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**B.Sc. (Biotechnology) (Semester – I) (New) (CBCS) Examination:  
March/April-2023  
ENGLISH (COMPULSORY)  
Literary Voyage (BT1101)**

Day & Date: Tuesday, 18-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple choice questions:**

**08**

- 1) Mahatma Gandhi said, "Within ten miles radius of \_\_\_\_\_ you will see skin and bone.
 

a) Gaya	b) Puri
c) Delhi	d) Mumbai
- 2) Payeng's Forest got disclosed, when a herd of wild \_\_\_\_\_ entered into it accidentally.
 

a) dogs	b) monkeys
c) elephants	d) boars
- 3) In the city the grandmother of Khushwant Singh kept herself busy with the \_\_\_\_\_.
 

a) spinning wheel	b) cows
c) horses	d) neighbours
- 4) Tagore emphasized that a man needs \_\_\_\_\_ to conquer one's freedom.
 

a) intolerance	b) patience
c) hatred	d) haste
- 5) Love came to \_\_\_\_\_ asking for the queen of the flowers.
 

a) Fantasy	b) Flora
c) Fame	d) Futura
- 6) When the father went to his son's room, the son was \_\_\_\_\_.
 

a) playing	b) slumbering
c) dancing	d) painting
- 7) The word 'protect' requires \_\_\_\_\_ as a suffix to form a meaningful word.
 

a) -ly	b) -ship
c) -ion	d) -ful
- 8) 'He went to his father's office yesterday.' The underlined word in the sentence is \_\_\_\_\_.
 

a) a verb	b) an adjective
c) a pronoun	d) a modal

- Q.2 Answer any four of the following.** **12**
- a) What tactics were used by Mahatma Gandhi for making Khadi popular?
  - b) How did Jadav Payeng begin his work at Maioli Island?
  - c) Describe the tragic end of Khushwant Singh's "The Portrait of a Lady".
  - d) How did Rabindranath Tagore want God to help him?
  - e) Describe the process which gave birth to the Lotus.
  - f) What is the symbolic meaning of the title "The Toys" of the poem by Coventry Patmore?
- Q.3 a) Write a detailed note on the process of communication.** **10**
- OR
- b) What are the seven features of effective communication?**
- Q.4 Define intrapersonal skills and write a detailed note on them.** **10**

Seat No.	
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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
March/April-2023  
CHEMISTRY (Paper - I) (BT1102)**

Day & Date: Wednesday, 19-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple Choice Questions.**

**08**

- 1) \_\_\_\_\_ chemical bond was described by Kossel and Lewis.
  - a) Metallic bond
  - b) Polar covalent bond
  - c) Coordinate bond
  - d) Ionic and Covalent bond
- 2) \_\_\_\_\_ introduced the concept of hybridization.
  - a) Pauling
  - b) London
  - c) Sidgwick
  - d) Alexander
- 3) The p-orbital is in the shape of a \_\_\_\_\_.
  - a) Sphere
  - b) Dumbbell
  - c) Pear-shaped lobe
  - d) None of the mentioned
- 4) \_\_\_\_\_ compound releases heat when dissolved in water.
  - a) Barium chloride
  - b) Ammonium chloride
  - c) Lead chloride
  - d) Calcium chloride
- 5) \_\_\_\_\_ is a colligative property.
  - a) Relative lowering of fluid pressure
  - b) Decrease in boiling point
  - c) Decrease in freezing point
  - d) Change in volume after mixing
- 6) The process of reverse osmosis is also known as \_\_\_\_\_.
  - a) Hyper-filtration
  - b) Double-filtration
  - c) Double-osmosis
  - d) Hyper-osmosis
- 7) \_\_\_\_\_ is not a direct factor affecting the rate of a reaction.
  - a) Temperature
  - b) Presence of catalyst
  - c) Order of reaction
  - d) Molecularity
- 8) Buffer solution is destroyed when \_\_\_\_\_.
  - a) addition of weak base
  - b) addition of strong acid or base
  - c) addition of weak acid
  - d) addition of a salt

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

**08**

- a) Define Atomic mass.
- b) Write a short note on solution.
- c) Write a short note on buffer.
- d) Define molarity.
- e) Define rate constant.
- f) Define valency.

- Q.3 Write short note on any two of the following.** **08**
- a) Describe Modern periodic law.
  - b) Write a note on covalent bonds with suitable examples.
  - c) Write a note on Dipole moment.
- Q.4 Answer any two of the following.** **08**
- a) Write a note on elevation in boiling point.
  - b) Write a note on solubility & factors affecting solubility.
  - c) Write a note on normality, molality with example.
- Q.5 Answer any one of the following.** **08**
- a) Explain Hybridization and describe in detail SP<sup>3</sup> hybridization with respect to C<sub>2</sub>H<sub>4</sub>, CH<sub>4</sub>.
  - b) What is PH and Buffer? Explain Henderson equation for acidic and basic buffers with derivation.

Seat No.	
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**B.Sc. (Biotechnology) (Semester – I) (New) (CBCS) Examination:  
March/April-2023  
Biochemistry (Paper - II) (BT1103)**

Day & Date: Thursday, 20-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple choice questions:**

**08**

- 1) \_\_\_\_\_ composition of nucleoside.
  - a) a sugar + a phosphate
  - b) a base + a sugar
  - c) a base + a phosphate
  - d) a base + a sugar + phosphate
- 2) \_\_\_\_\_ the solubility of lipids in water.
  - a) Soluble
  - b) Partially soluble
  - c) Insoluble
  - d) Partially insoluble
- 3) \_\_\_\_\_ following is not a fat-soluble vitamin.
  - a) Vitamin D
  - b) Vitamin K
  - c) Vitamin C
  - d) Vitamin A
- 4) Lipopolysaccharide is found in cell wall of \_\_\_\_\_.
  - a) Gram positive bacteria
  - b) Gram negative bacteria
  - c) Both Gram positive negative bacteria
  - d) None of these
- 5) Group of adjacent nucleotides are joined by \_\_\_\_\_.
  - a) Phosphodiester bond
  - b) Peptide bond
  - c) Ionic bond
  - d) Covalent bond
- 6) Peptide bond is a \_\_\_\_\_.
  - a) Covalent bond
  - b) Ionic bond
  - c) Metallic bond
  - d) Hydrogen bond
- 7) \_\_\_\_\_ is the nature of an enzyme.
  - a) Vitamin
  - b) Lipid
  - c) Carbohydrate
  - d) Protein
- 8) \_\_\_\_\_ Number of hydrogen bonds between guanine and cytosine.
  - a) 1
  - b) 2
  - c) 3
  - d) 4

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

**08**

- a) Define storage lipid.
- b) Write a short note on water soluble vitamins.
- c) Write a short note on hypervitaminosis.
- d) Define Peptide bond.
- e) Define titration curve.
- f) Define essential Amino acid.

- Q.3 Write short notes on any two of the following** **08**
- a) Describe structure of B-form of DNA.
  - b) Write a note on properties of amino acids.
  - c) Write a note on membrane lipids.
- Q.4 Answer any Two of the following.** **08**
- a) Write a note on zwitter ion.
  - b) Write a note on structure and nomenclature of nucleotides.
  - c) Write a note on physiological role of fat-soluble vitamins.
- Q.5 Answer any one of the following** **08**
- a) What is carbohydrate? Explain its classification in details with example.
  - b) What is Protein? Explain its levels in details with example.

Seat No.	
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**B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023**  
**BIOTECHNOLOGY**  
**Biophysics (Paper-I) (BT1104)**

Day & Date: Friday, 21-07-2023  
 Time: 09:00 AM To 11:00 AM

Max. Marks: 40

- Instructions:** 1) All questions are compulsory.  
 2) Draw neat diagrams and give equations wherever necessary.  
 3) Figures to the right indicate full marks.  
 4) Use of logarithmic table and calculator is allowed.  
 (At. Wts.: H=1, C=12, O=16, N= 14, Na =23, Cl = 35.5)

**Q.1 Multiple choice questions.**

**08**

- 1) \_\_\_\_\_ bonding forms in liquid water as the hydrogen atoms of one water molecule are attracted towards the oxygen atom of a neighboring water molecule.
  - a) Hydrogen
  - b) Covalent
  - c) Strong
  - d) Permanent
- 2) \_\_\_\_\_ is the substance that is being dissolved in the solution.
  - a) Solute
  - b) Solvent
  - c) Water
  - d) gas
- 3) \_\_\_\_\_ is a molecule that is attracted to water molecules and tends to be dissolved by water.
  - a) Hydrophobe
  - b) Hydrophile
  - c) Nucleophile
  - d) Electrophile
- 4) \_\_\_\_\_ is called the "universal solvent".
  - a) Alcohol
  - b) Oil
  - c) Petrol
  - d) Water
- 5) The least random state of the water system is:
  - a) Ice
  - b) liquid water
  - c) Steam
  - d) randomness is same
- 6) Generally, \_\_\_\_\_ is defined as a measure of randomness or disorder of a system.
  - a) hydrogen bond
  - b) entropy
  - c) ionic bond
  - d) hydrophobic bond
- 7) \_\_\_\_\_ is an example of Ligand-receptor interaction.
  - a) oxygen-hemoglobin binding
  - b) Na-Cl binding
  - c) Electrostatic binding
  - d) Van der Waal's binding
- 8) In \_\_\_\_\_ type of binding, the first molecule makes it harder, not easier, for the second one' to bind.
  - a) cooperative binding
  - b) anti-cooperative binding
  - c) mutual binding
  - d) free binding

- Q.2 Answer any four of the following. 08**
- a) Define solvent.
  - b) Explain in brief - H-bonding.
  - c) Explain Hydrophobes with an example.
  - d) Write first law of thermodynamics.
  - e) Define entropy.
  - f) What is a ligand in Ligand-receptor interaction?
- Q.3 Write short notes on any two of the following. 08**
- a) Discuss physicochemical properties of water.
  - b) Differentiate between Hydrophiles and Hydrophobes.
  - c) Explain in detail second law of thermodynamics.
- Q.4 Answer any Two of the following. 08**
- a) Write a note on Specific Roles of Water in Structure and Function
  - b) Explain MWC model.
  - c) Differentiate between cooperative binding and anti-cooperative binding
- Q.5 Answer any one of the following. 08**
- a) Give a detailed account on Protein Hydration: Secondary Structure of protein, Protein-Protein Interactions
  - b) Discuss Ligand-receptor interaction: oxygen-hemoglobin binding



Seat No.	
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**B.Sc. (Semester – I) (New) (CBCS) Examination: March/April-2023**  
**BIOTECHNOLOGY**  
**Cell Biology (Paper – II) (BT1105)**

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

Max. Marks: 40

- Instructions:** 1) All questions are compulsory.  
 2) Draw neat diagrams and give equations wherever necessary.  
 3) Figures to the right indicate full marks.  
 4) Use of non-storage calculator is allowed.

**Q.1 Multiple choice questions:**

**08**

- 1) Cell fractionation involve 3 steps: Extraction, \_\_\_\_\_ and Centrifugation.
  - a) Filtration
  - b) Crushing
  - c) Cutting
  - d) Homogenization
- 2) Most organelles in a eukaryotic cell are found in the \_\_\_\_\_.
  - a) cell wall
  - b) cytoplasm
  - c) nucleus
  - d) capsul
- 3) Single membrane bound organelle is \_\_\_\_\_.
  - a) lysosome
  - b) mitochondrion
  - c) Golgi apparatus
  - d) rough endoplasmic reticulum
- 4) In prokaryotic cells, ribosomes are \_\_\_\_\_.
  - a) 70 S
  - b) 80 S
  - c) 60S + 40S
  - d) 50S + 40S
- 5) A \_\_\_\_\_ is a simple, single-celled (unicellular) organism.
  - a) Eukaryotic cell
  - b) Plant cell
  - c) Animal cell
  - d) Prokaryotic cell
- 6) The fluid mosaic model of plasma membrane was proposed by \_\_\_\_\_.
  - a) Singer and Nicolson
  - b) Meselson and Stahl
  - c) Devson
  - d) Robertson
- 7) The basic protein of microtubule is \_\_\_\_\_.
  - a) Tubulin
  - b) Myosin
  - c) Motor protein
  - d) Actin
- 8) Golgi body is absent in \_\_\_\_\_.
  - a) Yeast
  - b) Plant
  - c) Bacteria and blue green algae
  - d) Amphibians

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

**08**

- a) Describe prophase I in Meiosis.
- b) Give significance of Apoptosis.
- c) What is metastasis?
- d) Write the difference between Mitochondria and chloroplast.
- e) Explain types of cancer.

- Q.3 Write short notes on any two of the following** **08**
- a) Describe structure of Lysosomes.
  - b) Add a note on different types of chromosome based on centromere.
  - c) Write on Carcinogenesis.
- Q.4 Answer any Two of the following.** **08**
- a) Describe structure of Nucleus.
  - b) Add a note on Cell cycle.
  - c) Add a note on cell fractionation.
- Q.5 Answer any one of the following** **08**
- a) Write in detail stages in Mitosis and its importance in cell growth.
  - b) Describe structure and functions of Microtubules.

Seat No.	
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**B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023**  
**BIOTECHNOLOGY (Paper – I)**  
**Animal Physiology (BT1106)**

Day & Date: Sunday, 23-07-2023  
 Time: 09:00 AM To 11:00 AM

Max. Marks: 40

- Instructions:** 1) All questions are compulsory.  
 2) Draw neat diagrams and give equations wherever necessary.  
 3) Figures to the right indicate full marks.  
 4) Use of non-storage calculator is allowed.

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

**08**

- 1) The enzymes present in pancreatic juice are \_\_\_\_\_.  
 a) Amylase, Trypsinogen, Peptidase, Rennin  
 b) Trypsinogen, Lipase, Amylase, Procarboxypeptidase  
 c) Peptidase, Pepsin, Amylase, Rennin  
 d) Maltase, Amylase, Trypsinogen, Pepsin
- 2) \_\_\_\_\_ Plasma protein is responsible for blood coagulation.  
 a) Fibrinogen  
 b) Globulin  
 c) Serum amylase  
 d) Albumin
- 3) DNA is not present in \_\_\_\_\_.  
 a) an enucleated ovum  
 b) hair root  
 c) a mature spermatozoa  
 d) mature RBCs
- 4) The small intestine has three parts. The first part is called \_\_\_\_\_.  
 a) Duodenum  
 b) Oesophagus  
 c) Larynx  
 d) Mouth cavity
- 5) Corpus luteum is the source of secretion of \_\_\_\_\_.  
 a) LH  
 b) Estradiol  
 c) Estrogen  
 d) Progesterone
- 6) FSH is produced by \_\_\_\_\_.  
 a) Thyroid gland  
 b) Anterior pituitary gland  
 c) Ovary  
 d) Testis
- 7) In \_\_\_\_\_ part of the respiratory system, gaseous exchange takes place.  
 a) Alveoli  
 b) Pharynx  
 c) Larynx  
 d) Trachea
- 8) \_\_\_\_\_ of the following is not included in the excretory system of humans.  
 a) Cloaca  
 b) Kidneys  
 c) Ureters  
 d) Urethra

**Q.2 Answer the following. (4 out of 5)**

**08**

- a) Write about Saliva.
- b) Explain cardiac cycle.
- c) Draw neat labeled diagram of Testis.
- d) Write about Oxygen Dissociation Curve.
- e) Draw neat labeled diagram of Nerve Cell.

- Q.3 Write short notes on any two of the following. 08**
- a) Explain Mechanism of working of Heart.
  - b) Describe Female reproductive System.
  - c) Write about Synapse.
- Q.4 Answer the following. (2 out of 3) 08**
- a) Add a note on Transport of O<sub>2</sub> and CO<sub>2</sub> during respiration.
  - b) Explain function of Bowman capsule and Malphigian body.
  - c) Add a note on Mechanism of Coagulation of Blood.
- Q.5 Answer the following. (1 out of 2) 08**
- a) Write in detail about Endocrine gland and their hormones.
  - b) Explain in detail Mechanism of digestion.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
March/April-2023  
Developmental Biology (Paper-II) (BT1107)**

Day & Date: Monday, 24-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

- Instructions:** 1) All questions are compulsory.  
2) Draw neat diagrams wherever necessary.  
3) Figures to the right indicate full marks.  
4) Use of non-storage calculator is allowed.

