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Set	P
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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
ENGLISH (Compulsory)  
Literary Voyage**

Day & Date: Monday, 23-01-2023  
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 alternatives from the options. 08**

- 1) What has been at the back of every speech Gandhiji delivered?
  - a) Abstinence
  - b) Religion
  - c) Teetotalism
  - d) Missionaries
- 2) How did Khushvant Singh travel to school in the city?
  - a) Car
  - b) On foot
  - c) Bicycle
  - d) Motor bus
- 3) What does R. Tagore desire not to be sheltered from?
  - a) Love
  - b) Compassion
  - c) Dangers
  - d) Cowardice
- 4) Which flowers competed for the title in 'The Lotus'?
  - a) Lily and Daisy
  - b) Rose and Daisy
  - c) Lily and Rose
  - d) Rose and Tulips
- 5) In the word 'Powerless' the element '-less' is an example of \_\_\_\_\_.
  - a) suffix
  - b) prefix
  - c) fix
  - d) fixing
- 6) The word that denotes action is termed as \_\_\_\_\_.
  - a) pronoun
  - b) adjective
  - c) adverb
  - d) verb
- 7) In the word 'Unhappy' the element 'Un-' is an example of a \_\_\_\_\_.
  - a) prefix
  - b) suffix
  - c) both a and b
  - d) none of the above
- 8) I like to read novels. The underlined word in this sentence is \_\_\_\_\_.
  - a) a verb
  - b) an adverb
  - c) noun
  - d) an article

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

- a) What is the message given in the poem 'Let Me Not Pray to be Sheltered from Dangers'?
- b) What is the subject matter of the poem 'The Lotus'?
- c) What did the father see in his child's bedroom in the poem 'The Toys'?
- d) Why did Gandhiji want to promote Khadi?
- e) What is the significance of the title of the poem 'The Toys'?
- f) Comment on the nature of the grandmother in the story 'The portrait of a'

Lady'.

## **SLR-FY-1**

- Q.3 Answer the following question. (Any one)** **10**
- a)** Define the word communication and state the components of the communication.
  - b)** Write in detail about the channels of communication.
- Q.4** Discuss the intrapersonal skills and the strategies to improve them. **10**

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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
CHEMISTRY (Paper - I)**

Day & Date: Tuesday, 24-01-2023  
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 & rewrite the sentences. 08**

- 1) \_\_\_\_\_ is not the property of ionic bond.
  - a) loss of electrons
  - b) gain of electrons
  - c) sharing of electrons
  - d) transfer of electrons
- 2) \_\_\_\_\_ type of hybridization is present in CH<sub>4</sub> molecule.
  - a) SP
  - b) SP<sup>2</sup>
  - c) SP<sup>3</sup>
  - d) SP<sup>4</sup>
- 3) Amino acids are joined by \_\_\_\_\_ bond proteins.
  - a) glycosidic
  - b) peptide
  - c) phosphodiester
  - d) ester
- 4) If osmotic pressure of sucrose solution is higher than that of urea solution, the sucrose solution is \_\_\_\_\_ to urea solution.
  - a) hypertonic
  - b) hypotonic
  - c) isotonic
  - d) similar
- 5) In \_\_\_\_\_ order reaction, the rate of reaction is independent of the concentration of the reactants.
  - a) second
  - b) first
  - c) zero
  - d) pseudo first
- 6) In the following bond angle corresponds to SP<sup>2</sup> hybridization is \_\_\_\_\_.
  - a) 90°
  - b) 120°
  - c) 180°
  - d) 109°
- 7) \_\_\_\_\_ Law indicates the relationship between solubility of a gas in liquid and pressure.
  - a) Raoult's
  - b) Henry's
  - c) Lowering of vapour pressure
  - d) Vent Hoff
- 8) Debye is the unit of \_\_\_\_\_.
  - a) charge
  - b) mass
  - c) dipole moment
  - d) dielectric constant

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

- a) Define Chemical bond.
- b) Explain Atomic structure.
- c) Concept of pH.
- d) Define Solution.
- e) What is Hybridization in chemistry?
- f) Define Dipole Moment.

- Q.3 Answer the following questions. (Any Two)** **08**
- a) Explain  $SP^2$  hybridization with example.
  - b) Explain Covalent bond formation with suitable example.
  - c) What is Solvent? Explain in detail Colligative properties?
- Q.4 Write note on. (Any Two)** **08**
- a) Describe Chemical Kinetics with integrated rate expressions?
  - b) Explain Solubility with their factors affecting solubility and advantages.
  - c) Write a note on Glycosidic linkage.
- Q.5 Answer of the following questions. (Any One)** **08**
- a) Derive an expression for Henderson-Hasselbalch equation to calculate pH of the solution.
  - b) Describe different types of Chemical bonds. Add a note on bonds in biomolecules.

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
BIOCHEMISTRY (Paper - II)**

Day & Date: Wednesday, 25-01-2023  
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 non-storage calculator is allowed.

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

08

- 1) \_\_\_\_\_ is sulfur containing amino acid.

a) Glycine	b) Methionine
c) Proline	d) Alanine
- 2) \_\_\_\_\_ is non reducing sugar.

a) Sucrose	b) Glucose
c) Fructose	d) Ribose
- 3) \_\_\_\_\_ is example of water-soluble vitamins.

a) Vitamin A	b) Vitamin D
c) Vitamin E	d) Vitamin B
- 4) Primary structure of protein is stabilized by \_\_\_\_\_.

a) Peptide bond	b) Hydrogen bond
c) Hydrophobic bond	d) Vanderwalls forces
- 5) Monomer unit of starch is \_\_\_\_\_.

a) glucose	b) fructose
c) ribose	d) erythrose
- 6) Peptidoglycan is made up of \_\_\_\_\_.

a) Carbohydrate	b) Vitamin
c) Lipids	d) Protein
- 7) The number of carbon atoms in cholesterol structure is \_\_\_\_\_.

a) 17	b) 19
c) 27	d) 30
- 8) In Nucleic acid structure, the molecule with sugar, nitrogenous base and phosphate group is known as \_\_\_\_\_.

a) Nucleoside	b) Nucleotide
c) Histone	d) Polypeptide

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

08

- Draw the structure of sucrose.
- Write a note on essential amino acids.
- Write a note on peptide bond.
- Give an account on phospholipids.
- Describe composition of nucleotides.

