatures for food preservation.

**B) Answer the following questions. (Any One)** **04**

- 1) Explain Microbial spoilage of meat and meat products.
- 2) Explain Dye reduction tests-MBRT, Resazurin Test.

**Q.5 Answer the following questions. (Any Two)** **14**

- Explain chemical and physical properties of food affecting microbial growth.
- Explain Hazard Analysis and Critical Control Points (HACCP).
- Explain rapid methods for detection of Specific organisms and Toxins in food.

Seat No.	
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- Q.3 Answer the following questions. (Any Two)** **08**
- 1) Explain indeterminate cleavage and determinate cleavage.
  - 2) Explain ABC model in floral development.
  - 3) Fate map of discoblastula in chick.
- Q.4 Answer the following questions. (Any Two)** **08**
- 1) What is mean by chill - sensitive plants? Explain chilling injury in plants.
  - 2) Discuss radial cleavage and spiral cleavage.
  - 3) Explain is short Blastulation in frog.
- Q.5 Answer the following questions. (Any One)** **08**
- 1) Give detail process of oogenesis.
  - 2) Explain Gastrulation in frog with suitable diagram.

**Seat  
No.**

Day & Date: Friday, 15-11-2019  
Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

- 1) Nuclear polyembryony is reported in species of \_\_\_\_\_.
  - a) Brassica
  - b) Citrus
  - c) Gossypium
  - d) Triticum
- 2) Stage two of differentiation involves \_\_\_\_\_.
  - a) Production of leaf primordia
  - b) Formation of Embryo
  - c) Formation of Embryo
  - d) Recognition of apical meristems
- 3) Ovary wall gives rise to \_\_\_\_\_.
  - a) Fruit wall
  - b) Seed coat
  - c) Mesocarp
  - d) Endocarp
- 4) Auxin is synthesized mainly in \_\_\_\_\_.
  - a) Roots
  - b) Meristem region of plant
  - c) Shoots
  - d) Lateral roots
- 5) Muscle cells considered as differentiated cells, which produce specific proteins like \_\_\_\_\_.
  - a) Actin and Albumin
  - b) Myosin and Albumin
  - c) Albumin
  - d) Actin and Myosin
- 6) Fruits evolved as vehicles for production and dispersal of \_\_\_\_\_.
  - a) Pollen grains
  - b) Seeds
  - c) Ovules
  - d) Endocarp
- 7) In fleshy fruits upon ripening chromoplasts produce \_\_\_\_\_.
  - a) Chlorophyll-a
  - b) Xanthophyll
  - c) Carotenoids
  - d) Chlorophyll-b
- 8) Secondary nucleus of flower is developed into the \_\_\_\_\_.
  - a) Seed cell
  - b) Ectosperm embryo
  - c) Mesosperm nucleus
  - d) Endosperm tissue

08

- 1) Define zygote.
- 2) Explain Epigenetic landscape.
- 3) Differentiate between cell differentiation and cell determination
- 4) Enlist hormone involved in root, leaf and fruit development.
- 5) Define etioplasts.
- 6) What is 'triple response'?

- Q.3 Answer the following questions. (Any Two) 08**
- 1) Describe the fate of different primary germ layers.
  - 2) Explain cellular endosperm formation in early, middle and late phase.
  - 3) Write on Hormonal control of fruit ripening.
- Q.4 Answer the following questions. (Any Two) 08**
- 1) Write symptoms of fruit ripening.
  - 2) Describe hormones involved in formation of root.
  - 3) Write in brief Embryonic Differentiation.
- Q.5 Answer the following questions. (Any One) 08**
- 1) Describe development of placenta in mammals with suitable example.
  - 2) Explain the process of lens and optic cup formation.

Seat No.	
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**B.Sc. (Semester - I) (New) (CBCS) Examination Oct/Nov-2019**  
**Biotechnology (Paper - I)**  
**CHEMICAL SCIENCE**

Day & Date: Saturday, 16-11-2019  
 Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