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

- 1) Cavity present inside the fully formed gastrula is known as \_\_\_\_\_.
 

a) Antrum	b) Gastrocoel
c) Blastocoel	d) spongocoel
- 2) \_\_\_\_\_ type of cleavage were observed in bird eggs.
 

a) Holoblastic	b) Meroblastic
c) Complete	d) Equal Holoblastic
- 3) During early gastrulation \_\_\_\_\_ is infolding of cell layer to form a cavity encircled by infolded cells.
 

a) Involution	b) Invagination
c) Epiboly	d) Emboly
- 4) Ten spermatogonia produce \_\_\_\_\_ sperms after spermatogenesis.
 

a) 20	b) 40
c) 60	d) 80
- 5) \_\_\_\_\_ gene is considered as Floral meristem identity in *Arabidopsis thaliana*.
 

a) <i>LEAFY</i>	b) <i>cry</i>
c) <i>Rb</i>	d) <i>nif</i>
- 6) In angiosperms, flower is modified leaf helpful for \_\_\_\_\_.
 

a) Photosynthesis	b) Reproduction
c) Support	d) Transport of water
- 7) In angiospermic plants, anthers are derived from \_\_\_\_\_ cells.
 

a) Archosporium	b) Parietal
c) Sporogenous cell	d) Epidermis
- 8) In flowering plants, primary endosperm nucleus (PEN) is \_\_\_\_\_.
 

a) Haploid	b) Diploid
c) Triploid	d) tetraploid

**Q.2 Answer the following (4 out of 5). 08**

- a) Define amphimixis.
- b) Define spawning.
- c) Define epiboly.
- d) Write a note on globular stage embryo in plants.
- e) Draw neat labeled diagram of embryo sac in plants

- Q.3 Write Short Notes (2 out of 3). 08**
- a) Describe process of gastrulation with suitable example.
  - b) Explain process of spermatogenesis with neat labeled diagram.
  - c) Write different type of cleavage.
- Q.4 Answer the following (2 out of 3). 08**
- a) Describe mechanism of double fertilization in angiosperms.
  - b) Describe process of seed development in flowering plants with neat labeled diagram.
  - c) Describe process of embryo sac development in angiosperms with neat labeled diagram.
- Q.5 Answer the following (1 out of 2). 08**
- a) Describe ABC model of flower development *Arabidopsis*.
  - b) Describe process of fertilization in humans with neat labeled diagram.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
March/April-2023  
Ecology (Paper - I) (BT1108)**

Day & Date: Tuesday, 25-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

**08**

- 1) Edaphic factors include \_\_\_\_\_.
 

a) Air	b) Water
c) Plant	d) Soil
- 2) \_\_\_\_\_ consume dead and decaying organic matter obtained from producer and consumers.
 

a) Autotrophs	b) Heterotrophs
c) Carnivores	d) Saprotrophs
- 3) Using light energy and mineral, \_\_\_\_\_ prepare food energy.
 

a) Primary Consumers	b) Carnivores
c) secondary Consumers	d) Producers
- 4) \_\_\_\_\_ is top carnivore.
 

a) Frog	b) Elephant
c) Snake	d) Eagle
- 5) \_\_\_\_\_ Present in higher concentration in atmosphere.
 

a) Nitrogen	b) Carbon
c) Oxygen	d) Sulphur
- 6) The thickness of troposphere is about \_\_\_\_\_ above earth surface.
 

a) 21 km	b) 11km
c) 10km	d) 38km
- 7) \_\_\_\_\_ is living part of earth.
 

a) Hydrosphere	b) Biosphere
c) Lithosphere	d) Atmosphere
- 8) \_\_\_\_\_ deals with study of Interaction of living and non living things.
 

a) Ecosystem	b) Ecology
c) Topology	d) Environment

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

**08**

- a) Define hydrosphere.
- b) Define heterotrophs.
- c) Define primary productivity.
- d) Define natural resources.
- e) Define endangered species.
- f) Define estuarine.

- Q.3 Write notes on any two of the following. 08**
- a) Structure of ecosystem
  - b) Composition of atmosphere
  - c) Hot spot
- Q.4 Write notes on any two of the following. 08**
- a) Structure and function of Forest ecosystem
  - b) Energy flow in the ecosystem
  - c) Save Western Ghat
- Q.5 Answer any one of the following. 08**
- a) Define biogeochemical cycle and explain both carbon and nitrogen cycle.
  - b) Explain in detail Conservation and its types.



Seat No.	
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**B.Sc. (Biotechnology) (Semester- I) (New) (CBCS) Examination:  
March/April-2023**

**Biotechnology in Human Welfare (Paper – II) (BT1109)**

Day & Date: Wednesday, 26-07-2023

Max. Marks: 40

Time: 09:00 AM To 11:00 AM

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

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

**08**

- 1) Rosalind Franklin also known as \_\_\_\_\_.  
a) Dark leady of RNA                      b) Light leady of DNA  
c) Light leady of Nucleic Acid          d) Dark leady of DNA
- 2) Ascariasis is a disease caused by the parasitic roundworm \_\_\_\_\_.  
a) Entamoeba histolytica                  b) Ascaris lumbricoides  
c) parasitic roundworms                  d) Plasmodium parasites
- 3) Bt brinjal is product of \_\_\_\_\_ Technique.  
a) Replication                                  b) Fertilization  
c) Genetic engineering                      d) Mutation
- 4) The process of introduction of weakened pathogen into human body is called \_\_\_\_\_.  
a) Vaccination                                  b) Attenuation  
c) Immunization                                d) Vaccine reduction
- 5) The name of the first transgenic cow was \_\_\_\_\_.  
a) Dolly    b) Mary  
c) Elle    d) Rosie
- 6) Boosting the intake of \_\_\_\_\_ can help women trying to conceive  
a) Potassium                                      b) Folic acid  
c) Lycopene                                        d) Nicke
- 7) Maximum number of transgenic animal is of \_\_\_\_\_.  
a) cow    b) mice  
c) pig     d) fish
- 8) White revolution also known as \_\_\_\_\_.  
a) Operative food                                b) Operation food  
c) Preparation food                              d) Production milk

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

**08**

- a) Define Biotechnology.
- b) Define Nanotechnology.
- c) Define In vitro fertilization.
- d) Define Green revolution.
- e) Define vaccine.
- f) Name any 4 National Institutes of Biotechnology in India.

- Q.3 Write notes on any two of the following. 08**
- a) Karry Mullis contribution in biotechnology.
  - b) Introduction and objective of Yellow revolution.
  - c) Golden rice production technique and its advantages.
- Q.4 Write notes on any two of the following. 08**
- a) Importance of Medicinal plants in therapeutics.
  - b) Methods and significance of Transgenic cattle.
  - c) Vermitechnology and its importance.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail Active and passive immunity mechanism.
  - b) Give brief note on biotechnology and interdisciplinary scope.

Seat No.	
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**B.Sc. (Biotechnology) (Semester – I) (Old) (CBCS) Examination:  
March/April-2023  
ENGLISH (COMPULSORY)  
Literary Voyage (BT101 / BT20101)**

Day & Date: Tuesday, 18-07-2023  
Time: 09:00 AM To 12:00 PM

Max. Marks: 80

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

**Q.1 A) Choose the correct alternatives from the given options. 10**

- 1) What percentage of the population in India was poverty stricken at the time of the essay?
  - a) one - third
  - b) one - fourth
  - c) one - tenth
  - d) one - sixth
- 2) What is the name of the river island where Payeng began his work?
  - a) Miling
  - b) Mishing
  - c) Malang
  - d) None of these
- 3) The school was attached to \_\_\_\_\_.
  - a) a hospital and the nurses taught them
  - b) a public library and the librarian taught them
  - c) a bigger school and the teachers there taught them
  - d) a temple and the priest of the temple taught them
- 4) The poet is in \_\_\_\_\_ state of mind when he wrote this poem "Let Me Not pray to be sheltered from Dangers"
  - a) a doubtful
  - b) a horrid
  - c) a dangerous
  - d) a confident
- 5) The conflict for the honour of \_\_\_\_\_ between rose and lily.
  - a) as the king of flowers
  - b) the queen of nature
  - c) the queen of flowers
  - d) the stateliest flower
- 6) The boy in the poem "The Toys" is \_\_\_\_\_.
  - a) the speaker of the poem
  - b) a motherless child
  - c) on adamant child
  - d) a naughty little fellow
- 7) The last component of any successful communication is \_\_\_\_\_.
  - a) Receiving
  - b) Decoding
  - c) Acknowledging
  - d) Feedback
- 8) Which of the following is a communication channel?
  - a) Mobile technology
  - b) Zoom conferencing
  - c) Courier service
  - d) All the above
- 9) Please wait \_\_\_\_\_ me \_\_\_\_\_ the bus stop.  
(Use appropriate preposition to complete the sentence)
  - a) for, in
  - b) for, at
  - c) for, with
  - d) at, for

- 10) Green team was \_\_\_\_\_ (numbered) by Blue team [use suitable prefixes with the words]
- |                |                      |
|----------------|----------------------|
| a) unnumbered  | b) out numbered      |
| c) disnumbered | d) none of the Above |

**B) Answer the following questions in one sentence. 06**

- 1) What is the relation between economics and religion in the essay 'The Birth of Khadi'?
- 2) In which year, Jadav Payeng got the country's highest civilian award 'Padma shri'?
- 3) What did the grandmother desire to do on her deathbed?
- 4) In which year Tagore's ground breaking work 'Gitanjali' was published?
- 5) Who sang praises for the flowers in the poem 'The Lotus'?
- 6) What kind of coins did the father discover?

**Q.2 Answer the following questions in brief 30-40 words. (8 out of 12) 16**

- 1) What is the importance of khadi in the context of the freedom struggle?
- 2) How is environmental conservation crucial for the future?
- 3) Draw, a character sketch of 'grandmother' in the essay 'The portrait of a Lady'?
- 4) Discuss the poet's state of mind in the poem. 'Let Me Not pray to be sheltered from Dangers'?
- 5) Write down the summary of poem "The Lotus".
- 6) What is the significance of the toys in the poem?
- 7) Explain Gandhi's talk on religion.
- 8) Draw a character sketch of Jadav Payeng and his grand work.
- 9) What is the significance of sparrows in the story "The Portrait of a Lady"?
- 10) Write a note on the principles of effective communication.
- 11) What is communication? Explain.
- 12) Explain the soft skill 'Intrapersonal skill'

**Q.3 A) Write down the answer of any two of the following. 10**

- 1) How is untouchability related to the essay "The Birth of Khadi"?
- 2) What were some of the problems faced by Jadav?
- 3) What is the significance of the sparrows?

**B) Write short notes 06**

Write down the summary 'The Toys'.

**Q.4 A) Write down the answers of any two of the following. 08**

- 1) What is the receiver's role in the process of communication.
- 2) What are the barriers of communication breakdown?
- 3) Explain the concept of 'Intrapersonal skills'.

**B) Prepare a narrative essay on your first day experience of college. 08**

**Q.5 Write down the answers of any two of the following. 16**

- a) Prepare a descriptive essay on a Local Park.
- b) How would you improve your communication and make it effective?
- c) What is 'message' in a communication process?



- Q.3 Write notes on any two of the following.** **08**
- a) Classification of enzymes
  - b) Glycoproteins and their biological functions
  - c) Source, requirement, Role of: Thiamine pyrophosphate.
- Q.4 Write notes on any two of the following.** **08**
- a) Enzyme specificity: types & theories
  - b) Forces responsible for A and Z DNA
  - c) Starch and glycogen
- Q.5 Answer any one of the following.** **08**
- a) Explain different level of structural organization of proteins.
  - b) Write a note on function and classification of lipids.

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**B.Sc. (Biotechnology) (Semester – I) (Old) (CBCS) Examination:  
March/April-2023  
Metabolism (Paper - II) (BT103)**

Day & Date: Thursday, 20-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple choice questions:**

**08**

- 1) Name the energy source of the brain during starvation?
  - a) Fat
  - b) Protein
  - c) Ketone bodies
  - d) Lipids
- 2) The end product of purine catabolism in man is \_\_\_\_\_.
  - a) Inosine
  - b) Hypoxanthine
  - c) Xanthine
  - d) Uric acid
- 3) The coenzyme required for all transamination is derived from \_\_\_\_\_.
  - a) Pyridoxine (vitamin B6)
  - b) Riboflavin
  - c) Thiamin
  - d) Vitamin B 12
- 4) Where does oxidative phosphorylation take place?
  - a) Ribosomes
  - b) Nucleus
  - c) Mitochondria
  - d) Cell membrane
- 5) Hormones \_\_\_\_\_.
  - a) Act as coenzyme
  - b) Act as enzyme
  - c) Influence synthesis of enzymes
  - d) Belong to B-complex group
- 6) Which substrate is used in the last step of glycolysis?
  - a) Glyceraldehyde 3-phosphate
  - b) Pyruvate
  - c) Phosphoenol pyruvate
  - d) 1, 3-bisphosphoglycerate
- 7) What is lipolysis?
  - a) Hydrolysis of triacylglycerol
  - b) Formation of lipids
  - c) Breakdown of ketone bodies
  - d) Formation of ketone bodies
- 8) Using written convention which one of the following sequences is complimentary to TGGCAGCCT?
  - a) ACCGTCGGA
  - b) ACCGUCGGA
  - c) AGGCTGCCA
  - d) TGGCTCGGA

- Q.2 Answer any four of the following.** **08**
- a) Define glycogenesis.
  - b) Write a short note on nucleotide.
  - c) Write a short note on deamination.
  - d) Draw neat labelled diagram of mitochondria.
  - e) Define hormones.
  - f) Give the examples of purely glucogenic amino acids.
- Q.3 Write short notes on any two of the following** **08**
- a) Mention the sources of purine and pyrimidine synthesis.
  - b) Write a note on regulation of carbohydrate and Proteins by hormones.
  - c) Write a note on glycogenolysis.
- Q.4 Answer any Two of the following.** **08**
- a) Write a note on regulation of glycolysis.
  - b) Write a note on inhibitors and uncouplers.
  - c) Describe in details about transamination with mechanism.
- Q.5 Answer any one of the following** **08**
- a) With neat labelled diagram describe 3D model of ATP synthase complex with ATP generation.
  - b) Describe in details the Kreb's cycle.



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**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS) Examination:  
March/April-2023  
Cell Biology – I (Paper – I) (BT104)**

Day & Date: Friday, 21-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) \_\_\_\_\_ is responsible for starch biosynthesis and storage.
 

a) Tonoplast	b) Amyloplast
c) Cytoplast	d) Elaioplast
- 2) Actin filaments are polymer of \_\_\_\_\_.
 

a) Tubulin dimer	b) Globular actin
c) Albumin	d) Lamin
- 3) Fluid mosaic model of plasma membrane is proposed by \_\_\_\_\_.
 

a) Watson & Crick	b) Singer & Nicholson
c) Jacob & Monad	d) Tatum & Lederberg
- 4) \_\_\_\_\_ is an example of passive transport.
 

a) simple diffusion	b) Na-K pump
c) Proton pump	d) calcium pump
- 5) Packaging of proteins is the function of \_\_\_\_\_.
 

a) RER	b) SER
c) Golgi apparatus	d) Mitochondria
- 6) Lysosomes were first discovered by \_\_\_\_\_.
 

a) Camillo Golgi	b) Christian de Duve
c) Robertson	d) T. H. Morgan
- 7) \_\_\_\_\_ is known as minus end directed microtubule associated motor protein.
 

a) Kinesin	b) Dynein
c) Actin	d) Myosin
- 8) \_\_\_\_\_ is responsible for synthesis of lipids.
 

a) Ribosome	b) Golgi apparatus
c) ER	d) Lysosomes

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

- a) Define cell fractionation.
- b) What are intrinsic proteins?
- c) Enlist functions of cytoskeleton.
- d) Define osmosis.
- e) Enlist functions of RER.
- f) Define centriole.

- Q.3 Write short notes on any two of the following. 08**
- a) Describe structure of typical animal cell.
  - b) Describe structure and function plasma membrane.
  - c) Describe structure and functions of actin filaments.
- Q.4 Answer any two of the following. 08**
- a) Describe structure, types and functions of lysosomes.
  - b) Describe different types of active transport with suitable examples.
  - c) Describe structure and functions of microtubules.
- Q.5 Answer any one of the following. 08**
- a) Describe ultra-structure and function of SER & RER.
  - b) Describe ultra-structure and function of Golgi apparatus.

Seat No.	
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**B.Sc. (Semester – I) (Old) (CBCS) Examination: March/April-2023**  
**BIOTECHNOLOGY (Paper - II)**  
**Cell Biology – II (BT105)**

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

Max. Marks: 40

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

**Q.1 Multiple choice questions:**

**08**

- 1) \_\_\_\_\_ is the site on a ribosome that is occupied by the growing polypeptide chain.
 

a) P site (peptidyl site)	b) A site
c) B site	d) C site
- 2) Beta-oxidation of fatty acids takes place in \_\_\_\_\_.
 

a) Chloroplast	b) Mitochondria
c) Cytoplasm	d) Nucleus
- 3) \_\_\_\_\_ are distinctive structures within the chloroplast formed by the stacking of the thylakoid membranes.
 

a) F1 elements	b) Cytoskeleton
c) Grana	d) Matrix
- 4) \_\_\_\_\_ are holes running through the nuclear envelope that regulate traffic of proteins and nucleic acids between the nucleus and the cytoplasm.
 

a) Nuclear pores	b) Desmosomes
c) Tight junctions	d) Synapses
- 5) \_\_\_\_\_ is the period of the cell division cycle during which the cell divides.
 

a) A phase	b) B phase
c) C phase	d) M phase
- 6) \_\_\_\_\_ type of cell division found in somatic cells.
 

a) Mitosis	b) Meiosis
c) Mutation	d) Transformation
- 7) \_\_\_\_\_ is the cell organelle concerned with aerobic respiration.
 

a) Mitochondrion	b) Nucleus
c) Cytoplasm	d) Chloroplast
- 8) \_\_\_\_\_ are heavily glycosylated proteins that contribute to the extracellular matrix.
 

a) Tubulin	b) Keratin
c) Globulin	d) Proteoglycans

- Q.2 Answer the following questions briefly. (Any Four) 08**
- a) Draw neat labeled ultrastructure of 80s ribosome.
  - b) Define meiosis.
  - c) What is mitochondrial matrix?
  - d) Define chromosomes.
  - e) Define cell synchrony.
  - f) What is cell adhesion?
- Q.3 Write notes on any two of the following 08**
- a) Structure of chromosome
  - b) Function of ribosome
  - c) Extracellular matrix
- Q.4 Write notes on any two of the following 08**
- a) Ultrastructure of chloroplast
  - b) Cell synchrony and its applications
  - c) Carcinogenesis and agents promoting carcinogenesis
- Q.5 Answer any one of the following 08**
- a) Explain in detail cell division by Mitosis.
  - b) Give a detailed account on Structures and functions of mitochondria.