- Q.3 Write short notes. (Any Two)** **08**
- a) Give an account on source, daily requirement and physiological role of vitamin A and D.
  - b) Explain in detail structure and properties of fatty acids.
  - c) Describe protein classification based on composition.
- Q.4 Answer of the following questions. (Any Two)** **08**
- a) Write a note on properties and function of disaccharides.
  - b) Give an account on amino acid classification based on R group.
  - c) Write a note on starch and glycogen.
- Q.5 Answer of the following questions. (Any One)** **08**
- a) Explain in detail primary, secondary, tertiary and quaternary structure of proteins.
  - b) Write a note on B form of DNA with neat labelled diagram.

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
BIOPHYSICS (Paper - I)**

Day & Date: Friday, 27-01-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

**08**

- 1) \_\_\_\_\_ interactions are important for the folding of proteins.
  - a) Hydrophobic
  - b) Hydrophilic
  - c) Molecular
  - d) Non molecular
- 2) The H-O-H bond angle in a water molecule is about \_\_\_\_\_.
  - a) 90°
  - b) 105°
  - c) 135°
  - d) 165°
- 3) \_\_\_\_\_ dissolve in water.
  - a) Honey
  - b) Soap
  - c) Vinegar
  - d) Turpentine
- 4) \_\_\_\_\_ is the alternate name of water.
  - a) Azide
  - b) Dihydrogen Oxide
  - c) Hydroxide
  - d) Oxidane
- 5) Energy is measured in \_\_\_\_\_ units.
  - a) Joule
  - b) Kelvin
  - c) Pascal
  - d) Mol
- 6) If a liquid crystallizes into a solid, entropy will be \_\_\_\_\_.
  - a) increases
  - b) decreases
  - c) zero
  - d) same
- 7) A bomb calorimeter is used to calculate the heat of reaction at a constant \_\_\_\_\_.
  - a) temperature
  - b) pressure
  - c) volume
  - d) weight
- 8) The specific heat of a material can be determined by \_\_\_\_\_.
  - a) manometers
  - b) barometers
  - c) anemometer
  - d) calorimetry

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

**08**

- a) Write a note on molecular structure.
- b) Write a note on role of water in structure breaking.
- c) Define free energy.
- d) Write a note on negative entropy.
- e) Define cooperative binding.

- Q.3 Write short notes. (Any Two)** **08**
- a) Explain association of water through H-bonding.
  - b) Discuss in detail influence of ions on water as structure breaking.
  - c) Describe in detail involvement of Bound Water in Catalytic Action.
- Q.4 Write notes on. (Any Two)** **08**
- a) Describe binding of small molecules by polymer.
  - b) Describe Sequential model.
  - c) Give a brief account on structures of protein ligand complexes.
- Q.5 Answer the following questions. (Any One)** **08**
- a) Explain energy generation & energy transfer processes in biochemical reactions.
  - b) Explain in detail energetics & dynamics of binding.



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Day & Date: Saturday, 28-01-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

08

- 1) Monomeric subunits of microtubules are \_\_\_\_\_.  
a) Tubulin dimer  
b) Globular actin  
c) Keratin  
d) Lamin
- 2) In eukaryotes plasma membrane is act as \_\_\_\_\_ barrier.  
a) impermeable  
b) selectively permeable  
c) freely permeable  
d) transparent
- 3) \_\_\_\_\_ genes responsible for causing cancer.  
a) Proto-oncogenes  
b) Oncogenes  
c) Tumor suppressor  
d) Luxury genes
- 4) Mitochondria are known as \_\_\_\_\_ of the cell.  
a) protein factory  
b) suicide bags  
c) heart  
d) power house
- 5) In eukaryotes, DNA replication is carried out in \_\_\_\_\_ phase.  
a) M  
b) S  
c) G1  
d) G2
- 6) The function of proteasome is \_\_\_\_\_.  
a) protein degradation  
b) localization proteins in different compartments of the cell  
c) protein synthesis  
d) prevention of degradation of proteins
- 7) The free radicals produced in the cells are removed by \_\_\_\_\_.  
a) Ribosomes  
b) Peroxisomes  
c) Mitochondria  
d) Lysosomes
- 8) \_\_\_\_\_ play important role in the execution of apoptosis.  
a) Apoptosome  
b) Orisome  
c) Primosome  
d) Replisome

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

08

- Define cell theory.
- Define genome.
- Enlist types of plastids.
- Define cell growth.
- Define carcinogenesis

- Q.3 Write short notes. (Any Two)** **08**
- a) Give different types of chromosomes.
  - b) Explain properties of cancer cell.
  - c) Describe mitosis with neat labeled diagram.
- Q.4 Answer the following questions. (Any Two)** **08**
- a) Describe structure and function of microtubules with neat labeled diagram.
  - b) Explain structure and function of plasma membrane with neat labeled diagram.
  - c) Describe structure typical prokaryotic cell with neat labeled diagram.
- Q.5 Answer the following questions. (Any One)** **08**
- a) Describe structure and function of nucleus with neat labeled diagram.
  - b) Describe mechanism of apoptosis with neat labeled diagram.

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
ANIMAL PHYSIOLOGY (Paper - I)**

Day & Date: Monday, 30-01-2023  
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.  
(At. Wts.: H=1, C=12, O=16, N=14, Na=23, Cl=35.5)

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

- 1) Chymosin is also known as \_\_\_\_\_.  
a) Rennin  
b) Trypsin  
c) Lipase  
d) Amylase
- 2) The exchange of gases between the external environment and the lungs \_\_\_\_\_.  
a) Cellular Respiration  
b) Respiration  
c) External Respiration  
d) Internal Respiration
- 3) The duct of Bartholin is linked with \_\_\_\_\_.  
a) maxillary glands  
b) infraorbital glands  
c) sublingual glands  
d) parotid glands
- 4) Pacemaker is \_\_\_\_\_.  
a) SA node  
b) AV node  
c) Bundle of HIS  
d) Ventricle muscles
- 5) The full form of GFR is \_\_\_\_\_.  
a) Glomerulus filtering unit  
b) Globulin filtering rate  
c) Globulin fast rate  
d) Glomerular filtration rate
- 6) The portion of stomach opens into small intestine is \_\_\_\_\_.  
a) Body portion  
b) Pyloric portion  
c) Cardiac portion  
d) Fundic portion
- 7) The location of the neuro centre activity of the heart is \_\_\_\_\_.  
a) Cerebrum  
b) Medulla Oblongata  
c) Pons  
d) Midbrain
- 8) \_\_\_\_\_ stimulates the production of gastric juice in the stomach.  
a) Digestin  
b) Enterokinase  
c) Gastrin  
d) Rennin

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

- Explain Chloride Shift.
- Draw structure of nerve cell.
- Enlist functions of Bowman's capsule.
- Write a note on Composition of blood.
- What is Oxygen dissociation curve?
- Describe Cardiac output.