**Q.1 Select the correct alternatives from the following and rewrite the sentence. 08**

- 1) Nitrogenous base linked with sugar by \_\_\_\_\_ bond.
  - a) peptide
  - b) hydrogen
  - c) phosphodiester
  - d) hydrophobic
- 2) \_\_\_\_\_ among the following chemical bond were described by Kossel and Lewis.
  - a) Metallic bond
  - b) Polar covalent bond
  - c) Coordinate bond
  - d) Ionic and Covalent bond
- 3) Ionic bonds are \_\_\_\_\_.
  - a) easy to break
  - b) weak
  - c) electrical bonds
  - d) very difficult to break
- 4) The polypeptide chains run parallel and are held together by \_\_\_\_\_ bonds.
  - a) disulphide
  - b) covalent
  - c) glycosidic
  - d) Co-NH bond
- 5) Methane involves \_\_\_\_\_ hybridization of carbon.
  - a)  $Sp$
  - b)  $Sp^2$
  - c)  $Sp^3$
  - d)  $Sp^3d$
- 6) \_\_\_\_\_ is universal solvent.
  - a) Alcohol
  - b) Acetone
  - c) Water
  - d) Ester
- 7) Amylose part of starch consists of \_\_\_\_\_ linkage.
  - a)  $\alpha 1 \rightarrow 4$
  - b)  $\alpha 1 \rightarrow 2$
  - c)  $\alpha 1 \rightarrow 3$
  - d)  $\alpha 1 \rightarrow 6$
- 8) Atoms undergo bonding in order to \_\_\_\_\_.
  - a) Attain stability
  - b) Lose stability
  - c) Move freely
  - d) Increase energy

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

- 1) Define dipole moment. Mention its significance.
- 2) Order following interactions from strongest to weakest.  
 Hydrogen bonds, covalent bonds, ionic bonds and van der waals.
- 3) Explain the term Solvation Energy.
- 4) Name any four non-covalent interactions that occur between biological molecules.
- 5) Enlist any four interactions in proteins.
- 6) Enlist different types of solution.

- Q.3 Answer the following questions. (Any Two)** **08**
- 1) Explain concept of hybridization of  $Sp^2$  with respect to  $C_2H_4$ .
  - 2) Define the basic buffers and explain their action.
  - 3) Explain the order of reaction with suitable example.
- Q.4 Answer the following questions. (Any Two)** **08**
- 1) Calculate the  $P^H$  of 0.1M NaOH solution.
  - 2) Define dipole moment & write its significance.
  - 3) Explain the formation of covalent bond between two atoms of chlorine in a chlorine molecule on the basis of octet rule.
- Q.5 Answer the following questions. (Any One)** **08**
- 1) What an account order of a reaction and its integrated rate expression?
  - 2) What is equivalent & molecular mass and note on Expression for concentration of solution?

**Seat  
No.**

Day & Date: Monday, 18-11-2019  
Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

**Q.1 Select the correct alternatives from the following and rewrite the sentence. 08**

- 1) Which out of the following protein does not possess a quaternary structure?
  - a) Myoglobin
  - b) Lactate dehydrogenase
  - c) Immunoglobulin
  - d) Creatine Phospho Kinase
- 2) ATP stands for \_\_\_\_\_.
  - a) Adenosine tri-phosphate
  - b) Adenine Tri-phosphate
  - c) Alpha Tri-phosphate
  - d) Acetate Tri-phosphate
- 3) The Scatchard equation is an equation used in \_\_\_\_\_.
  - a) Physio biology
  - b) Micro biology
  - c) Chemistry
  - d) Molecular biology
- 4) The sequential model is a theory that describes cooperatively of \_\_\_\_\_.
  - a) Protein subunits
  - b) Vitamins subunits
  - c) Lipids subunits
  - d) Nucleic acidsubunits
- 5) \_\_\_\_\_ is a Non-polar Biomolecule.
  - a) Glucose
  - b) Typical wax
  - c) Glycine
  - d) Gluceronol
- 6) Among the following has specialized tissue for conduction of water.
  - a) Thallophyta
  - b) Bryophyte
  - c) Pteridophyta
  - d) Fungi
- 7) Phospholipids are molecules that contain \_\_\_\_\_.
  - a) Positively charged functional group
  - b) Long water soluble carbon chain
  - c) Cholesterol
  - d) Hydrophilic head and hydrophobic tails
- 8) The entropy of isolated system can never be \_\_\_\_\_.
  - a) Increase
  - b) Decrease
  - c) Zero
  - d) Neutral

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

- 1) Write a note on “micelles”?
- 2) What is meant by hydrophobic interaction?
- 3) Define sequential model.
- 4) How energy transfers in biochemical reactions?
- 5) Explain the properties of sequential model.
- 6) Enlist the examples of Amphipathic Bio molecules.



- Q.3 Answer the following questions. (Any Two)** **08**
- 1) Explain the application of protein secondary structure.
  - 2) Explain influence of ions on water in structure breaking.
  - 3) Explain Catalyst design of hydrogen-bond.
- Q.4 Answer the following questions. (Any Two)** **08**
- 1) Explain bomb calorimeter and its principle.
  - 2) Explain structure of protein ligand complex.
  - 3) Describe the types of nucleic acids.
- Q.5 Answer the following questions. (Any One)** **08**
- 1) Differentiate between co-operative binding and Anti-cooperative binding.
  - 2) With the help of neat diagram explain biological importance of Hydrophobic Interaction.