Seat No.	
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**B.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2023**  
**BIOTECHNOLOGY (Paper – I)**  
**Developmental Biology – I (BT106)**

Day & Date: Sunday, 23-07-2023  
 Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Fill in tire blank by choosing correct alternatives.**

**08**

- 1) Spermatogenesis occurs in \_\_\_\_\_ of testis.
  - a) Fallopian tube
  - b) seminiferous tubule
  - c) Ovaries
  - d) Uterus
- 2) After a sperm has penetrated an ovum in the process of fertilization, entry of further sperms is prevented by \_\_\_\_\_.
  - a) condensation of yolk
  - b) development of the vitelline membrane
  - c) formation of the fertilization membrane
  - d) development of the pigment coat
- 3) Spermatogenesis occurs in \_\_\_\_\_ of testis.
  - a) Fallopian tube
  - b) seminiferous tubule
  - c) Ovaries
  - d) uterus
- 4) The nutritive medium for the ejaculated sperms is given by \_\_\_\_\_.
  - a) fallopian tube
  - b) uterine lining
  - c) seminal fluid
  - d) vaginal fluid
- 5) Implantation is the process of \_\_\_\_\_.
  - a) Attachment of blastocyst to the uterine wall
  - b) Egg-movement
  - c) Degeneration of egg
  - d) Egg fertilization
- 6) \_\_\_\_\_ is the solid, compact mass of cells.
  - a) fallopian tube
  - b) uterine lining
  - c) seminal fluid
  - d) vaginal fluid
- 7) The process by which fertilized egg divides is known as \_\_\_\_\_.
  - a) Cleavage
  - b) Oogenesis
  - c) Regeneration
  - d) Invagination
- 8) \_\_\_\_\_ are formed from mesoderm.
  - a) Heart, blood, bones, notochord
  - b) Heart, blood, muscles, liver
  - c) Notochord, blood, liver, muscles
  - d) Liver, heart, bones, blood

- Q.2 Answer the following questions briefly. (any four) 08**
- a) Define the term oogenesis.
  - b) Which steps are included in mechanism of fertilisation?
  - c) What is gastrula?
  - d) What is emboly?
  - e) Give the names of essential and non-essential floral whorls.
  - f) What is the effect of increased temperature on plant growth?
- Q.3 Write notes on any two of the following. 08**
- a) Spermatogenesis.
  - b) Types of eggs on the basis of amount and location of yolk with example.
  - c) Theories of aging.
- Q.4 Write notes on any two of the following 08**
- a) Fate map in early embryo.
  - b) Shoot patterning.
  - c) Effect of claimatric changes on plant development.
- Q.5 Answer any one of the following. 08**
- a) Define fertilisation and describe the process of gastrulation in chick.
  - b) Describe in detail parthenogenesis.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS) Examination:  
March/April-2023 (Paper - II)  
Developmental Biology - II (BT107)**

Day & Date: Monday, 24-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) The process in which the three germ layers form is called \_\_\_\_\_.
  - a) fertilization
  - b) cleavage
  - c) gastrulation
  - d) organogenesis
- 2) Gametogenesis occurs in \_\_\_\_\_.
  - a) gonads
  - b) testis
  - c) ovaries
  - d) stomach
- 3) Egg development without fertilization is known as
  - a) Parthenogenesis
  - b) Metagenesis
  - c) Gametogenesis
  - d) Oogenesis
- 4) \_\_\_\_\_ is an embryonic stage which consists of a solid, compact mass of cells.
  - a) Morula
  - b) Blastula
  - c) Blastocyst
  - d) ICM
- 5) When the first Cleavage furrow divides the Zygote completely into two. it is \_\_\_\_\_.
  - a) Meroblastic cleavage
  - b) Radial cleavage
  - c) Equatorial cleavage
  - d) Holoblastic cleavage
- 6) \_\_\_\_\_ is the characterizes ageing.
  - a) increase in the consumption of oxygen
  - b) increased anabolism
  - c) increased metabolic activity
  - d) decrease in the metabolic activity
- 7) Degenerative changes take place during
  - a) ageing only
  - b) metamorphosis only
  - c) both in ageing and metamorphosis
  - d) parthenogenesis
- 8) \_\_\_\_\_ is formed during gastrulation.
  - a) Gill
  - b) Vitelline membrane
  - c) Heart
  - d) Archenteron

- Q.2 Answer the following questions briefly (any four) 08**
- a) Define the term spermatogenesis.
  - b) What is fertilisation?
  - c) What is epiboly?
  - d) What is blastula?
  - e) Name the genes involved in floral patterning.
  - f) What is the effect of increased CO<sub>2</sub> on plant growth?
- Q.3 Write notes on any two of the following. 08**
- a) Oogenesis.
  - b) Patterns of cleavage with neat labeled diagram.
  - c) Teratogenesis
- Q.4 Write notes on any two of the following. 08**
- a) Types of morphogenetic movement.
  - b) Root patterning.
  - c) Life cycle of *Arabidopsis thaliana*.
- Q.5 Answer any one of the following. 08**
- a) With neat labelled diagram describe the process of gastrulation in chick.
  - b) Describe in detail asexual reproduction.



Seat No.	
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**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS) Examination:  
March/April-2023  
Chemical Science (Paper - I) (BT108)**

Day & Date: Tuesday, 25-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

- Instructions:** 1) All questions are compulsory.  
2) Draw neat diagrams and give equations wherever necessary.  
3) Figures to the right indicate full marks.  
4) Use of non-storage calculator is allowed.

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

- 1) pH of neutral salt is \_\_\_\_\_.
 

a) 4	b) 5
c) 7	d) 10
- 2) The number of unpaired electrons in O<sub>2</sub> molecule is \_\_\_\_\_.
 

a) 0	b) 1
c) 2	d) 3
- 3) The two carbon atoms in acetylene are \_\_\_\_\_.
 

a) Sp <sup>3</sup> hybridized	b) Sp <sup>2</sup> hybridized
c) sp hybridized	d) Unhybridized
- 4) The Henderson Hasselbalch equation explains the relationship between \_\_\_\_\_.
 

a) pH and pOH	b) pH and logK <sub>a</sub>
c) pH and pK <sub>a</sub>	d) pOH and pK <sub>a</sub>
- 5) \_\_\_\_\_ of the following elements has 2 shells, and both are completely filled.
 

a) Helium	b) Neon
c) Calcium	d) Boron
- 6) Methane molecule is \_\_\_\_\_ hybridized.
 

a) sp <sup>2</sup>	b) sp <sup>3</sup>
c) sp <sup>1</sup>	d) sp <sup>4</sup>
- 7) \_\_\_\_\_ is the other name for group 18th elements.
 

a) Noble gases	b) Alkali metals
c) Alkali earth metals	d) Halogens
- 8) \_\_\_\_\_ the molality of a dilute aqueous 0.02 N H<sub>3</sub>PO<sub>4</sub> solution.
 

a) 0.0050	b) 0.0200
c) 0.00330	d) 0.0067

**Q.2 Answer the following. (4 out of 5) 08**

- a) Name any two compounds having equal boiling points.
- b) What were the criteria used by Mendeleev in creating his Periodic Table?
- c) Describe any two characteristics of ideal solution.
- d) What is the effect of temperature on vapour pressure?
- e) Describe noble gas elements.

- Q.3 Write Short Notes. (2 out of 3) 08**
- a) Describe the hybridization in ethane and methane briefly.
  - b) Write a note on activation energy.
  - c) Define dipole moment, give its significance.
- Q.4 Answer the following. (2 out of 3) 08**
- a) Write a note on integrated rate equation for first order reactions.
  - b) Explain in detail osmotic pressure and its measurement.
  - c) Define solution, add a note on types of solution.
- Q.5 Answer any one of the following. 08**
- a) Write the colligative property that is used to identify the molecular mass of macromolecules.
  - b) Write a note on intramolecular forces in biomolecules.

Seat No.	
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**B.Sc. (Biotechnology) (Semester- I) (Old) (CBCS) Examination:  
March/April-2023  
Biophysics (Paper – II) (BT109)**

Day & Date: Wednesday, 26-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

**08**

- 1) \_\_\_\_\_ of the following is not a property of water.
  - a) It can dissolve ionic and polar molecules
  - b) It has a high surface tension
  - c) Hydrogen bonds exist only in the solid state
  - d) The solid state is less dense than the liquid state
- 2) \_\_\_\_\_ of the following ion is a structure breaker.
 

a) $H^+$	b) $F^-$
c) $Na^+$	d) $K^+$
- 3) Protein hydration is very important for \_\_\_\_\_.
  - a) three-dimensional structure and activity
  - b) protein destabilization
  - c) protein denaturation
  - d) protein crystallization
- 4) The entropy of an isolated system can never \_\_\_\_\_.
 

a) decrease	b) increase
c) be zero	d) be understood
- 5) The \_\_\_\_\_ model describes the allosteric transitions of proteins made up of identical subunits.
 

a) SWISS	b) MWC
c) REM	d) DCML
- 6) Hemoglobin has \_\_\_\_\_ binding sites for oxygen.
 

a) Six	b) Five
c) Four	d) Two
- 7) Calorific value of food can be determined by \_\_\_\_\_.
 

a) Haldane oximeter	b) Douglas bag
c) Bomb Calorimeter	d) Gibbs ioniser
- 8) \_\_\_\_\_ of the following is not a hydrophobic material.
 

a) Waxes	b) Fats
c) Oil	d) Sugar

- Q.2 Answer the following questions briefly. (any four) 08**
- a) Hydrophobic interactions
  - b) Secondary Structure of protein
  - c) MWC model
  - d) Anti-cooperative binding
  - e) Concept of free energy
  - f) Concept of Ligand
- Q.3 Write notes on any two of the following 08**
- a) Write a note on physico-chemical properties of water.
  - b) Write a note on the Influence of Ions on water Structure-breaking.
  - c) Write a note on negative entropy change in living system.
- Q.4 Write notes on any two of the following 08**
- a) Explain Scatchard plot
  - b) Describe the interaction between oxygen-hemoglobin binding
  - c) Write a notes on Bomb calorimetry
- Q.5 Answer any one of the following 08**
- a) Define Thermodynamics? Explain Energy generation & energy transfer processes in biochemical reactions.
  - b) Explain the roles of water in maintaining the structure and function of protein.

<b>Seat No.</b>	
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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:  
March/April-2023  
ENGLISH (Comp.)  
Communication Skill (BT1201)**

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

Max. Marks: 40

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

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

- 1) Who according to the author has only one year of schooling?
 

a) John Rockefeller	b) Jay Gould
c) B. Russell	d) Sir Henry
- 2) Rabindranath Tagore won the Nobel Prize for Literature for his book Gitanjali in \_\_\_\_\_.
 

a) 1911	b) 1912
c) 1913	d) 1914
- 3) In the age of Monarchy, who gets manipulated to achieve their own personal interests?
 

a) The People	b) The Ministers
c) The Countries	d) The King
- 4) Who has lynched the lakes?
 

a) The poet	b) Factories
c) Vehicles	d) Humans
- 5) How old is Pope believed to be when he wrote 'Ode on Solitude'?
 

a) 11	b) 13
c) 12	d) 14
- 6) What does the poet wish to hear from the lover in the poem – 'Remember'?
 

a) Marriage plans	b) His work
c) His family	d) Future plans
- 7) Choose the correct synonyms for the word - Dark.
 

a) Dirty	b) Light
c) Gloomy	d) Thought
- 8) Use past tense form in the following sentence.  
We \_\_\_\_\_ (go) to Mumbai last year.
 

a) gone	b) was go
c) went	d) was going

- Q.2 Write the answers in short. (Any Four)** **12**
- a) What opinion does the author have of the education system of his time?
  - b) What is the true sense of freedom?
  - c) Discuss the theme of the poem – ‘Our Earth Will Not Die’ in your words.
  - d) Why is the poet giving so much emphasis on solitude in the poem and what does it mean to him?
  - e) Discuss the tone of compassion used by the poet in the poem - Remember?
  - f) What kind of people can achieve the true essence of freedom?
- Q.3 Answer the following questions. (Any One)** **10**
- a) Write a letter to your father requesting him to send 5000/- as your class trip is going on to visit South India. Mention the details of four tour and places to visit.
  - b) Write a formal letter to your college librarian as you lost your library card. Request him also to issue a duplicate library card to you. Mention all details of yourself like Name, Class, Roll No and how you lost the card.
- Q.4** What is interpersonal intelligence? Write a detailed note on interpersonal intelligence and how to improve them. **10**

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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:  
March/April-2023  
Metabolism (Paper – I) (BT1202)**

Day & Date: Tuesday, 20-06-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

**Q.1 Multiple choice questions.**

**08**

- 1) Nitrogen at position 3 of pyrimidine nucleotide comes from \_\_\_\_\_.
  - a) Glutamine
  - b) Glutamate
  - c) Glycine
  - d) Aspartate
- 2) Glutamine is converted glutamate and NH<sub>4</sub> by \_\_\_\_\_.
  - a) amino transferase
  - b) glutaminase
  - c) Glutamate dehydrogenase
  - d) glutamate hydratase
- 3) \_\_\_\_\_ is the uncoupler of oxidative phosphorylation.
  - a) 2,4 dinitrophenol
  - b) CO
  - c) Cyanide
  - d) H<sub>2</sub>S
- 4) \_\_\_\_\_ has the highest redox potential.
  - a) O<sub>2</sub>
  - b) NAD
  - c) Cyt C
  - d) Cyt a<sub>3</sub>
- 5) \_\_\_\_\_ is the site for electron transport chain.
  - a) outer mitochondrial membrane
  - b) inner mitochondrial membrane
  - c) Matrix
  - d) Inter membrane space
- 6) In \_\_\_\_\_ glucose is converted into pyruvate.
  - a) TCA cycle
  - b) Gluconeogenesis
  - c) Glycolysis
  - d) Glycogenolysis
- 7) Complex I of ETS is also known as \_\_\_\_\_.
  - a) cytochrome oxidase
  - b) cytochrome bc<sub>1</sub> complex
  - c) succinate dehydrogenase complex
  - d) NADH-Q oxidoreductase
- 8) \_\_\_\_\_ is a measure of the degree of randomness or disorder of a system.
  - a) Enthalpy
  - b) Gibbs Free energy
  - c) Entropy (S)
  - d) Conservation energy

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

**08**

- a) Write a note on redox reaction.
- b) Define uncouplers with one example.
- c) What is the energetics of glycolysis?
- d) Give the reaction for conversion of acetyl co-A into malonyl co-A.
- e) Enlist the enzymes involved in urea cycle.
- f) Give the function of aminopterin.

- Q.3 Write short notes on any two of the following. 08**
- a) Enzymatic reactions of gluconeogenesis
  - b) Breakdown of triacylglycerol
  - c) Salvage pathway
- Q.4 Answer any Two of the following. 08**
- a) Write a note on redox potential.
  - b) Give an account on components of electron transport chain.
  - c) Describe biosynthesis of cholesterol.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail  $\beta$ -oxidation of palmitic acid.
  - b) Write a note on enzymatic reaction and regulation of TCA cycle.



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**B.Sc. (Biotechnology) (Semester – II) (New) (CBCS) Examination:  
March/April-2023  
Enzymology (Paper – II) (BT1203)**

Day & Date: Wednesday, 21-06-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

**Q.1 Multiple choice questions:**

**08**

- 1) Oxidation reduction reaction is carried out by \_\_\_\_\_ enzyme.
  - a) Transferase
  - b) Ligase
  - c) Lyase
  - d) Oxidoreductase
- 2) \_\_\_\_\_ Discovered the term enzymes.
  - a) Kuhne
  - b) Pasteur
  - c) Sumner
  - d) Buchner
- 3) A complete catalytically active enzyme with its coenzyme is called \_\_\_\_\_.
  - a) holoenzyme
  - b) apoenzyme
  - c) apoprotein
  - d) cofactor
- 4) \_\_\_\_\_ value is substrate concentration at half-maximal velocity.
  - a) [s]
  - b) [P]
  - c) km
  - d) Vmax
- 5) Lock and key model were proposed by \_\_\_\_\_ in 1890.
  - a) Henri
  - b) Miachelis and Menten
  - c) Emil Fischer
  - d) Daniel Koshland
- 6) The energy required to attain transition state is referred to as \_\_\_\_\_.
  - a) Gibbs free energy
  - b) Activation energy
  - c) Standard free energy change
  - d) pH
- 7) The study of rates of chemical reactions that are catalyzed by enzymes is referred to as \_\_\_\_\_.
  - a) first order reaction kinetics
  - b) zero order reaction kinetics
  - c) chemical kinetics
  - d) enzyme kinetics
- 8) In \_\_\_\_\_ method, the enzyme is bound to a suitable adsorbent material rendering it immobile.
  - a) Adsorption
  - b) Covalent binding
  - c) Entrapment
  - d) Membrane confinement

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

**08**

- 1) Write a note on enzyme active site.
- 2) Define simple enzyme with one example.
- 3) What is the function of transferase enzyme?
- 4) Give the definition of optimum pH.
- 5) Enlist the significance of Km.
- 6) Define isoenzymes.