- Q.3 Answer the following questions. (Any Two) 08**
- a) Define Respiration and enlist functions of Respiratory system.
  - b) Discuss in detail about Mechanism of working of heart.
  - c) Explain structure and functions of Kidney.
- Q.4 Answer of the following questions. (Any Two) 08**
- a) Write a detailed note on Urine formation.
  - b) Discuss absorption and assimilation of carbohydrates, Proteins and lipids.
  - c) What is Pituitary gland and Explain functions of Pituitary gland.
- Q.5 Answer of the following questions. (Any One) 08**
- a) Define reproductive system and write a note on female reproductive system with its structure and function.
  - b) Write a note on Respiratory system and Explain in detail about Transport of O<sub>2</sub> and CO<sub>2</sub>.

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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
Developmental Biology (Paper - II)**

Day & Date: Tuesday, 31-01-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

- 1) Each sperm consists of a \_\_\_\_\_ nucleus.
  - a) haploid
  - b) diploid
  - c) triploid
  - d) polyploid
- 2) \_\_\_\_\_ (or egg wall) is an outer membrane of the egg.
  - a) zona pellucida
  - b) tapetum
  - c) micropyle
  - d) integument
- 3) The Blastula stage is characterized by the presence of \_\_\_\_\_.
  - a) amniotic fluid
  - b) blastoderm
  - c) acrosome
  - d) centromere
- 4) \_\_\_\_\_ is not a germ layer.
  - a) pericarp
  - b) ectoderm
  - c) endoderm
  - d) mesoderm
- 5) In plants, the embryo is developed from \_\_\_\_\_.
  - a) Nucellus
  - b) Integuments
  - c) Hilum
  - d) Zygote
- 6) The female gametophyte, also called embryo sac, is mostly \_\_\_\_\_ celled structure.
  - a) 7
  - b) 9
  - c) 10
  - d) 12
- 7) *Arabidopsis thaliana* is a member of \_\_\_\_\_ family.
  - a) Asteraceae
  - b) Bigniniaceae
  - c) Brassicaceae
  - d) Arabidopsis
- 8) \_\_\_\_\_ is a formative plant tissue usually made up of small cells capable of dividing indefinitely and giving rise to similar cells or to cells that differentiate to produce the definitive tissues and organs.
  - a) nucleus
  - b) cytoplasm
  - c) nucleoplasm
  - d) meristem

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

- a) Define fertilization.
- b) What is an egg? Mention types of egg.
- c) Define copulation.
- d) Define double fertilization.
- e) Define seed germination.
- f) Define organogenesis

- Q.3 Write short notes. (Any Two)** **08**
- a) Describe the structure of sperm.
  - b) Discuss External vs internal fertilization.
  - c) Write a note on pollen development.
- Q.4 Answer the following questions. (Any Two)** **08**
- a) Write a note on cleavage.
  - b) Write a note on embryogenesis in plants.
  - c) Describe organization of shoot meristem.
- Q.5 Answer the following questions. (Any One)** **08**
- a) Describe the process of fertilization in animals.
  - b) Give a detailed account on double fertilization in angiosperms.

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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022  
Ecology (Paper - I)**

Day & Date: Wednesday, 01-02-2023  
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.  
(At. Wts.: H=1, C=12, O=16, N= 14, Na =23, Cl = 35.5)

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

- 1) The succession occurring within a microhabitat is \_\_\_\_\_.  
a) Primary succession                      b) Climax succession  
c) Nudation                                      d) Serule
- 2) \_\_\_\_\_ occupies more than one trophic level in a pond ecosystem.  
a) Fish    b) Frog  
c) Zooplankton                                      d) Phytoplankton
- 3) The natural place of an organism or community is known as \_\_\_\_\_.  
a) Niche    b) Habitat  
c) Habit    d) Biome
- 4) \_\_\_\_\_ is known as an edaphic abiotic factor.  
a) Air    b) Soil  
c) Water     d) Light
- 5) Human beings belong to species \_\_\_\_\_.  
a) *Homo neanderthalensis*                      b) *Homo erectus*  
c) *Homo habilis*                                      d) *Homo sapiens*
- 6) \_\_\_\_\_ is one of the most prevalent hotspots of biodiversity in India.  
a) Himalayas                                      b) Ganges  
c) Western Ghats                                      d) Eastern Himalayas
- 7) Plants growing at high temperatures alternatively is called as \_\_\_\_\_.  
a) Microtherms                                      b) Megatherms  
c) Conifers    d) Mesotherms
- 8) The major producers in a terrestrial ecosystem is \_\_\_\_\_.  
a) Zooplankton                                      b) Green plants  
c) Phytoplankton                                      d) Birds

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

- a) What is mortality?
- b) Write a note on commensalism.
- c) Explain ecological pyramid.
- d) Define predation and parasitism.
- e) Explain fecundity tables.
- f) Discuss Aquatic ecosystem.

- Q.3 Write short notes. (Any Two) 08**
- a) Define Ecosystem and write a note on grassland and desert ecosystem.
  - b) Explain in brief about Animal Associations.
  - c) Discuss in detail about energy flow and ecological succession.
- Q.4 Answer of the following questions. (Any Two) 08**
- a) What is community? Explain characteristics of community.
  - b) Explain in detail about pond ecosystem.
  - c) Write a note on Brief idea about attributes of population.
- Q.5 Answer of the following questions. (Any One) 08**
- a) Define Abiotic Factors and add a detail note on effect of abiotic factors on animals.
  - b) Explain Biodiversity of hot-spots and sacred groves in India with examples.



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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:  
Oct/Nov-2022**

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

Day &amp; Date: Friday, 24-03-2023

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 diagrams and give equations wherever necessary.