- Q.3 Write short notes on any two of the following.** **08**
- 1) Isoenzymes of lactate dehydrogenase.
  - 2) Applications of enzyme immobilization.
  - 3) Non-genetic regulation of enzyme activity
- Q.4 Answer any two of the following.** **08**
- 1) Write a note on trivial system of nomenclature and classification.
  - 2) Give an account on Lineweaver Burk plot.
  - 3) Describe allosteric enzymes.
- Q.5 Answer any one of the following** **08**
- 1) Explain in detail Michaelis-Menten equation
  - 2) Write a note on enzyme classification with example.

<b>Seat No.</b>	
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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS)**  
**Examination: March/April-2023**  
**Cell Physiology (Paper - I) (BT1204)**

Day & Date: Thursday, 22-06-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

**08**

- 1) Plasma membrane is act as \_\_\_\_\_.
  - a) Impermeable
  - b) Selectively permeable
  - c) Freely permeable
  - d) Transparent
- 2) \_\_\_\_\_ acts as primary messenger molecule.
  - a) Ca<sup>++</sup>
  - b) IP<sub>3</sub>
  - c) cAMP
  - d) Insulin
- 3) \_\_\_\_\_ in an example of calcium-independent CAM.
  - a) Cadherins
  - b) Selectins
  - c) Integrins
  - d) IgSF CAMs
- 4) \_\_\_\_\_ is described as the directed migration of cells towards a chemoattractant.
  - a) Cell adhesion
  - b) Chemotaxis
  - c) Ligation
  - d) Attraction
- 5) \_\_\_\_\_ is the process by which solutes are moved along a concentration gradient across a cell membrane.
  - a) simple diffusion
  - b) active transport
  - c) Proton pump
  - d) Na-K ATPase pump
- 6) Enterocyte having microvilli meant for \_\_\_\_\_.
  - a) secretion
  - b) excretion
  - c) absorption
  - d) conduction of nerve impulse
- 7) \_\_\_\_\_ is known as communicating junctions.
  - a) gap junctions
  - b) tight junctions
  - c) Zonula occludens
  - d) Zonula adherens
- 8) In \_\_\_\_\_ cell uptakes extracellular material bound to cell surface receptors.
  - a) phagocytosis
  - b) pinocytosis
  - c) receptor mediated endocytosis
  - d) exocytosis

- Q.2 Answers any four of the following. 08**
- a) Define neurotransmitter.
  - b) What signaling molecule?
  - c) What is neuron?
  - d) Define osmosis.
  - e) Enlist functions of ER.
  - f) Define sporulation in bacteria.
- Q.3 Write short notes on any two of the following. 08**
- a) Describe mechanism of nerve impulse transmission.
  - b) Describe process and significance of quorum sensing in bacterial cells.
  - c) Explain structure and functions of cells in digestive system.
- Q.4 Answers any two of the following. 08**
- a) Write about endocytosis with suitable examples.
  - b) Describe various types of active transport mechanisms across cell membrane.
  - c) Write a note on stress response in bacterial cells.
- Q.5 Answers any one of the following. 08**
- a) Describe mechanism of signal transduction with suitable example.
  - b) Write an essay on different types of cell adhesion molecules.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS)  
Examination: March/April-2023**

**Bioinstrumentation (Paper - II) (BT1205)**

Day & Date: Friday, 23-06-2023

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

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

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

**08**

- 1) Southern blotting is also known as \_\_\_\_\_ blotting.
  - a) DNA
  - b) Protein
  - c) RNA
  - d) Lipid
- 2) Chromatography is \_\_\_\_\_ method for separation of compounds.
  - a) Mechanical
  - b) Physical
  - c) Biological
  - d) Chemical
- 3) During autoclave temperature used is \_\_\_\_\_.
  - a) 100 °C
  - b) 90 °C
  - c) 121 °C
  - d) 95 °C
- 4) Wavelength range used for colorimeter is \_\_\_\_\_ To \_\_\_\_\_.
  - a) 100, 200
  - b) 200, 300
  - c) 300, 400
  - d) 400, 700
- 5) pH of Separating gel is \_\_\_\_\_.
  - a) 8.3
  - b) 5.3
  - c) 2.3
  - d) 7.3
- 6) \_\_\_\_\_ fluorescent dye used for detection of nucleic acid during electrophoresis.
  - a) ANS
  - b) EtBr
  - c) CBB
  - d) Riboflavin
- 7) According to beers law light absorbed is directly proportional to \_\_\_\_\_.
  - a) Path length
  - b) Viscosity
  - c) Concentration
  - d) Density
- 8) Biosensors are used in food industry to \_\_\_\_\_.
  - a) detect mustard gas
  - b) determine fatigue
  - c) detect acid alcohol
  - d) sense taste

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

**08**

- a) Define electrophoresis.
- b) Enlist the applications of colorimeter.
- c) Enlist the applications of CT SCAN.
- d) Write a note on immuno blotting.
- e) Define chromatography.
- f) Define Lamberts Law.

- Q.3 Write notes on any two of the following. 08**
- a) Explain western blotting.
  - b) Discuss maintenance of hot air oven.
  - c) Describe TLC.
- Q.4 Write notes on any two of the following 08**
- a) Describe 2-D gel electrophoresis.
  - b) Describe principle of MRI SCAN.
  - c) Give a brief account on thermometric biosensors.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail GM counter.
  - b) Explain instrumentation of visible spectroscopy.

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

Day &amp; Date: Saturday, 01-07-2023

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

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

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

- 1) Cells organize to form \_\_\_\_\_.
  - a) Cellulose
  - b) Organelle
  - c) Tissues
  - d) Organ system
- 2) In \_\_\_\_\_ phase of growth curve, rate of cell division is high as per cell death rate.
  - a) lag
  - b) log
  - c) stationary
  - d) decline
- 3) Transpiration is regulated by the movements of \_\_\_\_\_.
  - a) Parenchyma cells
  - b) Guard cells
  - c) Epithelial cells
  - d) DNA
- 4) Plant tissue are broadly classified as \_\_\_\_\_.
  - a) Meristematic and Permanent tissue
  - b) Simple and Complex tissue
  - c) Xylem and Phloem
  - d) root cell and stem cell
- 5) \_\_\_\_\_ are made up of living cells which are elongated and thick at the corners or edges?
  - a) Collenchyma
  - b) Parenchyma
  - c) Sclerenchyma
  - d) meristematic tissue
- 6) Movements of solvent from high to low concentration is called \_\_\_\_\_.
  - a) osmosis
  - b) imbibition
  - c) diffusion
  - d) evaporation
- 7) The primary site of water absorption is \_\_\_\_\_.
  - a) Phloem
  - b) Xylem
  - c) Shoot
  - d) Root
- 8) \_\_\_\_\_ is site for light reaction of photosynthesis.
  - a) Chloroplast membrane
  - b) Stroma
  - c) Cytoplasm
  - d) Thylakoid membrane

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

- 1) Define photorespiration.
- 2) Define symbiotic nitrogen fixation.
- 3) Define guttation.
- 4) Define vegetative phase of plant life cycle.
- 5) Define macronutrient with example.
- 6) Define triple response.

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

- 1) Explain in detail dorsio-ventral anatomy of leaf.
- 2) Explain in detail role and deficiency symptoms of micronutrient.
- 3) Explain in detail photosystem.

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

- 1) Explain in detail structure and function of plant cell.
- 2) Write note on physiological role and mode of action of gibberellins.
- 3) Explain in detail non-cyclic photophosphorylation.

**08**

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

- 1) Explain in detail shoot and root apical meristem and its histological organization.
- 2) Explain in detail nitrogen fixation, reduction and ammonification in nitrogen metabolism.



Seat  
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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:  
March/April-2023  
Tissue Culture (Paper-II) (BT1207)**

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

Max. Marks: 40

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

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

- 1) Culture freshly prepared from isolated tissue is known as \_\_\_\_\_.
  - a) Organ culture
  - b) Primary culture
  - c) Cell line
  - d) Histotypic Culture
- 2) The following are methods of sterilization except \_\_\_\_\_.
  - a) Dry heat sterilization
  - b) Autoclaving
  - c) Sterilization by filters
  - d) Laminar airflow
- 3) \_\_\_\_\_ is one of the limitations of animal tissue culture.
  - a) Disposal of biohazards is not easy
  - b) Cultured cells are not easy to store
  - c) Both
  - d) None
- 4) Animal tissue culture is \_\_\_\_\_.
  - a) Growth and maintenance of animal cells
  - b) Growth and selling of animal cells
  - c) only maintenance of animal cells
  - d) All
- 5) pH of culture medium is initially controlled by \_\_\_\_\_.
  - a) presence of CO<sub>2</sub>
  - b) presence of bicarbonate buffer
  - c) addition of bases
  - d) None of these
- 6) In animal cell culture, particularly mammalian cell culture, transformation means \_\_\_\_\_.
  - a) uptake of new genetic material
  - b) phenotypic modifications of cells in culture
  - c) both (a) and (b)
  - d) release of genetic information
- 7) In ATC the number of times that the culture has been sub-cultured is called as \_\_\_\_\_.
  - a) Saturation density
  - b) Split ratio
  - c) Generation number
  - d) Passage number
- 8) During the growth of animal cells, it is important to keep cells in \_\_\_\_\_ phase of the growth curve.
  - a) decline
  - b) stationary
  - c) lag
  - d) Log

- Q.2 Answer the following questions briefly. (any four) 08**
- 1) Define cell growth.
  - 2) Define agar.
  - 3) Define secondary cell culture.
  - 4) Define cold trypsinization.
  - 5) Define collagenase.
  - 6) Define plasma.
- Q.3 Write notes on any two of the following. 08**
- 1) Explain in detail CO<sub>2</sub> incubator.
  - 2) Explain in detail physiochemical properties of media.
  - 3) Explain in detail application of animal tissue culture.
- Q.4 Write notes on any two of the following. 08**
- 1) Explain principle working of Laminar air flow.
  - 2) Explain in detail agar gel method.
  - 3) Explain cell line identification by isozyme method.
- Q.5 Answer any one of the following. 08**
- 1) Explain in detail secondary and transformed cell line establishment.
  - 2) Explain in detail methods used for mechanical separation of cell.

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

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

Max. Marks: 40

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

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

- 1) A feature of MS office that saves the document automatically after certain interval is called \_\_\_\_\_.
  - a) Save
  - b) Save As
  - c) Auto Save
  - d) Backup
- 2) Internet is \_\_\_\_\_.
  - a) A worldwide interconnected network of computers which use a common protocol to communicate with one another
  - b) A worldwide network of computers
  - c) An interconnected network of computers
  - d) A local computer network
- 3) The application used for creating presentations \_\_\_\_\_.
  - a) MS Access
  - b) MS Word
  - c) MS Excel
  - d) MS PowerPoint
- 4) The following form \_\_\_\_\_ the computer stores its data in memory.
  - a) Hexadecimal form
  - b) Octal form
  - c) Binary form
  - d) Decimal form
- 5) The \_\_\_\_\_ Unit performs the mathematical operations for CPU.
  - a) Control unit
  - b) ALU
  - c) Storage unit
  - d) Input unit
- 6) The physical components of a computer are called \_\_\_\_\_.
  - a) Software
  - b) Hardware
  - c) ALU
  - d) CPU
- 7) \_\_\_\_\_ is the father of Modern digital computer.
  - a) Charles Newman
  - b) Charles Babbage
  - c) Henry Babbage
  - d) Henry Luce
- 8) \_\_\_\_\_ is an example of pointing device.
  - a) Mouse
  - b) Pointer
  - c) Cursor
  - d) HDMI port

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

- a) Define Hardware and Software.
- b) What is number system in Computer System?
- c) Uses of Microsoft office
- d) Define Computer.
- e) Function of ALU
- f) Function of Central Processing Unit

- Q.3 Solve. (any two) 08**
- a) Internet with its Uses.
  - b) Explain MS-Office PowerPoint.
  - c) Define Operating System. Explain different functions of operating system.
- Q.4 Write note on. (any two) 08**
- a) Write a note on basics of electronic mail, creation and accessing the e-mail?
  - b) Explain Input output devices in detail.
  - c) Explain write a note on History and characteristics of computer?
- Q.5 Answer any one of the following. 08**
- a) What is a MS-Office? Explain the process of creating chart in Excel.
  - b) Explain in detail Computer Organization with suitable diagram?



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

- a) Write and explain parts of table.
- b) Write a short note on measures of dispersion.
- c) Write various areas and scope of Biostatistics in detail.

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

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

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

- a) Find the standard deviation for the following distribution:

11,12,13,14,15,16,17,18,19,20,21.

- b) Calculate the coefficient of correlation between x and y.

x	10	9	8	7	6	5	4	3	2	1
y	6	7	8	4	9	2	1	5	10	3



## SLR-QC-28

8) Fill in the blanks with the past tense forms of the verbs given within the brackets.

'The Mechanic \_\_\_\_\_ (repair) the car.

- a) will repaired
- b) was repaired
- c) repaired
- d) repair

9) The outline of a presentation includes \_\_\_\_\_.

- a) acknowledgment
- b) probable questions
- c) an introduction, body and conclusion
- d) None of the above

10) P.P.T Presentation means \_\_\_\_\_

- a) Power Point Presentation
- b) Power Presentation
- c) Point Power Presentation
- d) None of the above

**B) Answer the following questions in one word/one sentence.**

**06**

- 1) Which sort of person asks troublesome questions in the essay 'Of Discourse'?
- 2) What benefit could be derived from Struggle of youth?
- 3) What kind of people can achieve the true essence of freedom?
- 4) What is described as septic daggers?
- 5) Which literary era did Alexander Pope write it?
- 6) What does the poet wish to hear from the lover?

**Q.2 Answer the following questions in brief. (Eight out of Twelve)**

**16**

- 1) What is author's purpose in discussing discourse?
- 2) What is the relation between education and virtue?
- 3) What kind of people can achieve the true essence of freedom?
- 4) What opinion does the author present to the people in India of that time regarding freedom?
- 5) What are the common factors among men of eminence?
- 6) What is the author's purpose in discussing discourse?
- 7) Discuss and write the theme of the poem "Our Earth Will Not Die"?
- 8) Write down the summary of the poem "Ode on Solitude".
- 9) Discuss the tone of compassion used by the poet in the poem "Remember".
- 10) Write down the process of paneer in milk factory.
- 11) Prepare a presentation on your favourite social worker.
- 12) Write down the importance of the soft skill "Interpersonal intelligence".



## SLR-QC-28

- Q.3 A) Write down the answers of any two briefly. 10**
- 1) Describing the reaching process of Pune to Mahabaleshwar by car.
  - 2) Define and explain the use of power point presentation in today's advanced digital learning school / college.
  - 3) Explain the difference between formal letter and informal letter.
- B) Prepare a presentation on your own college and its facilities. 06**
- Q.4 A) Write down the following answers only any two briefly. 12**
- 1) Read the following advertisement and write a job application letters.

MATOSHREE UMABAI ENGLISH MEDIUM SCHOOL  
Wanted Teacher  
Qualification - M.A. B.Ed  
Experience - Min 1 year  
Interested candidates send CV and application at  
Indiaumabaischool@gmail.com.
  - 3) Explain the soft skill "Interpersonal Intelligence".
  - 4) Write down the process of making pizza. How to make it within 15 minutes.
- B) Explain power point presentation and its importance. 04**
- Q.5 Write down any two of the following. 16**
- a) State three such situations from your professional life when you have felt the following emotions.
    - 1) Mad
    - 2) Sad
    - 3) Glad
  - b) Write down the process of making sugar in factory in your own language.
  - c) Write down the process of reaching the vegetable market in your city from your home.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination:  
March/April-2023  
Mammalian Physiology – I (Paper – I) (BT202)**

Day & Date: Tuesday, 20-06-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

**Q.1 Multiple Choice Questions.**

**08**

- 1) Bile helps in \_\_\_\_\_.
  - a) Digestion of proteins
  - b) Breaking down of nucleic acids
  - c) Emulsification of fats
  - d) Phagocytosis
- 2) Asthma is caused due to inflammation of \_\_\_\_\_.
  - a) bronchi and bronchioles
  - b) alveoli
  - c) trachea
  - d) pharynx
- 3) Which of the following is not correct regarding esophagus?
  - a) Thick
  - b) Long tube
  - c) Passes through neck
  - d) Extends the study
- 4) The study of joints is known as \_\_\_\_\_.
  - a) Archaeology
  - b) Osteology
  - c) Syndesmology
  - d) Arthrology
- 5) Heart beat initiates from \_\_\_\_\_.
  - a) Purkinji fibers
  - b) SA node
  - c) Bundle of HIS
  - d) Auriculo ventricular node
- 6) What type of tissue is cartilage?
  - a) Muscular
  - b) Epithelial
  - c) Connective
  - d) Nervous
- 7) In human being the duration of cardiac cycle is \_\_\_\_\_.
  - a) 0.008 sec
  - b) 0.5 sec
  - c) 0.8 sec
  - d) 8 sec
- 8) What does food provide for us?
  - a) Energy and water
  - b) Energy and organic material
  - c) Energy and nitrogen
  - d) Only energy

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

**08**

- a) Define Peristalsis.
- b) Write a short note on Alveoli.
- c) Write a short note on Pancreatic Juice.
- d) What is tricuspid valve?
- e) Define cardiac output.
- f) Write a short note on Larynx.