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

**08**

- 1) James Dewey Watson birth date is \_\_\_\_\_.  
a) 16 April 1926                      b) 8 April 1926  
c) 6 April 1928                      d) 6 August 1938
- 2) Golden Rice is a variety of rice (*Oryza sativa*) produced through genetic engineering to biosynthesize \_\_\_\_\_.  
a) beta-carotene                      b) alpha-carotene  
c) vitamin A                      d) beta protein
- 3) \_\_\_\_\_ revolution was launched to increase the production of Edible oilseed.  
a) Green                      b) Grey  
c) Yellow                      d) Red
- 4) PCR stands for \_\_\_\_\_.  
a) Polymerase chain replication                      b) Polymerase check reaction  
c) Polyploidy chain reaction                      d) Polymerase chain reaction
- 5) Amebiasis is an infection of the intestines with a parasite called \_\_\_\_\_.  
a) entamoeba histolytica                      b) Ascaris lumbricoides  
c) parasitic roundworms                      d) plasmodium parasites
- 6) The process of weakening of pathogen is called \_\_\_\_\_.  
a) Vaccination                      b) Attenuation  
c) Immunization                      d) Vaccine reduction
- 7) Transgenic animals have \_\_\_\_\_.  
a) foreign protein                      b) foreign gene  
c) foreign lipid                      d) foreign amino acid
- 8) Transgenic animals can be designed to study the change in \_\_\_\_\_.  
a) serum                      b) Urine  
c) gene                      d) Saliva

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

**08**

- a) Define Chromosome.
- b) Define white revolution.
- c) Define vermicompost.
- d) Define genetic engineering.
- e) Define passive immunity.
- f) Define transgene.

- Q.3 Write notes. (Any Two) 08**
- a) Rosalind Franklin contribution in biotechnology.
  - b) Introduction and objective of green revolution.
  - c) Bt cotton production technique and its advantages.
- Q.4 Write notes. (Any Two) 08**
- a) Mechanism of active immunity.
  - b) Methods and significance of genetically engineered insulin.
  - c) Biotechnology and interdisciplinary scope.
- Q.5 Answer of the following questions. (Any One) 08**
- a) Explain in detail Effects, Prevention and Control of human diseases Pneumonia, Common cold and Malaria.
  - b) Give brief note on Transgenic organisms and reproductive technology for transgenic fish. Transgenic cattle, birds and pigs.

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- Q.3 Answer the following question. (Any one)** **10**
- a)** Write about the process of communication in detail.
  - b)** Write about the principles of effective communication.
- Q.4** Write a description about your memorable tour with your family members. **10**

**Seat  
No.**

Day & Date: Tuesday, 24-01-2023  
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 labeled diagram wherever necessary.

## 08

- 1) Dipeptide are made up of \_\_\_\_\_ Amino acids.  
a) 2    b) 3  
c) 4    d) 5
- 2) Cane sugar is source of \_\_\_\_\_.  
a) glucose    b) sucrose  
c) fructose    d) maltose
- 3) \_\_\_\_\_ is example of water-soluble vitamins.  
a) Vitamin A                                        b) Vitamin B  
c) Vitamin E                                        d) Vitamin D
- 4) \_\_\_\_\_ alcohol is most commonly found in waxes.  
a) cetyl    b) glycerol  
c) ethanol    d) methanol
- 5) \_\_\_\_\_ is acidic amino acid.  
a) Glycine    b) Alanine  
c) Proline     d) Aspartic acid
- 6) \_\_\_\_\_ protein is known as defense protein.  
a) Hemoglobin                                      b) Casein  
c) Collagen     d) Immunoglobulin
- 7) Phospholipids contain \_\_\_\_\_ in addition to alcohol and fatty acids.  
a) nucleic acid                                      b) carbohydrate  
c) metal ion     d) phosphoric acid
- 8) Starch is composed of \_\_\_\_\_ units.  
a) Glucose    b) Fructose  
c) Mannose     d) Sucrose

## 08

- Define fibrous proteins and give its one example.
- Write a note on structure and function of cholesterol.
- What is the difference between reducing and non-reducing sugar?
- Give an account on active site of enzyme.
- Enlist the biological functions of Vitamin B12.
- Define Vitamins with its one example.

- Q.3 Write notes on any two of the following. 08**
- a) Classification of Lipids
  - b) Biologically important nucleotides
  - c) Source, requirement, Role of: NAD<sup>+</sup>
- Q.4 Write notes on any two of the following. 08**
- a) Denaturation and renaturation of proteins
  - b) Bacterial cell wall polysaccharides
  - c) Activation energy and transition state
- Q.5 Answer any one of the following. 08**
- a) Explain function and properties of Monosaccharides, Disaccharides and Polysaccharides.
  - b) Write a note on double helical model of DNA structure.

<b>Seat No.</b>	
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**B.Sc. (Biotechnology) (Semester-I) (Old) (CBCS) Examination:  
Oct/Nov-2022  
METABOLISM (Paper- II)**

Day & Date: Wednesday, 25-01-2023  
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 labeled diagram wherever necessary.

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

08

- 1) Krebs cycle occurs in the \_\_\_\_\_.  
a) Cytosol  
b) Nucleus  
c) matrix of mitochondria  
d) Ribosome
- 2) End product of glycolysis is two molecules of \_\_\_\_\_.  
a) Acetate  
b) PEP  
c) Oxaloacetate  
d) Pyruvate
- 3) Most of the triacylglycerols are stored in the \_\_\_\_\_.  
a) adipose tissue  
b) lung  
c) kidney  
d) pancreas
- 4) During PKU \_\_\_\_\_.  
a) Accumulation of phenylalanine  
b) Accumulation of tryptophan  
c) Accumulation of tyrosine  
d) Accumulation of alanine
- 5) Under anaerobic condition pyruvate is converted to \_\_\_\_\_.  
a) Glucose  
b) Alcohol  
c) Succinate  
d) Glycerol
- 6) \_\_\_\_\_ is the source of carbon atom for biosynthesis of fatty acids.  
a) acetyl co-A  
b) butyryl co-A  
c) propionyl co-A  
d) succinyl co-A
- 7) Terminal electron acceptor in electron transport chain is \_\_\_\_\_.  
a) Carbon  
b) Oxygen  
c) Nitrogen  
d) Hydrogen
- 8) The fuel reserves of a healthy adult human are \_\_\_\_\_.  
a) nucleic acids and vitamins  
b) glycogen, triacylglycerols and proteins  
c) vitamins and enzymes  
d) nucleic acid and hormones

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

08

- Define Metabolism.
- What is Fatty acid synthase?
- Give Function of Mitochondria.
- Significance of HMP shunt pathway.
- Role of Hormones in metabolism.
- Give any two enzymes involved in Glycolysis.