- Q.3 Write short note on any two of the following. 08**
- a) How are lipid digested?
  - b) Write a note on cardiac output.
  - c) Give the composition of intestinal juice and bile.
- Q.4 Answer any two of the following. 08**
- a) Explain mechanism of correlation of blood.
  - b) Give schematic representation of Oxygen dissociation curve.
  - c) List out the types of joints in body along with its location.
- Q.5 Answer any one of the following. 08**
- a) Describe in detail about digestion, absorption and assimilation of carbohydrate.
  - b) Describe the process of hematopoiesis, explain in detail about plasma protein along with its role.

Seat  
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**B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination:  
March/April-2023  
Mammalian Physiology - II (Paper - II) (BT203)**

Day & Date: Wednesday, 21-06-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

- 1) \_\_\_\_\_ brings blood towards Bowman's capsule.
  - a) afferent arteriole
  - b) efferent arteriole
  - c) coronary sinus
  - d) coronary vein
- 2) Fishes excrete nitrogenous waste product in the form of \_\_\_\_\_.
  - a) urea
  - b) uric acid
  - c) ammonia
  - d) trimethylamine oxide
- 3) \_\_\_\_\_ is a signaling molecule secreted by a neuron to affect another cell across a synapse.
  - a) hormone
  - b) neurotransmitter
  - c) vitamin
  - d) secondary messenger
- 4) \_\_\_\_\_ cells of islets of Langerhans secrete glucagon hormone.
  - a)  $\alpha$
  - b)  $\delta$
  - c)  $\beta$
  - d)  $\gamma$
- 5) \_\_\_\_\_ cells responsible for secretion of ACTH.
  - a) Thyrotrophs
  - b) Corticotrophs
  - c) Somatotrophs
  - d) Gonadotrophs
- 6) \_\_\_\_\_ receptors responsible for detection of taste.
  - a) Olfactory
  - b) Gustatory
  - c) Somatosensory
  - d) Baroreceptors
- 7) Cushing's disease is caused due to \_\_\_\_\_.
  - a) hyposecretion of thyrocalcitonin
  - b) hyposecretion of TSH
  - c) hypersecretion of TSH
  - d) hypersecretion of ACTH
- 8) \_\_\_\_\_ is hyperglycemic hormone in humans.
  - a) Insulin
  - b) Glucagon
  - c) ADH
  - d) TSH

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

- a) Give structure of Bowman's capsule.
- b) Define ureotelism.
- c) Define neurotransmitter.
- d) Enlist names and functions of steroid hormones.
- e) Write a note on glucagon.
- f) Give account on olfactory receptors.

- Q.3 Write notes on any two of the following. 08**
- a) Explain mechanism of generation and conduction of nerve impulse.
  - b) Describe mechanism of action of insulin hormone.
  - c) Describe structure and function of adenohipophysis.
- Q.4 Write notes on any two of the following. 08**
- a) Explain mechanism of muscle contraction and relaxation.
  - b) Give account on structure and function of thyroid gland.
  - c) Give an account on hyper and hypo secretion of insulin and glucagon.
- Q.5 Answer any one of the following. 08**
- a) Describe structure and function of human eye.
  - b) Describe mechanism of urine formation with neat labeled diagram.



- Q.3 Write short notes on any two of the following. 08**
- a) Describe types of complex permanent tissue.
  - b) Describe Diffusion and Imbibitions'.
  - c) Describe the deficiency of Phosphorus in plant.
- Q.4 Answer any two of the following. 08**
- a) Write detail note on Shoot Apical Meristem.
  - b) Write detail note on Primary Structure of Root.
  - c) Write note on water absorption pathway with diagram.
- Q.5 Answer any one of the following. 08**
- a) Write detail mechanism of stomata opening and closing.
  - b) Describe the detail mechanism of uptake of nutrient.

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**B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS)  
Examination: March/April-2023  
Plant Physiology (Paper - II) (BT205)**

Day & Date: Friday, 23-06-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

**08**

- 1) \_\_\_\_\_ is a system of photoreactions that absorbs maximally far-red light (700 nm), oxidizes plastocyanin and reduces ferredoxin.
  - a) Photosystem I
  - b) Photosystem II
  - c) Phyllotaxy
  - d) Phytate
- 2) \_\_\_\_\_ is the process by which plants use sunlight, water, and carbon dioxide to create oxygen and energy in the form of sugar.
  - a) Respiration
  - b) Photosynthesis
  - c) Transpiration
  - d) Perspiration
- 3) \_\_\_\_\_ is uptake of atmospheric O<sub>2</sub> with a concomitant release of CO<sub>2</sub> by illuminated leaves.
  - a) Photorespiration
  - b) Photosynthesis
  - c) Transpiration
  - d) Perspiration
- 4) \_\_\_\_\_ is the process by which atmospheric nitrogen is converted to ammonia or nitrate.
  - a) Photorespiration
  - b) Photosynthesis
  - c) Transpiration
  - d) Nitrogen Fixation
- 5) \_\_\_\_\_ is a biochemical process for concentrating CO<sub>2</sub> at the carboxylation site of rubisco and found in the family Crassulaceae.
  - a) Crassulacean acid metabolism
  - b) Calvin cycle
  - c) Glycolysis
  - d) C<sub>4</sub> pathway
- 6) \_\_\_\_\_ is the state in which a living seed will not germinate even if all the necessary environmental conditions for growth are met.
  - a) seed dormancy
  - b) seed germination
  - c) growth and development
  - d) Differentiation
- 7) \_\_\_\_\_ is a biological response to the length and timing of day and night, making it possible for an event to occur at a particular time of year.
  - a) Photoperiodism
  - b) seed germination
  - c) growth and development
  - d) Differentiation
- 8) In some species, the cold temperature is a requirement for flowering, the concept is known as \_\_\_\_\_.
  - a) photoperiodism
  - b) Vernalization
  - c) nitrogen fixation
  - d) CAM



- Q.2 Answer the following questions briefly. (any four)** **08**
- a) Differentiate between Photosystem I and Photosystem II.
  - b) What is chlorophyll?
  - c) Define compensation point in plants.
  - d) In which molecular forms is atmospheric nitrogen converted to by the mechanism of nitrogen fixation?
  - e) Enlist plant growth hormones.
  - f) Define seed germination.
- Q.3 Write notes on any two of the following.** **08**
- a) Photosynthesis pigments
  - b) Nitrogen fixation
  - c) Growth curve
- Q.4 Write notes on any two of the following.** **08**
- a) Concept of two photo systems
  - b) Concept of photo-periodism and vernalization
  - c) Photophosphorylation
- Q.5 Answer any one of the following.** **08**
- a) Give a detailed account on Calvin cycle.
  - b) Discuss in detail Physiological role and mode of action-auxins and cytokinins.

Set  
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**B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination:  
March/April-2023  
Computer (Paper – I) (BT206)**

Day & Date: Saturday, 01-07-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

- 1) CPU is the \_\_\_\_\_ of computer.
 

a) Ear	b) Brain
c) Eye	d) Body
- 2) Any computer of computer you can see and touch is \_\_\_\_\_.
 

a) Hardware	b) Software
c) Storage	d) Peripheral
- 3) \_\_\_\_\_ is the chief of Microsoft.
 

a) Babbage	b) Bill Gates
c) Bill Clinton	d) Tim Lee
- 4) RAM stands for \_\_\_\_\_.
 

a) Random Origin Money	b) Random Only Memory
c) Read Only Memory	d) Random Access Memory
- 5) Which of the following is not a binary number?
 

a) 001	b) 101
c) 202	d) 110
- 6) Excel files have a default extension of \_\_\_\_\_.
 

a) Xls	b) Xlw
c) Wk1	d) 123
- 7) You organize files by storing them in \_\_\_\_\_.
 

a) Archives	b) Folders
c) Indexes	d) Lists
- 8) WWW stands for \_\_\_\_\_.
 

a) World Wide Wizard	b) World Wide Web
c) Wide World Web	d) World Wide Wonder

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

- a) What is meant by Database?
- b) Define- Software.
- c) Write types of computer.
- d) Define- browser.
- e) Write examples of input and output devices of system.
- f) What is the function of search engine?

- Q.3 Write short notes on any two of the following. 08**
- 1) Write brief account on introduction and history of computer.
  - 2) Explain types of software with examples.
  - 3) Write and explain computer features and application in details.
- Q.4 Answer any two of the following. 08**
- 1) Write brief account on Computer organization.
  - 2) Write and explain number system with examples.
  - 3) Write brief account on generation of computers.
- Q.5 Answer any one of the following. 08**
- a) Write a brief account on MS-Office and its products.
  - b) Describe in detail operating system with its types.



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

- 1) Explain applications of biostatistics.
- 2) Write a brief account on classification of Measures of central tendency.
- 3) Write various parts of table and its definitions.

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

- 1) Draw histogram from following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students	05	07	10	15	13	10	06

- 2) Calculate mean from the following data:

Marks	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of Students	10	18	20	26	30	28	18

- 3) Find out the median for following data:

Marks	0-10	10-20	20-30	30-40	40-50
Frequency	22	38	46	34	20

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

- 1) Calculate standard deviation and variance for following data:

Wages in Rs.	55-65	65-75	75-85	85-95	95-105	105-115	115-125
No. of Workers	10	12	15	20	14	7	2

- 2) Write brief account on ANOVA.

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Set **P**

**B.Sc. (Biotechnology) (Semester - II) (Old) (CBCS) Examination:  
March/April-2023**

**Animal Tissue Culture (Paper - I) (BT208)**

Day &amp; Date: Monday, 03-07-2023

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

- Instructions:** 1) All questions are compulsory.  
 2) Draw neat diagrams and give equations wherever necessary.  
 3) Figures to the right indicate full marks.  
 4) Use of logarithmic table and calculator is allowed.  
 (At. Wts.: H=1, C=12, O=16, N=14, Na=23, Cl=35.5)

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

- 1) Two important enzymes used for disaggregation of animal tissue are \_\_\_\_\_.  
 a) Trypsin and pectinase                      b) Collagenase and pectinase  
 c) Cellulase and trypsin                      d) Collagenase and trypsin
- 2) Cryopreservation is carried out at the temperature of \_\_\_\_\_.  
 a) -196 °C    b) 196 °C  
 c) -96 °C    d) 96 °C
- 3) Who is regarded as the father of tissue culture?  
 a) Harrison    b) Arnold  
 c) Ross    d) Roux
- 4) Optimum pH required for the growth of mammalian cells is \_\_\_\_\_.  
 a) 5.3-7.0    b) 6.5-7.0  
 c) 7.2-7.4    d) 8.1-8.9
- 5) Which of these is used in raft culture?  
 a) Lens paper                                      b) Rayon acetate sheet  
 c) Both a) and b)                              d) None of these
- 6) Which stain is often added to the cell suspension before viable counting?  
 a) Trypan blue                                      b) Gram stain  
 c) Crystal violet                                      d) Fluorescein
- 7) \_\_\_\_\_ 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) MTT assay                                      d) LDH assay
- 8) Which chemical is used in chemical blockade of cell in M phase for cell synchronization?  
 a) Colchicine                                      b) Aspirin  
 c) Liquid nitrogen                              d) BSS

- Q.2 Answer any four of the following. 08**
- a) Define serum.
  - b) What is cell synchronization?
  - c) Define animal tissue culture.
  - d) Define primary cell culture.
  - e) Define sterilization.
  - f) Write the applications of animal cell culture.
- Q.3 Write short notes on any two of the following. 08**
- a) Flow cytometry
  - b) Serum with its importance in animal tissue culture medium
  - c) Cell counting and monitoring methods
- Q.4 Answer any Two of the following. 08**
- a) Explain the plasma clot technique for organ culture.
  - b) Define trypsinization. Explain the methods Warm trypsinization.
  - c) Explain the methods of Karyotyping and Isozyme patterns used for cell line identification.
- Q.5 Answer any one of the following. 08**
- a) Draw the diagram of animal tissue culture laboratory design and explain about it in brief.
  - b) Explain in detail any two indirect methods of cell determination.

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

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

Max. Marks: 40

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

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

**08**

- 1) \_\_\_\_\_ is the Father of tissue culture.
  - a) Bonner
  - b) Laibach
  - c) Haberlandt
  - d) Gautheret
- 2) The formation of embryoids from the pollen grains in the tissue culture medium is due to \_\_\_\_\_.
  - a) Organogenesis
  - b) Test tube culture
  - c) Double fertilization
  - d) Cellular totipotency
- 3) Synthetic seeds are produced by the encapsulation of somatic embryos with \_\_\_\_\_.
  - a) Sodium acetate
  - b) Sodium nitrate
  - c) Sodium chloride
  - d) Sodium alginate
- 4) \_\_\_\_\_ plant part is free from the attack of the virus.
  - a) Stem
  - b) Root
  - c) Meristem
  - d) Leaves
- 5) \_\_\_\_\_ chemicals are most widely used for protoplast fusion.
  - a) Mannitol
  - b) Polyethylene glycol
  - c) Sorbitol
  - d) Mannol
- 6) \_\_\_\_\_ is function of auxin in tissue culture.
  - a) inducing shoot
  - b) root initiation
  - c) cell death
  - d) seed dormancy
- 7) The most common solidifying agent used in micropropagation is \_\_\_\_\_.
  - a) agar
  - b) dextran
  - c) mannan
  - d) starch
- 8) Cybrids are \_\_\_\_\_.
  - a) nuclear hybrids
  - b) hybrid plants derived from cross pollination
  - c) cytoplasmic hybrids
  - d) cytological hybrids



- Q.2 Answers any FOUR of the following. 08**
- a) Define plant tissue culture.
  - b) Define totipotency.
  - c) Define organogenesis.
  - d) Define transgenic plants.
  - e) Define callus.
  - f) Define haploid plants.
- Q.3 Write short notes on any TWO of the following. 08**
- a) Culture media composition and their significance.
  - b) Define sterilization and explain types of sterilization.
  - c) Somatic embryogenesis.
- Q.4 Write notes on any TWO of the following. 08**
- a) Cell suspension culture and its application.
  - b) Methods in production of hybrid.
  - c) Production and advantages of golden rice transgenic plant.
- Q.5 Answers any ONE of the following. 08**
- a) Explain in detail steps in micropropagation with diagrammatic representation.
  - b) Explain in detail isolation, gene transfer, fusion and culture of protoplast.

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**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS)  
Examination: March/April-2023  
GENETICS - I (BT301)**

Day & Date: Monday, 03-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple choice questions.**

**08**

- 1) In \_\_\_\_\_ the typical Mendelian dihybrid ratio is changed to 9:4:3.
  - a) Complementary gene action
  - b) Supplementary gene action
  - c) Inhibitory gene action
  - d) Mutualistic gene interaction
- 2) B. Ephrussi was first discovered Petite mutants in the \_\_\_\_\_.
  - a) *Arabidopsis thaliana*
  - b) *Saccharomyces cerevisiae*
  - c) *E. coli*
  - d) *Zea mays*
- 3) \_\_\_\_\_ is known as Bleeder disease or Royal disease.
  - a) Hemophilia
  - b) Colorblindness
  - c) Hypertrichosis
  - d) Night blindness
- 4) Transformation naturally found in \_\_\_\_\_.
  - a) *E. coli*
  - b) *Thermus aquaticus*
  - c) *D. pneumoniae*
  - d) *Mycobacterium tuberculosis*
- 5) \_\_\_\_\_ is known as fertility factor and actively involved in conjugation process of bacterial cells.
  - a) 'Ti' plasmids
  - b) 'F' plasmids
  - c) pBR322
  - d) pUC18
- 6) \_\_\_\_\_ discovered the process of transduction in bacteria.
  - a) A. Hershey and M. Chase
  - b) J. Lederberg and E. Tatum
  - c) J. Lederberg and N. Zinder
  - d) Avery, MacLeod and McCarthy
- 7) Extranuclear genes are located on organelles like \_\_\_\_\_.
  - a) lysosomes & chloroplast
  - b) lysosomes & plasmids
  - c) Ribosomes & chloroplast
  - d) mitochondria & chloroplast
- 8) In linkage mapping, the distance between two genes is measured in terms of \_\_\_\_\_.
  - a) Centimorgan
  - b) base pairs
  - c) Metre
  - d) kilo base pairs

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

**08**

- a) Define test cross.
- b) What are X linked genes?
- c) What is red and green colorblindness?
- d) Define supplementary gene action.
- e) Define co-dominance.
- f) Define Complementation test.