- Q.3 Answer any two of the following. 08**
- a) Explain in detail Oxidative phosphorylation.
  - b) Gluconeogenesis
  - c) Explain the amphibolic role of TCA cycle with its importance.
- Q.4 Write notes on any two of the following. 08**
- a) Write a note on metabolic changes during starvation.
  - b) Diagrammatic representation of ETC and sites of ATP production.
  - c) Pentose phosphate pathway
- Q.5 Answer any one of the following. 08**
- a) Describe in detail EM Pathway along with its energetic and regulation.
  - b) Give an account of  $\beta$  - oxidation of saturated even carbon fatty acid (Palmitic acid).



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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS) Examination:  
Oct/Nov-2022**

**CELL BIOTECHNOLOGY – I**

Day & Date: Friday, 27-01-2023  
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 algorithmic table and calculator is allowed.

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

**08**

- 1) \_\_\_\_\_ discovered the cell in 1965.
 

a) Robert Hooke	b) Schwann
c) Tatum	d) De Bary
- 2) Which of the following cell organelles is absent in animal cells but present in a plant cell?
 

a) Cell wall	b) Cytoplasm
c) Vacuoles	d) Mitochondria
- 3) \_\_\_\_\_ cell organelles is called suicide bags.
 

a) Nucleus	b) Lysosomes
c) Chloroplast	d) Mitochondria
- 4) The Golgi complex is responsible for transporting, modifying, and packaging of \_\_\_\_\_.
 

a) DNA	b) RNA
c) Proteins and Lipids	d) None of them
- 5) \_\_\_\_\_ regulates the entry and exit of molecules to and from the cell.
 

a) Lysosomes	b) Golgi bodies
c) Cell membrane	d) Mitochondria
- 6) Which of the following cell organelles is involved in the storage of food, and other nutrients, required for a cell to survive?
 

a) Vacuoles	b) Lysosome
c) Mitochondria	d) Cell membrane
- 7) The intermediate filaments found in hairs and nails are a type 1 IF protein, composed of
 

a) Tubulin	b) Keratin
c) Vimentin	d) Lamin
- 8) \_\_\_\_\_ is the site for detoxification of xenobiotic compounds inside the cell.
 

a) Rough endoplasmic reticulum
b) Ribosomes
c) Cytosol
d) Smooth endoplasmic reticulum

- Q.2 Answer the following questions. (Any Four)** **08**
- a) Define Cell.
  - b) Define diffusion.
  - c) What is a synaptic junction?
  - d) Differentiate between rough and smooth endoplasmic reticulum.
  - e) Explain microtubules in brief with an example.
  - f) Draw a neat labeled diagram of Golgi apparatus.
- Q.3 Write notes on any two of the following.** **08**
- a) Fluid Mosaic Model
  - b) Structure and functions of microfilaments
  - c) Biogenesis of Golgi complex
- Q.4 Write notes on any two of the following.** **08**
- a) Lysosomes
  - b) Cell fractionation
  - c) Classification of organisms by cell structure
- Q.5 Answer any one of the following.** **08**
- a) Give a detailed account on transport across plasma membrane.
  - b) Give a detailed account on structure and functions of Endoplasmic Reticulum.

**Seat  
No.**

Set P

Day & Date: Saturday, 28-01-2023  
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.

## 08

- Multiple Choice questions:**
- 1) Ribosome are made up of \_\_\_\_\_.  
a) DNA & Protein                      b) RNA & Protein  
c) DNA alone                          d) DNA & RNA
  - 2) \_\_\_\_\_ the form of cell division which results in the creation of gametes or sex cells.  
a) Mitosis                                  b) Meiosis  
c) Miosis                                 d) Metastasis
  - 3) The condensation of chromosome observed in \_\_\_\_\_.  
a) Prophase I                            b) Anaphase I  
c) Metaphase I                         d) Telophase I
  - 4) \_\_\_\_\_ Pigment is responsible for the process of sunlight.  
a) Chlorophyll a                        b) Chlorophyll b  
c) Xanthophyll                         d) Anthocyanin
  - 5) Cristae in mitochondria serves as sites for \_\_\_\_\_.  
a) Oxidation-reduction reaction    b) Protein synthesis  
c) Macromolecules breakdown    d) Flavoproteins are phosphorylated
  - 6) Polytene chromosome found in \_\_\_\_\_.  
a) Human                                b) Monkey  
c) Maggots                               d) Chironomus
  - 7) End of chromosome is called \_\_\_\_\_.  
a) Centromere                          b) Telomere  
c) Chromomere                         d) Chromocenter
  - 8) \_\_\_\_\_ is not the property of cancerous cell.  
a) Metastasis                              b) Angiogenesis  
c) Autocrine signaling                d) Contact Inhibition.

## 08

- Define Cell cycle.
- Mention any two functions of ribosome's.
- Define Carcinogenesis.
- Enlist types of chromosome based on centromere.
- Draw a neat labeled diagram of Nucleus.
- What are Telomere?

- Q.3 Write short notes on any two of the following. 08**
- a) Explain in brief about cancer causing agents.
  - b) Write a note on Signal Transduction.
  - c) Explain in short cell senescence & its applications.
- Q.4 Answer any two of the following. 08**
- a) Explain Ultrastructure of Chloroplast.
  - b) Write note on Cell Adhesion molecules.
  - c) Distinguish between Mitosis & Meiosis.
- Q.5 Answer any one of the following. 08**
- a) Define Cell division & Write a note on Phases of Meiosis along with significance.
  - b) Describe in details about Ultra structure & function of Mitochondria with suitable diagram

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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS) Examination:  
Oct/Nov-2022**

**DEVELOPMENTAL BIOLOGY- I (Paper - I)**

Day & Date: Monday, 30-01-2023  
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 labeled diagram and give equation wherever necessary.  
4) Use of logarithmic table and calculator is allowed.