- Q.3 Write notes on any two of the following. 08**
- a) Describe mechanism of sex determination in animals with suitable examples.
  - b) Describe process of conjugation in bacteria with neat labeled diagram.
  - c) Explain process of physical and linkage gene mapping.
- Q.4 Write notes on any two of the following. 08**
- a) Write about types and significance of linkage.
  - b) Describe law of independent assortment with suitable example.
  - c) Describe Y linked inheritance with any two suitable examples.
- Q.5 Answer any one of the following. 08**
- a) Describe mechanism of cytoplasmic inheritance with any two suitable examples.
  - b) Write process of specialized transduction in bacteria.

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**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:  
March/April-2023  
Genetics - II (BT302)**

Day & Date: Tuesday, 04-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

**08**

- 1) SINES stand for \_\_\_\_\_.
  - a) Short interspersed Nuclear sequences
  - b) Small interspersed Nuclear sequences
  - c) Small interrelated Nuclear sequences
  - d) Short interrelated Nuclear sequences
- 2) Polytenic structure of the polytene chromosome is caused by the process of \_\_\_\_\_.
  - a) Mitosis
  - b) Endomitosis
  - c) Meiosis
  - d) Polyploidy
- 3) Transposable elements were first discovered by \_\_\_\_\_ in 1958.
  - a) Barbara McClintock
  - b) H.J. Muller
  - c) T.H. Morgan
  - d) G.J. Mendel
- 4) The individuals having one chromosome extra to diploid genome are called \_\_\_\_\_.
  - a) Nullisomy
  - b) Trisomy
  - c) Tetrasomy
  - d) Monosomy
- 5) The "X" Chromosome is placed in \_\_\_\_\_ of the Human Karyotype Analysis.
  - a) Group B
  - b) Group E
  - c) Group C
  - d) Group D
- 6) The proportion of different alleles of a gene present in a mendelian population is \_\_\_\_\_.
  - a) Gene pool
  - b) Gene Frequency
  - c) Genotype Frequency
  - d) Gemetic pool
- 7) \_\_\_\_\_ is considered as sex chromosomal disorder.
  - a) Nightblindness
  - b) Thalassemia
  - c) Turner syndrome
  - d) Down's syndrome
- 8) Traits show continuous variations are referred as \_\_\_\_\_.
  - a) Genetic disorder
  - b) phenotypic variations
  - c) Qualitative traits
  - d) quantitative traits

- Q.2 Answer the following questions briefly. (Any Four) 08**
- a) Define euchromatin.
  - b) What mutagens?
  - c) What is polyploidy?
  - d) Define micro satellite DNA.
  - e) Define Gene pool.
  - f) Define mean.
- Q.3 Write notes on any Two of the following. 08**
- a) Describe multiple factor hypotheses with suitable example.
  - b) Describe structure of X and Y chromosomes.
  - c) Explain structural aberrations in chromosomes.
- Q.4 Write notes on any Two of the following, 08**
- a) Write about mechanism transposition of DNA transposons.
  - b) Describe various factors affecting gene frequency in Mendelian population.
  - c) Describe effect of the environment on quantitative traits.
- Q.5 Answers any One of the following. 08**
- a) Describe numerical aberrations in chromosomes.
  - b) Write process of meiosis with neat labeled diagram.

Seat  
No.

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:  
March/April-2023  
General Microbiology – I (BT303)**

Day & Date: Wednesday, 05-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) Who developed the system of antiseptic surgery?
  - a) Robert Koch
  - b) Louis Pasteur
  - c) Joseph Lister
  - d) Elie Metchnikoff
- 2) Who proposed five kingdom classifications?
  - a) Ernst Haeckel
  - b) Francesco Redi
  - c) R. H. Whittaker
  - d) Robert Hooke
- 3) Edward Jenner introduced vaccination against \_\_\_\_\_.
  - a) Small pox
  - b) Cow pox
  - c) Cholera
  - d) Polio
- 4) Which of the following type of microorganism is photosynthetic?
  - a) Yeast
  - b) Virus
  - c) Helminth
  - d) Algae
- 5) Which of the following is acellular organism?
  - a) Virus
  - b) Bacterium
  - c) Protozoa
  - d) Fungus
- 6) The size and number of bacteria cells are increased in the \_\_\_\_\_.
  - a) Exponential
  - b) Acceleration
  - c) Lag phase
  - d) Stationary Phase
- 7) A slippery outer covering in some bacteria that protects them from phagocytosis by host cell is called as \_\_\_\_\_.
  - a) Cell wall
  - b) Flagella
  - c) Capsule
  - d) Peptidoglycan
- 8) Infectious protein is characteristics of \_\_\_\_\_.
  - a) Satellite viruses
  - b) Viroids
  - c) prions
  - d) Gemini viruses

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

- 1) Write in short contribution of Alexander Fleming and Elie Metchnikoff.
- 2) Define Species, Strain and Taxa.
- 3) Define Viroids and Prions.
- 4) Write in short about Algae and give its examples.
- 5) Give difference between Capsule and Slime layer.
- 6) Write in short about Batch culture.

- Q.3 Write notes on any two of the following. 08**
- 1) Write note on Contribution of Louis Pasteur in Microbiology.
  - 2) Write note on Rule of Bacterial Nomenclature.
  - 3) Write in short Size shape and arrangement in bacteria.
- Q.4 Answer any two of the following. 08**
- 1) Define bacterial Growth and Explain concept of Growth Curve.
  - 2) Explain structure and function of flagella.
  - 3) Give general characteristics of Archaeobacteria.
- Q.5 Answer any one of the following. 08**
- 1) Explain difference between eukaryotic and Prokaryotic organisms.
  - 2) Explain classification of microorganisms on the basis of Carbon and Energy.

Seat  
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**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:  
March/April-2023  
General Microbiology - II (BT304)**

Day & Date: Thursday, 06-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) \_\_\_\_\_ is the mordant used in Gram staining.
  - a) Crystal violet
  - b) Safranin
  - c) Acid- alcohol
  - d) Iodine
- 2) For observation of stained bacteria \_\_\_\_\_ objective of compound microscope is used.
  - a) 4x
  - b) 10x
  - c) 40x
  - d) 100x
- 3) The dye eosinate of methylene blue belongs to which group?
  - a) Acidic dye
  - b) Basic dye
  - c) Neutral dye
  - d) Oxazine dye
- 4) Which of the following is used as a solidifying agent for media?
  - a) Beef extract
  - b) Peptone
  - c) Agar
  - d) Yeast extract
- 5) Production of acetoin is detected by \_\_\_\_\_ test.
  - a) Indol
  - b) Methyl Red
  - c) Voges Prauskaeur
  - d) Citrate
- 6) Which of the following is a rich source of B vitamins?
  - a) Peptone
  - b) Yeast extract
  - c) Beef extract
  - d) Agar
- 7) In pour-plate method, the medium should be maintained at what temperature?
  - a) 37 degree C
  - b) 67 degree C
  - c) 45 degree C
  - d) 0 degree C
- 8) Nichrome loop wire is used in which of the following techniques?
  - a) Pour-plate
  - b) Streak-plate
  - c) Spread-plate
  - d) Roll-tube technique

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

- a) Write in short about objective and condenser of compound microscope.
- b) Define natural media and synthetic media with one example.
- c) Define lyophilisation and give its importance.
- d) Write in short about the negative staining.
- e) Explain starch hydrolysis test.
- f) Give difference between dye and stain.



- Q.3 Write notes on any two of the following.** **08**
- a) Explain principle and working of Compound microscope.
  - b) Write note on various components of microbial media.
  - c) Explain standard plate count of bacteria.
- Q.4 Attempt any two of the following.** **08**
- a) Explain mechanism of simple staining.
  - b) Explain IMViC test.
  - c) Explain maintenance and preservation of pure culture.
- Q.5 Answer any one of the following.** **08**
- a) Describe in detail about the different methods of isolation of bacteria.
  - b) Explain mechanism of gram staining.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination –  
March/April – 2023  
Plant Biotechnology - I (BT305)**

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

Max. Marks: 80

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

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

- 1) The temperature of the autoclave for sterilization of glasswares is maintained at \_\_\_\_\_ °C.
 

a) 37	b) 27
c) 121	d) 4
- 2) \_\_\_\_\_ is the development or improvement of cultivars using conservatives tools for manipulating the plant genome within the natural genetic boundaries of the species.
 

a) Conventional plant breeding	b) Plant Tissue Culture
c) Plant Development	d) Plant Biotechnology
- 3) Growing cells, tissues, plant organs, or whole plants in nutrient medium, under aseptic conditions is called as \_\_\_\_\_.
 

a) Contamination	b) Culture
c) Storage	d) Transport
- 4) Interference of microorganisms, which may inhibit the growth of cells or tissues in culture is called as \_\_\_\_\_.
 

a) Necrosis	b) Apoptosis
c) Chlorosis	d) Contamination
- 5) Culture of embryos excised from immature or mature seeds is known as \_\_\_\_\_.
 

a) Micropropagation	b) Callusing
c) Embryo culture	d) Sterilization
- 6) An unorganized proliferatives mass of cells is known as \_\_\_\_\_.
 

a) Organ	b) Meristem
c) Shoot	d) Callus
- 7) \_\_\_\_\_ is the development of plants from male gametophytes.
 

a) Protoplast culture	b) Androgenesis
c) Micropropagation	d) Callus culture
- 8) \_\_\_\_\_ is the technique of creating beneficial environmental conditions for plants or crops, along with automation.
 

a) Greenhouse Technology	b) Plant Tissue Culture
c) Algal culture	d) Mushroom technology

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

- 1) What is sterilization?
- 2) Which instruments are commonly used in Tissue Culture laboratory?
- 3) What is embryo rescue?

- 4) Define anther culture.
- 5) Differentiate between androgenesis and gynogenesis.
- 6) What is thawing?

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

- 1) Advantages and disadvantages of conventional plant breeding and plant tissue culture.
- 2) Anther culture
- 3) Types of Greenhouse Based on Shape.

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

- 1) Embryo Culture
- 2) Slow Growth Method of germplasm storage
- 3) Gynogenic Haploids

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

- 1) Give a detailed account on cryopreservation.
- 2) Discuss basic techniques in Plant Tissue Culture.



- Q.2 Answer the following questions briefly (any Four):** **08**
- 1) Define microinjection.
  - 2) Explain virulence genes with an example.
  - 3) What are hairy roots?
  - 4) Define Biofertilizers.
  - 5) Explain characteristic features of Golden Rice.
  - 6) Define edible vaccines.
- Q.3 Write notes on any Two of the following.** **08**
- 1) Bt cotton
  - 2) Single Cell Proteins
  - 3) Direct method of gene transfer - Particle bombardment
- Q.4 Write notes on any Two of the following.** **08**
- 1) Plant cell culture for production of secondary metabolites.
  - 2) Biocontrol of phytopathogens.
  - 3) Crop improvement, productivity, performance and fortification of agricultural product - Bt brinjal.
- Q.5 Answer any One of the following.** **08**
- 1) Explain Mechanism of DNA transfer in Agrobacterium mediated gene transfer.
  - 2) Give a detailed account on Biofertilizers.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
March/April-2023  
Molecular Biology (PAPER - I) (BT401)**

Day & Date: Monday, 19-06-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple choice question.**

**08**

- 1) One helical turn of B-DNA comprises \_\_\_\_\_ bp.
  - a) 10
  - b) 11
  - c) 9
  - d) 12
- 2) Watson and Crick proposed double helical structure of DNA on the basis of \_\_\_\_\_ images.
  - a) Radiographic
  - b) X-ray crystallographic
  - c) Fluorescent
  - d) Electron microscopic
- 3) \_\_\_\_\_ termination codon is known as ochre.
  - a) UGA
  - b) UAG
  - c) AUG
  - d) UAA
- 4) \_\_\_\_\_ removes of positive supercoils formed ahead of replication fork.
  - a) DNA primase
  - b) Topoisomerases
  - c) DNA helicase
  - d) FEN1 endonuclease
- 5) \_\_\_\_\_ act as replicase in prokaryotic DNA replication.
  - a) DNA Polymerase I
  - b) DNA Polymerase II
  - c) DNA Polymerase III
  - d) DNA Polymerase IV
- 6) Mitochondrial DNA is replicated by \_\_\_\_\_.
  - a) DNA Polymerase  $\alpha$
  - b) DNA Polymerase  $\beta$
  - c) DNA Polymerase  $\gamma$
  - d) DNA Polymerase  $\delta$
- 7) *Xeroderma pigmentosum* patients have defective \_\_\_\_\_ pathway.
  - a) BER
  - b) NER
  - c) Mismatch repair
  - d) SOS repair
- 8) \_\_\_\_\_ enzyme removes thymine dimers in photoreactivation repair pathway.
  - a) DNA Glycosylase
  - b) Photolyase
  - c) DNA methylase
  - d) FEN1 endonuclease

- Q.2 Answer any four of the following. 08**
- a) Define nucleoside.
  - b) Define DNA topology.
  - c) What are RNA primers?
  - d) Enlist DNA polymerases in prokaryotes.
  - e) Define homologous recombination.
  - f) Write a note on replisome.
- Q.3 Write short notes on any two of the following. 08**
- a) Describe Watson and Crick model of DNA.
  - b) Describe structure of tRNA.
  - c) Explain organization of DNA in viruses.
- Q.4 Answer any two of the following. 08**
- a) Explain different types of DNA damage with suitable examples.
  - b) Give properties of genetic code.
  - c) Rolling circle model of DNA replication.
- Q.5 Answer any one of the following. 08**
- a) Explain mechanism of DNA replication in eukaryotes.
  - b) Describe mechanism of BER and NER pathway with neat labeled diagram.





- Q.3 Write short notes on any two of the following.** **08**
- a) Write a detail note on Post translational modifications.
  - b) Add a note on Trp operon.
  - c) Discuss in detail about mRNA transport.
- Q.4 Answer any two of the following.** **08**
- a) Define Operon and add a note on Lac operon.
  - b) Write a note on Translation in prokaryotes.
  - c) Add a note on Auxin Signal Transduction and Regulation.
- Q.5 Answer any One of the following.** **08**
- a) Define Transcription and add a detailed note on Eukaryotic transcription.
  - b) What is spliceosome machinery and explain splicing pathway?



- 8) \_\_\_\_\_ is an effector T cell (usually CD8) that can mediate the lysis of target cells bearing antigenic peptides complexed with a class I MHC molecule.
- a) Helper T cells
  - b) Cytotoxic T lymphocytes
  - c) Macrophages
  - d) B cells

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

- a) Define hematopoiesis.
- b) Write in brief about Macrophage.
- c) Define innate immunity.
- d) What are complement proteins?
- e) What is an immunoglobulin?
- f) Explain adjuvant.

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

- a) Mucus membrane
- b) Natural Killer Cells
- c) Properties of cytokines

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

- a) Programmed Cell Death
- b) Immunogenicity
- c) Basic structure of an immunoglobulin

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

- a) Explain in detail - structure and functions of class I MHC molecule.
- b) Give a detailed account on structure and functions of spleen.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS)  
Examination: March/April-2023  
Immunology (Paper - II) (BT404)**

Day & Date: Thursday, 22-06-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

**08**

- 1) \_\_\_\_\_ is a disease caused by HIV that is marked by significant depletion of CD4+ T cells and that results in increased susceptibility to a variety of opportunistic infections and cancers.
  - a) SCID
  - b) AIDS
  - c) Corona
  - d) Monkey pox
- 2) \_\_\_\_\_ is an immediate type I hypersensitivity reaction, which is triggered by IgE-mediated mast cell degranulation.
  - a) Anaphylaxis
  - b) Prophylaxis
  - c) SLE
  - d) RA
- 3) \_\_\_\_\_ is an abnormal immune response against self antigens.
  - a) Innate immunity
  - b) Native immunity
  - c) Acquired immunity
  - d) Autoimmunity
- 4) \_\_\_\_\_ is an antibody that aggregates a soluble antigen, forming a macromolecular complex that yields a visible precipitate.
  - a) Precipitin
  - b) Epitope
  - c) Antigenic determinant
  - d) Immunogen
- 5) Maturation of B-lymphocytes occurs in \_\_\_\_\_.
  - a) Bone marrow
  - b) Thymus
  - c) GI tract
  - d) Lymph node
- 6) \_\_\_\_\_ is an antibody class that serves importantly as a receptor on naive B cells.
  - a) IgA
  - b) IgB
  - c) IgC
  - d) IgD
- 7) \_\_\_\_\_ assay uses of an enzyme-linked antibody and a substrate for quantitating either antibody or antigen.
  - a) ELISA
  - b) Immunofluorescence
  - c) Radioimmunoassay
  - d) Immunodiffusion
- 8) Exaggerated immune response that causes damage to the individual is termed as \_\_\_\_\_.
  - a) Autoimmunity
  - b) Tolerance
  - c) Hypersensitivity
  - d) Hypertension

- Q.2 Answer the following questions briefly. (any four) 08**
- a) What is thymus-dependent antigen?
  - b) By which pathway is Exogenous antigen processed?
  - c) Define autoimmunity.
  - d) Differentiate between active and passive immunization.
  - e) What is radioimmunoassay?
  - f) Explain in brief any two Nonspecific immunity to Bacteria.
- Q.3 Write notes on any two of the following. 08**
- a) Primary and secondary immune response
  - b) T cell – maturation
  - c) Hemolytic autoimmunity
- Q.4 Write notes on any two of the following. 08**
- a) Live attenuated vaccine.
  - b) Principles of antigen-antibody interaction
  - c) Nonspecific immunity to virus.
- Q.5 Answer any one of the following. 08**
- a) Give a detailed account on ELISA.
  - b) Explain in detail Processing of Exogenous Antigens - The Endocytic Pathway.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS)  
Examination: March/April-2023  
Animal Biotechnology (Paper - I) (BT405)**

Day & Date: Friday, 23-06-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

**08**

- 1) Spaces In Between Cells, Filled With \_\_\_\_\_.
  - a) Extra cellular Matrix
  - b) Serum
  - c) Blood
  - d) Muscles
- 2) Ca<sup>2+</sup> Dependent Cell -Cell Adhesion molecule is \_\_\_\_\_.
  - a) Collagen
  - b) Cadherins
  - c) Cytoskeleton
  - d) Actin
- 3) A colorimetric assay for viable cells has been developed by using \_\_\_\_\_.
  - a) CTT
  - b) GTT
  - c) MTT
  - d) None of these
- 4) Embryonic stem cell isolated from blastula are \_\_\_\_\_.
  - a) Pluripotent
  - b) Multipotent
  - c) Oligopotent
  - d) Totipotent
- 5) Primary cell culture is established from \_\_\_\_\_.
  - a) Secondary cell culture
  - b) Cell line
  - c) Cryopreserved cell line
  - d) Excised Tissue
- 6) The technique in which fertilization carried, outside of the mammalian body is called \_\_\_\_\_.
  - a) *In vivo* fertilization
  - b) *In vitro* fertilization
  - c) Embryo transfer
  - d) *Ex vivo* fertilization
- 7) The Retro viral Mediated Gene Transfer is responsible to develop \_\_\_\_\_.
  - a) Transgenic
  - b) Totipotent
  - c) Knockout
  - d) Chimeric
- 8) The is \_\_\_\_\_ a legally binding global protocol that seeks to contribute to ensuring the safe transfer, handling and use of living modified organisms (LMOs).
  - a) Environment release protocol
  - b) GLP protocol
  - c) Cartagena Protocol on Biosafety
  - d) Institution level protocol

- Q.2 Answer the any four of the following. 08**
- a) Animal cell culture
  - b) Cell line
  - c) Adult stem cells
  - d) *In vitro* Fertilization
  - e) GLP and GMP
  - f) Transgenesis
- Q.3 Write short note on any two of the following. 08**
- a) Add a note on establishment of primary cell culture.
  - b) Write about Genetical manipulation of animal by recombinant retroviral method.
  - c) Add a note on Embryonic stem cells.
- Q.4 Answer any two of the following. 08**
- a) Explain role of embryo transfer techniques in conservation biology.
  - b) Describe Genetical manipulation of animal by Pronuclear microinjection method.
  - c) Write about Cell-Cell Adhesion molecule.
- Q.5 Answer any one of the following. 08**
- a) Describe *In vitro* Fertilization.
  - b) Explain use of genetical modified organism and their release in environment.

<b>Set No.</b>	
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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
March/April-2023  
Animal Biotechnology (PAPER-II) (BT406)**

Day & Date: Saturday, 01-07-2023  
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

**Q.1 Multiple Choice Questions.**

**08**

- 1) Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as \_\_\_\_\_.
  - a) transgenic animals
  - b) animals
  - c) infected animals
  - d) Bt animals
- 2) Theileriosis is a disease caused by a species of Theileria which is \_\_\_\_\_.
  - a) Nerve borne parasite
  - b) Digestive system parasite
  - c) A blood borne parasite
  - d) Skin parasite
- 3) \_\_\_\_\_ disease is called as Transboundary animal disease (TAD).
  - a) Theileriosis
  - b) Foot and Mouth
  - c) Bacterial
  - d) Bird flu
- 4) 95% transgenic animals are \_\_\_\_\_.
  - a) sheep
  - b) rabbits
  - c) pigs
  - d) mice
- 5) \_\_\_\_\_ is inventor of gene therapy.
  - a) French Anderson
  - b) G. Mendel
  - c) Morgan
  - d) Robertson
- 6) \_\_\_\_\_ cell line is used for the production of polio vaccine.
  - a) Liver cell line
  - b) Embryonic cell line
  - c) Primate kidney cell line
  - d) Endothelial cell line
- 7) Monoclonal antibody technology is also known as \_\_\_\_\_.
  - a) Fusion technology
  - b) Antigen- antibody reaction technology
  - c) Myeloma technology
  - d) Hybridoma technology
- 8) \_\_\_\_\_ is the first transgenic cow.
  - a) Dolly
  - b) Rosie
  - c) Rubi
  - d) Noori

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

**08**

- 1) Vectors in gene therapy
- 2) Gene therapy
- 3) Monoclonal antibodies
- 4) Bioethics
- 5) Cell culture
- 6) Cloning



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

- 1) Add a note on Transgenic Sheep.
- 2) Explain importance of biotechnology in Foot and mouth disease.
- 3) Add a note on pharmaceutical products produced from mammalian cells.

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

- 1) Add a note on Transgenic Bird.
- 2) Write about Bioethics related with use of animals for research and testing.
- 3) Explain importance of biotechnology in Trypanosomiasis.

**08**

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

- 1) Explain in detail about transgenic mice model for tacking human disease.
- 2) Describe Use of gene therapy to prevent, treat or cure disease.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
March/April-2023  
ENGLISH  
Business English (BT501)**

Day & Date: Sunday, 02-07-2023  
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 Rewrite the sentence by filling the blanks with the correct answer from the given options. 08**

- 1) What did Jim sell to buy a gift for Della?
  - a) His old house
  - b) His motorbike
  - c) Wedding ring
  - d) Heirloom watch
- 2) What did Phatik lose?
  - a) Cycle
  - b) Pocket
  - c) School text book
  - d) Shoes
- 3) The story 'The Homecoming' ends with \_\_\_\_\_.
  - a) Phatik's death from illness
  - b) Phatik's death in an accident
  - c) Phatik's birth in the hospital
  - d) Phatik's arriving to his village
- 4) What did the poet in 'The Solitary Reaper' carry in his heart?
  - a) The beauty of the Tiger
  - b) The boy's beauty
  - c) The girl's song
  - d) The necklace
- 5) Who snatched the Queen's mirror in 'The Queen's Rival'?
  - a) Her son
  - b) Her daughter
  - c) The King
  - d) The father
- 6) What did the schoolmaster in the poem 'The Village Schoolmaster' love?
  - a) Religious books
  - b) Debate
  - c) Learning
  - d) Gossiping
- 7) The gate \_\_\_\_ by the watchman.
  - a) had opened
  - b) was opened
  - c) opened
  - d) has opened
- 8) It is not easy \_\_\_\_\_ the meeting.
  - a) to get rid off
  - b) to tie up
  - c) to send off
  - d) to call off

**Q.2 Write answer in short. (Any 4 out of 6) 12**

- 1) Why was Della sad in the beginning of the story 'The Gift of the Magi'?
- 2) How did Phatik feel arriving at the uncle's house?
- 3) Describe the Reaper in the poem 'The Solitary Reaper'.
- 4) Why is the Queen unsatisfied in 'The Queen's Rival'?
- 5) Describe the character of Schoolmaster in the poem 'The Village Schoolmaster'.
- 6) Where did Della go to buy Jim's gift?

**Q.3 Answer any One of following.** **10**

1) What are the benefits of 21<sup>st</sup> century technology?

**OR**

2) Write a detailed note on learning and literacy skills.

**Q.4 Describe in detail the four C's. in your own words.** **10**

Seat  
No.

**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
March/April-2023  
Bioprocess Technology (BT502)**

Day & Date: Monday, 03-07-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

- Q.1 A) Multiple choice questions. 10**
- 1) Sparger in stirred tank bioreactor helps in \_\_\_\_\_.
    - a) Better sterility
    - b) Measuring temperature of medium
    - c) Proper mixing of medium
    - d) Proper gas distribution
  - 2) The term biomass most often refers to \_\_\_\_\_.
    - a) Inorganic matter
    - b) Organic matter
    - c) Chemicals
    - d) Ammonium compounds
  - 3) The Continuous culture is a/an \_\_\_\_\_ culture system.
    - a) Open
    - b) Closed
    - c) Isolated
    - d) Semi-closed
  - 4) Which Growth phase is usually longer in continuous culture?
    - a) Log
    - b) Exponential
    - c) Stationary
    - d) Death
  - 5) A common filter medium is the cloth filter generally made of \_\_\_\_\_.
    - a) canvas
    - b) synthetic fabrics
    - c) metal or glass fiber
    - d) all of these
  - 6) What are primary metabolites?
    - a) Synthesized during primary phase of cell growth
    - b) Synthesized during secondary phase of cell growth
    - c) Synthesized during death phase of cell growth
    - d) Synthesized during growth phase of cell
  - 7) Which of the following is an upstream process?
    - a) Product recovery
    - b) Product purification
    - c) Media formulation
    - d) Cell lysis
  - 8) Which of the following is not a product of fermentation?
    - a) Oxygen
    - b) Carbon dioxide
    - c) Ethanol
    - d) Lactate
  - 9) Anaerobic respiration by yeast produces \_\_\_\_\_.
    - a) CO<sub>2</sub>
    - b) Wine and Beer
    - c) Alcohol
    - d) All of the above

- 10) The physical and chemical methods are the type of which of the following treatment?
- a) Quaternary
  - b) Primary
  - c) Secondary
  - d) Tertiary

**B) Answer in One sentence.****06**

- 1) What is Chronological study.
- 2) Give one example of microbial biomass.
- 3) What is Inoculum media?
- 4) Give one example of single cell protein.
- 5) Mention any one use of recombinant technology in fermentation.
- 6) What is downstream processing.

**Q.2 Solve any eight of the following.****16**

- 1) With suitable example explain what is bioreactor?
- 2) What is growth kinetics?
- 3) Give any two examples of microbial enzymes.
- 4) What is fermentation media?
- 5) Name any two-purification technique used in bioprocess technology.
- 6) What is transformation?
- 7) Explain growth curve.
- 8) What is effluent; give any one example of industrial effluent?
- 9) Write any two use of lactic acid.
- 10) Draw a neat labeled diagram of bubble column reactor.

**Q.3 A) Attempt any Two of the following.****10**

- 1) Discuss in detail about design and operation of airlift bioreactor.
- 2) Explain about types of microbial culture.
- 3) Explain in detail about ethanol production.

**B) Attempt the following.****06**

- 1) Add a short note on basic principle components of fermenter.
- 2) Add a note on downstream processing.

**Q.4 A) Attempt any two of the following.****08**

- 1) Discuss in detail about principle of upstream processing.
- 2) Explain in detail about amylase production.
- 3) Add a brief note on sterilization of media.

**B) Attempt the following.****08**

Describe the use of Computer application in fermentation process control.

**Q.5 Attempt any two of the following.****16**

- a) Discuss the construction of photo bioreactor and their application in production processes?
- b) Discuss in detail about batch culture with mathematical expression.
- c) Describe the role of inoculum and fermentation media in bioprocess technology with suitable example.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
March/April-2023  
Recombinant DNA Technology (BT503)**

Day & Date: Tuesday, 04-07-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

**Q.1 A) Choose the correct alternatives from the options. 10**

- 1) In the restriction endonuclease *EcoRI*, letter R is used for \_\_\_\_\_.  
a) restriction endonuclease      b) strain  
c) order of identification      d) genus or species of organism
- 2) Thymidine kinase is a \_\_\_\_\_ enzyme.  
a) decarboxyl      b) polymerase  
c) phosphotransferase      d) dehydrating
- 3) Cosmids are plasmids that incorporate a segment of \_\_\_\_\_ DNA.  
a) bacteriophage  $\sigma$       b) bacteriophage  $\beta$   
c) bacteriophage  $\mu$       d) bacteriophage  $\lambda$
- 4) At the University of California \_\_\_\_\_ cloning venvor are created.  
a) pBR      b) pUC  
c) pMB      d) pRB
- 5) DNA as well as RNA are normally visualized from agarose gel by staining with \_\_\_\_\_.  
a) ethidium bromide      b) methylene blue  
c) methyl red      d) malachite green
- 6) \_\_\_\_\_ is the genetically engineered insulin.  
a) H-insulin      b) Rumulin  
c) Humulin      d) R-insulin
- 7) In the colony hybridization technique, colonies from the master plate are initially transferred to \_\_\_\_\_.  
a) nitrocellulose filter paper      b) agarose gel  
c) SDS gel      d) Replica plate
- 8) Polymerase used for PCR is extracted from \_\_\_\_\_.  
a) *Escherichia coli*      b) *Homo sapiens*  
c) *Saccharomyces cerevisiae*      d) *Thermus aquaticus*

- 9) The chain termination PCR is used for \_\_\_\_\_ DNA sequencing method.
- |                  |            |
|------------------|------------|
| a) Maxam-Gilbert | b) Sanger  |
| c) Edmans        | d) Pasteur |
- 10) \_\_\_\_\_ has discovered the method of site directed mutagenesis.
- |                    |                 |
|--------------------|-----------------|
| a) Bostein Shortle | b) Craik        |
| c) Grait           | d) Joller Smith |

**B) Fill in the blanks with suitable answer. 06**

- 1) DNA polymerase enzyme is required for \_\_\_\_\_.
- 2) In the cloning vector pBR, letter p stands for \_\_\_\_\_.
- 3) Proteins are blotted using the \_\_\_\_\_ blotting technique.
- 4) The PCR technique was developed by \_\_\_\_\_.
- 5) Colony hybridization is a method of \_\_\_\_\_ bacterial colonies with desired genes.
- 6) Creation of mutant proteins with novel properties is called \_\_\_\_\_.

**Q.2 Answer the followings (Any Eight): 16**

- a) What is ligase?
- b) What is shuttle vector?
- c) What is transduction?
- d) What is immunological screening?
- e) What is reverse transcription?
- f) What is mutation?
- g) What is senescence?
- h) What is chimeric protein?
- i) What is probe?
- j) What is bioreactor?

**Q.3 A) Answer the following. (Any two): 10**

- 1) Explain in brief various enzymes used in rDNA technology with example.
- 2) Write in brief any two DNA transfer techniques.
- 3) Describe in brief principle and applications of Polymerase chain reaction.

**B) Write short note on Site directed mutagenesis. 06**

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

- 1) Write in short genetic engineering of vaccines.
- 2) Describe in brief Gene shuffling.
- 3) Explain yeast vectors.

**B) Explain in detail molecular markers. 08**

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

**16**

- a)** Describe in detail any two vectors used in rDNA technology with example.
- b)** Explain in detail any two Screening methods for selection of recombinants.
- c)** Write in detail on any one method of DNA sequencing.





- B) Definition. 06**
- 1) Genscan
  - 2) Boolean operators
  - 3) Phylip
  - 4) Accession Number
  - 5) FASTA
  - 6) Consensus sequence
- Q.2 Solve any eight of the following. 16**
- a) What is Algorithms? Explain Needleman-Wunsch algorithm.
  - b) Describe the Scope and applications of bioinformatic.
  - c) What is ENTREZ? Mention its applications in Bioinformatics.
  - d) Describe PubMed and PubMed Central in brief.
  - e) What are alignments? Mention its significance in sequence analysis.
  - f) What is Maximum Likelihood? Mention its importance in phylogenetic analysis.
  - g) What is GRAVY? Mention its significance.
  - h) What is Pfam? Write its importance in protein classification.
  - i) What is INSDC? Describe its collaborators.
  - j) What is NBRF? Mention its role.
- Q.3 A) Attempt any two of the following. 10**
- 1) Write a note on Ensembl Genomic database.
  - 2) Write a note on Bibliographic databases -PubMed and, PubMed central.
  - 3) Write a note on Global and Local alignments.
- B) Write a short note on protein secondary structure prediction. 06**
- Q.4 A) Attempt any Two of the following. 08**
- 1) Write a note on NCBI and ENTREZ.
  - 2) Describe structure classification databases.
  - 3) Explain multiple alignments tools and applications.
- B) Describe Primary Protein sequence databases. 08**
- Q.5 Attempt any Two of the following. 16**
- a) What is database? Explain the principle nucleic acid sequence database.
  - b) What is phylogeny? Explain the construction of phylogenetic tree using MEGA with parts of phylogeny.
  - c) What is homology? Explain the steps involved in homology modeling of protein using SwissModel.