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

- 1) \_\_\_\_\_ type of eggs found in the birds.
  - a) Alecithal
  - b) Telolecithal
  - c) Centrolecithal
  - d) Microlecithal
- 2) During humans embryogenesis liver is derived from \_\_\_\_\_ primary germinal layer.
  - a) Ectoderm
  - b) Mesoderm
  - c) Blastoderm
  - d) Endoderm
- 3) According to Gilchrist (1968), the prospective \_\_\_\_\_ is called "Zone of involution".
  - a) Ectodermal zone
  - b) Mesodermal zone
  - c) Endodermal zone
  - d) Epidermal zone
- 4) In ABC model of flower patterning, class 'C' genes governs development of \_\_\_\_\_.
  - a) sepal
  - b) petal
  - c) carpel
  - d) calyx
- 5) The arrhenotokous parthenogenesis is observed in \_\_\_\_\_.
  - a) hydra
  - b) weevils
  - c) honey bee
  - d) long-horned grasshoppers
- 6) Elevated \_\_\_\_\_ concentrations cause partial stomatal closure.
  - a) SO<sub>2</sub>
  - b) NO<sub>2</sub>
  - c) CO<sub>2</sub>
  - d) O<sub>2</sub>
- 7) \_\_\_\_\_ stress progressively reduces CO<sub>2</sub> assimilation rates owing to decrease stomatal conductance.
  - a) temperature
  - b) nutrient depletion
  - c) drought
  - d) heat
- 8) In Angiosperms, pollen mother cells (PMC) also known as \_\_\_\_\_.
  - a) Archosporium
  - b) Parietal
  - c) Sporogenous cell
  - d) Epidermis

- Q.2 Answer the following questions briefly. (Any Four) 08**
- a) Enlist different planes of cleavage.
  - b) Define gastrulation.
  - c) Define oogenesis.
  - d) Define emboly.
  - e) Define metamorphosis.
  - f) Define aging.
- Q.3 Write notes on any two of the following. 08**
- a) Describe structure of human sperm.
  - b) Describe different patterns of cleavage.
  - c) Explain parthenogenesis with suitable example.
- Q.4 Write notes on any two of the following. 08**
- a) Describe flower development in *A. thaliana*.
  - b) Explain effect of elevated temperature on plant development.
  - c) Describe types of asexual reproduction with suitable examples.
- Q.5 Answer any one of the following. 08**
- a) Describe cell ablation technique with suitable example.
  - b) Write process of gastrulation in chick with neat labeled diagram.

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Set **P**

**B.Sc. (Biotechnology) (Semester - I) (Old) (CBCS) Examination:  
Oct/Nov-2022**

**DEVELOPMENTAL BIOLOGY - II (Paper - II)**

Day &amp; Date: Tuesday, 31-01-2023

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

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

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

- 1) \_\_\_\_\_ considered as terminally differentiated cell.
  - a) RBCs
  - b) blastomere
  - c) Spemann organizer
  - d) oogonium
- 2) \_\_\_\_\_ stimulate balbiani ring formation in poltene chromosomes.
  - a) Insulin
  - b) Glucagon
  - c) Ecdysone
  - d) Testosterone
- 3) Pluripotent, embryonic stem cells originate as \_\_\_\_\_ within a blastocyst.
  - a) inner mass cells
  - b) tropophoblast cells
  - c) uterine cells
  - d) endometrial cells
- 4) Mesoderm differentiates into \_\_\_\_\_ cells.
  - a) Epidermal
  - b) Muscle
  - c) Nerve
  - d) Hepatocytes
- 5) Haemochorial placenta found in \_\_\_\_\_.
  - a) horse
  - b) swine
  - c) human
  - d) dog
- 6) \_\_\_\_\_ is a climacteric fruit.
  - a) Grapes
  - b) Strawberry
  - c) Citrus
  - d) Apple
- 7) Endosperm tissue is \_\_\_\_\_.
  - a) Haploid
  - b) Diploid
  - c) Triploid
  - d) Tetraploid
- 8) Competence is the ability to respond to a specific \_\_\_\_\_ signal.
  - a) inductive
  - b) repressive
  - c) inhibitory
  - d) negative

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

- a) Define embryonic induction.
- b) Define cell determination.
- c) Define notogenesis.
- d) Define apical meristem.
- e) Define epitheliochorial placenta.
- f) Enlist functions of auxins.

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

- a) Describe different types of placenta in mammals.
- b) Describe control of differentiation at genome and transcription level.
- c) Explain development of vertebrate eye.

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

**08**

- a) Describe process of neural induction in mammals.
- b) Explain process of endosperm development in angiosperms.
- c) Describe role various hormones in shoot development.

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

**08**

- a) Describe role various hormones in process of fruit ripening.
- b) Describe epigenetic landscape model of determination and differentiation.



**Seat  
No.**

Day & Date: Wednesday, 01-02-2023  
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 & labeled diagram wherever necessary.

08

- 1) How many bonds do carbon form \_\_\_\_\_  
a) 2  
b) 4  
c) 3  
d) 5
- 2) In protein molecule, various amino acids are linked together by \_\_\_\_\_  
a) Peptide bond  
b) Alpha glycosidic bond  
c) Dative bond  
d) Beta-glycosidic bond
- 3) Metals and non metals are combined to give the electronic configuration of \_\_\_\_\_.  
a) Alkalis  
b) Metalloids  
c) Noble gases  
d) Acids
- 4) \_\_\_\_\_ is not the property of ionic bond formation.  
a) Sharing of electron  
b) Gaining of electron  
c) Transfer of electron  
d) Accepting of electron
- 5) \_\_\_\_\_ one of the base is not present in DNA  
a) Uracil  
b) Thymine  
c) Adenine  
d) Cytosine
- 6) \_\_\_\_\_ is responsible for the mass of an atom.  
a) Only protons  
b) Neutrons and protons  
c) Only neutrons  
d) Protons and electrons
- 7) If osmotic pressure of sucrose solution is higher than that of urea solution, the sucrose solution is \_\_\_\_\_ to urea solution.  
a) Hypertonic  
b) Hypotonic  
c) Isotonic  
d) Similar
- 8) \_\_\_\_\_ is the sequence to label the subshells in an atom  
a) S,p,d,f,g  
b) S,s,p,p,d,f,g  
c) S,p,p,f,d  
d) S,p,g,d,f

08

- Define Buffer.
- Give the two examples Ionic Bonds
- Concept of Hybridization of atom
- What is normality?
- Concept of pH
- Define Chemical bond

- Q.3 Solve. (Any Two)** **08**
- a) Covalent bond formation with examples
  - b) Define Solvent and Classification of solvents.
  - c) Glycosidic Bond formation
- Q.4 Write note on. (Any Two)** **08**
- a) What is Buffer? Write applications of buffers and solutions.
  - b) Define Colligative properties and explain osmosis and osmotic pressure.
  - c) Write a note on Solutions and types of solutions with importance.
- Q.5 Answer the following questions. (Any One)** **08**
- a) Describe the  $sp^3$  hybridization with respect to  $CH_4$  as example
  - b) Describe different types of bonds. Add a note on bonds in Biomolecules.

Seat No.	
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Day & Date: Friday, 24-03-2023  
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) Neat diagram must be drawn whenever necessary.

## 08

- [illegible]

## 08

- a) Biophysics
- b) Hydrophiles
- c) Solute
- d) Negative co-operativity
- e) Allosteric enzyme
- f) Van der Waals forces

- 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 structure of Hemoglobin molecule.
  - c) Write a note on MWC model.
- Q.4 Write a notes on any two of the following. 08**
- a) Explain Scatchard plot.
  - b) Describe the first law of thermodynamics.
  - c) Write a note on structure of protein ligand complex.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail the components of biosensors.
  - b) Explain the roles of water in maintaining the structure and function of protein.

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Set	P
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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:  
Oct/Nov-2022  
ENGLISH (Compulsory)  
Literary Voyage**

Day & Date: Tuesday, 07-02-2023  
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 Rewrite the following by choosing the correct option given below each bit. 08**

- 1) According to Francis Bacon, in discourse \_\_\_\_\_ must be used carefully and economically.
  - a) Fire
  - b) Wit
  - c) Weapons
  - d) Gadgets
- 2) Bertrand Russell was against the \_\_\_\_\_ learning.
  - a) Practical
  - b) Experimental
  - c) Bookish
  - d) Experiential
- 3) "The Spirit of Freedom" was actually \_\_\_\_\_ written by Tagore from America for Indians.
  - a) A poem
  - b) A letter
  - c) A song
  - d) A gazal
- 4) Niyi Osundare is basically \_\_\_\_\_ about the regeneration of the deteriorating earth.
  - a) Hopeful
  - b) Hopeless
  - c) Pessimistic
  - d) Without hope
- 5) Christina Rossetti didn't want her lover to be \_\_\_\_\_ remembering her.
  - a) happy
  - b) sad
  - c) pleased
  - d) blissful
- 6) The synonym of 'accountable' is \_\_\_\_\_.
  - a) hopeless
  - b) responsible
  - c) rich
  - d) economical
- 7) The antonym of 'objective' is \_\_\_\_\_.
  - a) critical
  - b) actual
  - c) subjective
  - d) factful
- 8) I saw a cuckoo, when I \_\_\_\_\_ the window of the room.
  - a) opening
  - b) opens
  - c) open
  - d) opened

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

- a) What subjects should be kept away from jest according to Bacon?
- b) What did Bertrand Russell as a schoolboy know about the squirrels?
- c) What was condition of freedom in a nation like America?
- d) How is water pollution depicted in "Our Earth Will Not Die"?
- e) What was Alexander Pope's source of comfort?
- f) Why did Christina Rossetti allow her lover to forget her?

- Q.3** a) Write an informal letter addressing your friend and inviting him to spend the Diwali vacation with you and your family. **10**

**OR**

- b) Describe the process of making tea. Use the instructions beginning from the initial preparation for making tea up to serving the tea.

- Q.4** Write a presentation on the topic “India and Democracy” by preparing slides on the basis of the following data: **10**

- a) India’s freedom struggle
- b) Indian freedom fighters
- c) India’s independence
- d) Indian constitution
- e) Democracy
- f) India as a nation
- g) Place of India in the world
- h) Future of India

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester – II) (New) (CBCS) Examination:  
Oct/Nov-2022**

**MAMMALIAN PHYSIOLOGY – I (Paper – I)**

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

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 questions:****08**

- 1) \_\_\_\_\_ cells secretes pepsinogen in the stomach.
  - a) Chief
  - b) Parietal
  - c) Oxyntic
  - d) Beta
- 2) Trypsin helps in the conversion of \_\_\_\_\_.
  - a) Lactose to Sucrose
  - b) Chymotrypsinogen into chymotrypsin
  - c) Pepsinogen into pepsin
  - d) Lactose into glucose & galactose
- 3) \_\_\_\_\_ are responsible for the phagocytosis of debris and particulate matter.
  - a) Type I pneumocytes
  - b) Type II pneumocytes
  - c) Dust cells
  - d) RBC
- 4) \_\_\_\_\_ is caused due to deficiency of enzyme lactase in the small intestine.
  - a) Gastroesophageal reflux disease
  - b) Irritable bowel syndrome
  - c) Lactose intolerance
  - d) Peptic Ulcer disease
- 5) Differentiation of myeloid progenitor cell into mature RBC requires \_\_\_\_\_.
  - a) Thrombopoietin
  - b) Growth hormone
  - c) Insulin
  - d) Erythropoietin
- 6) In humans blood vessels is derived from \_\_\_\_\_.
  - a) Ectoderm
  - b) Mesoderm
  - c) Endoderm
  - d) Notochord
- 7) Vertebral column of human adult comprises \_\_\_\_\_ number of thoracic vertebrae.
  - a) 12
  - b) 7
  - c) 5
  - d) 26
- 8) \_\_\_\_\_ calories of energy are stored in high energy phosphate bonds of ATP.
  - a) 6300
  - b) 6900
  - c) 7300
  - d) 7900

- Q.2 Answer any four of the following** **08**
- 1) Write a note on pepsin.
  - 2) Give causes of irritable bowel syndrome (IBS).
  - 3) Define Haldane and Bohr effect.
  - 4) Define Hematopoietic stem cell.
  - 5) Write a note on bicuspid valve.
  - 6) Write a note on pivotal joint.
- Q.3 Write short notes on any two of the following.** **08**
- 1) Give account on digestion of DNA and RNA.
  - 2) Explain physiology of muscles in exercise.
  - 3) Explain role of SA and AV node in working of human heart.
- Q.4 Answer any two of the following.** **08**
- 1) Describe composition of human blood.
  - 2) Explain chloride shift and its significance in gaseous exchange.
  - 3) Give causes, symptoms and management of Gastroesophageal reflux disease.
- Q.5 Answer any one of the following** **08**
- 1) Describe digestion and absorption of proteins.
  - 2) Describe appendicular skeletal system in humans.



Seat No.	
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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:  
Oct/Nov-2022**

**MAMMALIAN PHYSIOLOGY-II (PAPER-II)**

Day & Date: Thursday, 09-02-2023  
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 labeled diagram wherever necessary.