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**B.Sc. (Biotechnology) (Sem - V) (New) (CBCS) Examination:  
March/April-2023  
Intellectual Property Rights (BT505)**

Day & Date: Thursday, 06-07-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

**Q.1 A) Multiple choice questions.**

**10**

- 1) In IPR \_\_\_\_\_ means the invention shall not be apparent to a person ordinarily skilled in the field relating to the invention.
 

a) Novelty	b) Commercial value
c) Nonobviousness	d) Obviousness
- 2) In IPR, \_\_\_\_\_ is a first requirement for a patent claim to be patentable.
 

a) Patents	b) Copyright
c) Trademarks	d) Novelty
- 3) \_\_\_\_\_ is adopted in Geneva, Switzerland, in 1952 for protection of copyrights.
 

a) Universal Copyright Convention	b) Patent Co-operation Treaty
c) TRIPS Agreement	d) Intellectual Property Rights: Paris Convention
- 4) \_\_\_\_\_ of the following is not a type of patenting.
 

a) Utility Patent	b) Design Patent
c) Plant Patent	d) Water
- 5) \_\_\_\_\_ is the action of breaking the terms of a law, agreement, etc.
 

a) File	b) Withdraw
c) Infringement	d) Surrender
- 6) \_\_\_\_\_ is a type of intellectual property consisting of a recognizable sign, design, or expression that identifies products or services from a particular source and distinguishes them from others.
 

a) Copyright	b) Trademark
c) Trade secrets	d) Geographical indications
- 7) \_\_\_\_\_ is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin.
 

a) Copyright	b) Trademark
c) Trade secrets	d) Geographical indications
- 8) \_\_\_\_\_ consist of the customary rights of farmers to save, use, exchange and sell farm-saved seed and propagating material.
 

a) Farmers' Rights	b) Constitutional Rights
c) Public offense	d) Sportsmen's rights

- 9) Full form of WIPO \_\_\_\_\_.
- World International Plant Organization
  - Wild Indian Predators Occupancy
  - World Health Organization
  - World Intellectual Property Organization
- 10) \_\_\_\_\_ patent is a form of utility patent that covers methods of changing the functionality or characteristics of a material during a particular use.
- Process
  - Product
  - Patentability criteria
  - Pharmaceutical product

**B) Write the definition of the following. 06**

- Copyright
- Patent
- Intellectual Property Rights
- Trade secrets
- Product patent
- Design patent

**Q.2 Solve any Eight of the following. 16**

- Write advantages and disadvantages of PBR.
- What is the TRIPS Agreement, 1994?
- Explain the trademark with an example.
- What is GI tagging?
- Which are non-patentable inventions?
- What do you mean by PBR?
- What is Surrender in IPR?
- What is Revocation of IPR?
- Explain Berne Convention 1886.
- Explain the Patentability criteria.

**Q.3 a) Attempt any Two of the following. 10**

- Discuss advantages and disadvantages of IPR.
- Explain Rights of patentee.
- Write about the Patent Co-operation Treaty, 1970.

**b) Write a short note on Farmers' rights and Discuss procedure for its registration. 06**

**Q.4 a) Attempt any Two of the following. 08**

- Grounds for opposition Working of Patents.
- Procedure for granting a patent and obtaining patents in India.
- Plant variety protection in India.

**b) Write in detail on Types of patenting. 08**

**Q.5 Attempt any Two of the following. 16**

- Discuss IPRs Policy, Novelty, Utility Inventiveness / Non-obviousness.
- Discuss Genesis and development - IPR abroad and add a note on TRIPS Agreement, 1994.
- Discuss Pharmaceutical product and process patent.

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**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination:  
March/April-2023  
ENGLISH**

**Literary Mindscapes – I (BT601)**

Day & Date: Monday, 19-06-2023  
Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

**Q.1 Choose the correct word /Phrase from the given options and complete the sentence. 08**

- 1) Aksionov lived as a convict in Siberian prison for \_\_\_\_\_ years.
 

a) twenty six	b) twenty two
c) twenty	d) thirty two
- 2) Mrs. Quick was associated with the \_\_\_\_\_.
 

a) Welfare Committee	b) Old age Home
c) Orphanage	d) Rotary Club
- 3) \_\_\_\_\_ is not a dream says John Keats in the poem 'Ode to Blindness'.
 

a) illusions	b) ambition
c) life	d) goal
- 4) 'My Last Duchess' is based on historical events involving the \_\_\_\_\_.
 

a) Duke of Ferrara	b) Duke of Syberia
c) Robert Browning	d) Ezra Pound
- 5) \_\_\_\_\_ was found by Robert which was left by his wife.
 

a) money	b) note
c) ticket	d) wallet
- 6) The \_\_\_\_\_ of nature helps in strengthening the bond between nature and human beings.
 

a) cruelty	b) greenery
c) beauty	d) ugliness
- 7) The little lamb followed Mary everywhere. (Choose the type of adverb)
 

a) adverb of time	b) adverb of manner
c) adverb of place	d) adverb of frequency
- 8) He said to her, "What a Cold day!"
 

a) He told her that it was a Cold day.
b) He exclaimed that it was a Cold day.
c) He exclaimed Sorrowfully that it was a Cold day.
d) He claimed that it was a very Cold day.

**Q.2 Write answers in short (Any Four)**

**12**

- 1) What did Robert Quick expect from his daughter's after returning from the business trip?
- 2) What did Makar Semyonich want from Aksionov?
- 3) Why the mother feels sad while narrating the story of Sita?

- 4) What are the things of beauty mentioned in the poem?
- 5) What is the poem 'My Last Duchess' about?
- 6) How does Charlotte Bronte ask her readers to look towards life?

**Q.3 Answer any One of the following Questions. 10**

- 1) How can technology literacy Skills help learners in the future?
- 2) What life skills are needed to become a good leader?

**Q.4 As a Sensitive human being, what measures do you to take to conserve the environment and how will you educate people about the importance of environment? 10**

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**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination:  
March/April-2023  
Bio-Analytical Tools (BT602)**

Day & Date: Tuesday, 20-06-2023  
Time: 03:00 PM To 6:00 PM

Max. Marks: 80

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

**Q.1 A) Multiple choice question.****10**

- 1) Classical p H meter in chemical or clinical laboratory is made with a glass electrode that is selectively sensitive to \_\_\_\_\_ concentration?
  - a) Na<sup>+</sup>
  - b) K<sup>+</sup>
  - c) H<sup>+</sup>
  - d) OH<sup>-</sup>
- 2) Calibration should be performed with at least \_\_\_\_\_ buffers that span of range of p H to be measured.
  - a) One
  - b) Two
  - c) Three
  - d) Four
- 3) Na<sub>2</sub>CO<sub>3</sub>. 10 H<sub>2</sub>O is known as \_\_\_\_\_.
  - a) Baking soda
  - b) Baking powder
  - c) Washing soda
  - d) Bleaching powder
- 4) Farmers neutralize the effect of acidity on soil by adding \_\_\_\_\_.
  - a) Slaked lime
  - b) Gypsum
  - c) Caustic soda
  - d) Baking soda
- 5) In chromatography, the stationary phase can \_\_\_\_\_ be supported on a solid.
  - a) Solid or liquid
  - b) Solid only
  - c) Liquid or gas
  - d) Liquid only
- 6) Gas chromatography can be performed in which of the following way?
  - a) Only in column
  - b) Only on plane surface
  - c) Either in column or on plan surface
  - d) Neither in column nor on plane surface
- 7) Differential centrifugation is based on the differences in \_\_\_\_\_ of biological particles different sizes.
  - a) Density only
  - b) Sedimentation rate
  - c) Mass
  - d) None of the above
- 8) Which type of vapor is stored in mercury lamp?
  - a) Mercury vapor
  - b) Hydrogen vapor
  - c) Xe vapor
  - d) Ozone vapor
- 9) Diffraction grating consists of a \_\_\_\_\_.
  - a) Glass
  - b) Quartz
  - c) Alkyl halide
  - d) All of the above
- 10) Ion exchange chromatography is used for the separation of \_\_\_\_\_.
  - a) Polar molecules
  - b) Non polar molecules
  - c) Both of above
  - d) None of above

- B) Answer in One sentence. 06**
- 1) What are Acids?
  - 2) State the principle of vibrational spectrophotometer.
  - 3) What is the principle of chromatography?
  - 4) Name the polymer used in affinity chromatography.
  - 5) Dot- Blot represents which blot method?
  - 6) What is HRP?
- Q.2 Solve any eight of the following. 16**
- a) Draw a neat labeled diagram of p H glass electrode.
  - b) What is Nephelometer? Mention any one use of Nephelometer.
  - c) Draw a neat labeled diagram of Calorimeter.
  - d) Discuss any two uses of turbidometer.
  - e) What is the function of monochromator in spectrophotometer?
  - f) Mention any two use of Infra red spectrophotometer.
  - g) What is the application of ultracentrifuge?
  - h) Discuss the steps of Northern blotting.
  - i) What is Counter immune-electrophoresis?
  - j) State any two application of chromatography.
- Q.3 A) Attempt any two of the following. 10**
- 1) State the Beer-Lamberts law, with suitable example and application.
  - 2) What is the principle of autoradiography; mention its use in biotechnology.
  - 3) Add a comment on differential-centrifugation.
- B) Attempt the following. 06**
- 1) Discuss in short about p H indicators.
  - 2) Add a short note on applications of electrophoresis.
  - 3) Add a short note on applications of centrifugation.
- Q.4 A) Attempt any Two of the following. 08**
- 1) Explain working of Southern blotting.
  - 2) Add a brief note on Column chromatography.
  - 3) What is Dot-Blot technique?
- B) Attempt the following. 08**
- Describe the principle and working of UV- Visible spectrophotometer.
- Q.5 Attempt any Two of the following. 16**
- a) Add a brief note of thin layer chromatography and its application.
  - b) Discuss the principle, instrument and application of Gas chromatography.
  - c) Discuss in detail about native and SDS PAGE electrophoresis its application.





- B) Fill in the blanks/Definition/One sentences answer/one word answer/Give the name/predict the product etc.** **06**
- 1) Who is considered father of Genomics?
  - 2) Name the stain used for separated protein detection in PAGE.
  - 3) Full form of MALDI-TOF.
  - 4) Molecular taxonomy.
  - 5) Name the model plant widely used for genome study.
  - 6) Is Plasmodium falciparum a bacteria or protozoan?

**Q.2 Solve any Eight of the following.** **16**

- a) Define Contiguous DNA sequence.
- b) Define genome sequencing.
- c) Write about the ENCODE project.
- d) Write a note on function of SDS used in SDS-PAGE.
- e) Define Genomics.
- f) Write applications of proteomics in glycobiology.
- g) What is Hemophilia?
- h) Which macromolecules are used for phylogenetic analysis?
- i) Define Proteomics.
- j) Define DNA world.

**Q.3 a) Attempt any Two of the following.** **10**

- 1) Analysis of Human genome.
- 2) Write a note on origin of macromolecules.
- 3) Write about the Human Genome Project.

**b) Short note/Solve.** **06**

Describe Whole Genome Shot-Gun Sequencing.

**Q.4 a) Attempt any Two of the following.** **08**

- 1) Draw a neat and labeled diagram of 2D-PAGE. Write any two applications of 2D-PAGE.
- 2) Describe genetic diversity with its importance.
- 3) Write a note on HapMap project.

**b) Describe/Explain/Solve.** **08**

Describe in detail- Applications of Genomics and Proteomics analysis.

**Q.5 Attempt any Two of the following.** **16**

- a) Describe in detail molecular diagnosis of Sickle cell anemia.
- b) Write a note on RNA world hypothesis.
- c) Describe in detail 2-DE gel electrophoresis coupled with mass spectroscopy.

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Set **P**

**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination:  
March/April-2023  
Evolutionary Biology (BT604)**

Day & Date: Thursday, 22-06-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) All questions are compulsory.  
2) Figures to the right indicate full marks.  
3) Draw neat labelled diagrams wherever necessary.  
4) Use of log table and calculators is allowed.

**Q.1 A) Choose the correct alternatives from the options. 10**

- 1) Paleontologist speculated that of all the organisms that ever lived on earth only \_\_\_\_\_ % are still alive.
  - a) 1
  - b) 20
  - c) 50
  - d) 90
- 2) Radiocarbon dating can help to find the age range of biological specimens no older than \_\_\_\_\_.
  - a) 50,000years
  - b) 100000 years
  - c) 500000years
  - d) 1000000 years
- 3) The major center of distribution and origin of ores is \_\_\_\_\_.
  - a) North America
  - b) Asia
  - c) Europe
  - d) Japan
- 4) Equiscabalus is a \_\_\_\_\_.
  - a) White horse
  - b) wild horse
  - c) Ass
  - d) donkey
- 5) The last common ancestor of human is \_\_\_\_\_.
  - a) Pan troglodytes
  - b) homo neanderthalensis
  - c) lemuroided
  - d) Dromalosourus
- 6) When did dinosaurs die off?
  - a) 105.1 million years
  - b) 65.5million years
  - c) 75.5 million years
  - d) none of the above
- 7) The oldest mineral discovered so far was \_\_\_\_\_ which dates back to 4.4 billion years.
  - a) Iron
  - b) Zircon
  - c) Cadmium
  - d) Silicon
- 8) Australopithecus was also known as \_\_\_\_\_.
  - a) First ape man
  - b) first human
  - c) human baby
  - d) Humanoid
- 9) The primary focus of population genetics is \_\_\_\_\_.
  - a) Science
  - b) species creation
  - c) genetic variation
  - d) genetic drift



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Set P

**B.Sc. (Biotechnology) (Semester -VI) (New) (CBCS) Examination:  
March/April-2023  
Environmental Biotechnology (BT605)**

Day & Date: Friday, 23-06-2023  
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) All questions are compulsory.  
2) Draw neat labelled diagrams wherever necessary.  
3) Figures to right indicate full marks.  
4) Use of log table and calculators is allowed.

**Q.1 A) Multiple choice questions.****10**

- 1) Deforestation may reduce the chance of \_\_\_\_\_.  
a) Frequent landslides                      b) Erosion of soil  
c) Rainfall                                      d) Frequent cyclones
- 2) Soil erosion can be prevented by \_\_\_\_\_.  
a) Afforestation                              b) Overgrazing  
c) Increasing birds population      d) Removal of vegetation
- 3) Which of the following is the cleanest fossil fuel?  
a) Natural gas                              b) Petrol  
c) Petroleum                                  d) Coal
- 4) A process using microbes to convert toxic industrial waste to less toxic or non-toxic compound is called \_\_\_\_\_.  
a) Precipitation                              b) Complement fixation  
c) Bioconvention                              d) Bioremediation
- 5) The bioremediation process involve the uses of plants to degrade pollutants is \_\_\_\_\_.  
a) Compositing                              b) Biopile  
c) Phytoremediation                          d) Land farming
- 6) Which of the following is most common bacteria used for bioleaching?  
a) *Spirillum*                                  b) Coccus  
c) *Bacillus*                                      d) *Streptococcus*
- 7) Microbialcatalyzed redox reaction leads to metal \_\_\_\_\_.  
a) Mobilization                              b) Immobilization  
c) Reduction                                  d) Oxidation
- 8) Radioactivity is a form of \_\_\_\_\_.  
a) Water pollution                          b) Air pollution  
c) Environmental pollution                  d) Noise pollution
- 9) When did the environment protection act come into force?  
a) 01 April 1986                              b) 01 March 1986  
c) 01 May 1986                                d) 19 November 1986
- 10) Which of the following Gases is not included in Biogas?  
a) Methane                                      b) Hydrogen sulfide  
c) Carbon dioxide                          d) Water Vapour

**B) Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc. 06**

- 1) Fire wood
- 2) Mycoremediation
- 3) Cyanobacteria
- 4) Full form of EPA
- 5) Kerostene
- 6) Nucler waste

**Q.2 Solve any Eight of the following. 16**

- 1) Coal and gas
- 2) Heavy metals
- 3) Parafin wax
- 4) Fungal biofertilizer
- 5) Biofertilizer
- 6) Define bioleaching
- 7) Examples of petrolium products
- 8) Corn starch
- 9) Azospirillum
- 10) Bioremdiation of lignin

**Q.3 A) Attempt any Two of the following. 10**

- 1) Write a note on microbial hydrogen production.
- 2) Write a note on copper bioleaching.
- 3) Role of fungal and algal biofertilizer.

**B) Short note/Solve. 06**

Define bioleaching and micro-organisms used in bioleaching.

**Q.4 A) Attempt any Two of the following. 08**

- 1) Write a note on treatment of municipal waste water.
- 2) Describe brief on production of biogas.
- 3) Write a role of symbiotic nitrogen fixing bacteria in the enrichment of soil.

**B) Describe/Explain/Solve. 08**

Concept of bioremediation and importance of bioremediation.

**Q.5 Attempt any Two of the following. 16**

- a) Describe in detail agriculture and food industry waste to produce alcohol & gasohol.
- b) Describe in detail methods of treatment of industrial effluents.
- c) Describe in detail genetically modified microbes, plants and animals.