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

**08**

- 1) \_\_\_\_\_ is happens in contracted muscle fiber.
  - a) I-band is steady
  - b) A-band vanishes
  - c) H zone elongates
  - d) M line vanishes
- 2) Birds excrete nitrogenous waste product in the form of \_\_\_\_\_.
  - a) Urea
  - b) Uric acid
  - c) Ammonia
  - d) Trimethylamine oxide
- 3) Receptor sites for the \_\_\_\_\_ located on postsynaptic membrane.
  - a) ions
  - b) enzyme
  - c) hormone
  - d) neurotransmitters
- 4) \_\_\_\_\_ cells secrete glucagon which regulates blood sugar level.
  - a)  $\alpha$
  - b)  $\delta$
  - c)  $\beta$
  - d)  $\gamma$
- 5) \_\_\_\_\_ are responsible for the production and secretion of ACTH.
  - a) Thyrotrophs
  - b) Corticotrophs
  - c) Somatotrophs
  - d) Gondotrophs
- 6) \_\_\_\_\_ receptors responsible detection of smell.
  - a) Olfactory
  - b) Gustatory
  - c) Somatosensory
  - d) Baroreceptors
- 7) Cretinism is due to \_\_\_\_\_.
  - a) Hyposecretion of thyrocalcitonin
  - b) Hyposecretion of thyroxine
  - c) Hypersecretion of thyrocalcitonin
  - d) Hypersecretion of thyroxine
- 8) Diabetes insipidus is caused due to hyposecretion of \_\_\_\_\_.
  - a) Insulin
  - b) Glucagon
  - c) Vasopressin
  - d) TSH

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

**08**

- 1) Give structure of smooth muscle.
- 2) Define ammonotelism.
- 3) Define acetylcholine.
- 4) Enlist names and functions of steroid hormones.
- 5) Write a note on GTH.
- 6) Give account on olfactory receptors.

- Q.3 Write short note on any two of the following.** **08**
- 1) Explain sliding filament theory of muscle contraction.
  - 2) Describe mechanism of action of peptide hormone.
  - 3) Describe structure and function of adenohypophysis.
- Q.4 Write notes any two of the following.** **08**
- 1) Describe structure and function of human ear.
  - 2) Describe structure and function of thyroid gland.
  - 3) Give an account on hyper and hypo secretion of insulin and glucagon.
- Q.5 Answer any one of the following.** **08**
- a) Explain process of ultra filtration & selective reabsorption during urine formation.
  - b) Describe excitation and conduction of nerve impulse with neat labeled diagram.

Page 1 of 2

- Q.3 Write notes on any two of the following. 08**
- a) Explain in brief Internal Organization of Monocot Plants.
  - b) Describe in brief the mechanism of food transportation in plants.
  - c) Write a note on Osmosis.
- Q.4 Answer any two of the following 08**
- a) Enlist Macro & Micro nutrients with their role in plants.
  - b) Give the importance of water for plant life.
  - c) Distinguish between Monocot & Dicot plants.
- Q.5 Answer any one of the following. 08**
- a) Write a note on Secondary Growth & Annual rings with suitable diagram.
  - b) Define Transpiration & Write a note on mechanism of stomatal opening & closing.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester – II) (New) (CBCS) Examination:  
Oct/Nov-2022**

**PLANT PHYSIOLOGY - II (Paper – II)**

Day & Date: Saturday, 11-02-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

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

**08**

- 1) Photosynthetic pigments found in the chloroplasts occur in \_\_\_\_\_.  
 a) Chloroplast envelope                      b) Matrix  
 c) Plastoglobules                              d) Thylakoid membranes
- 2) In photosystem I, the first electron acceptor is \_\_\_\_\_.  
 a) Plastocyanin                                  b) Cytochrome  
 c) Ferredoxin                                    d) An iron-sulphur protein
- 3) Photosystem II occurs in \_\_\_\_\_.  
 a) Cytochrome                                    b) Grana  
 c) Stroma    d) Mitochondrial surface
- 4) \_\_\_\_\_ is the first step of the Calvin pathway.  
 a) Regeneration                                  b) Reduction  
 c) CO<sub>2</sub> fixation                                   d) Synthesis of sugar
- 5) \_\_\_\_\_ is the internal factors affecting photosynthesis dependent on.  
 a) External factors                                b) Geographical area  
 c) Genetic predisposition                      d) Species and sub-species
- 6) \_\_\_\_\_ is not a function of auxin.  
 a) inducing callus formation                      b) inducing dormancy  
 c) enhancing cell division                        d) maintaining apical dominance
- 7) An \_\_\_\_\_ aquatic fern that performs nitrogen fixation is \_\_\_\_\_.  
 a) *Nostoc*    b) *Azolla*  
 c) *Salvinia*     d) *Salvia*
- 8) A widely used rooting hormone is \_\_\_\_\_.  
 a) 2,4, -D    b) NAA  
 c) 2,4,5 – T     d) Cytokine

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

**08**

- 1) Define photosynthesis.
- 2) Define respiration.
- 3) Define guttation.
- 4) Define ammonium assimilation.
- 5) Define photoperiodism.
- 6) Define growth.

- Q.3 Write short notes on any two of the following. 08**
- a) Photosynthetic pigments
  - b) Growth curve
  - c) Seed germination
- Q.4 Write short notes on any two of the following. 08**
- a) Physiological role of auxin and cytokine
  - b) CAM pathway
  - c) Vernalisation and its significance
- Q.5 Answer any one of the following 08**
- a) Explain in detail cyclic and non-cyclic photophosphorylation.
  - b) Give Application and significance of secondary metabolites.

<b>Seat No.</b>	
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Day & Date: Monday, 13-02-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 70

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

- 1) The \_\_\_\_\_ Unit performs the mathematical operations for CPU.

a) Control unit	b) Storage unit
c) ALU	d) Input unit
- 2) The application used for creating presentations \_\_\_\_\_.

a) MS Access	b) MS Excel
c) MS Word	d) MS PowerPoint
- 3) The physical components of a computer are called \_\_\_\_\_.

a) Software	b) ALU
c) Hardware	d) CPU
- 4) CPU is the \_\_\_\_\_of computer.

a) Brain	b) Ear
c) Eye	d) Heart
- 5) The \_\_\_\_\_ name of programs that control the computer system.

a) Hardware	b) Software
c) Keyboard	d) Mouse
- 6) A feature of MS Office that saves the document automatically after certain interval is called \_\_\_\_\_.

a) Save	b) Auto Save
c) Save As	d) Backup
- 7) The DVD disk put in \_\_\_\_\_ of a computer.

a) Floppy drive	b) Hard disk drive
c) USB port	d) DVD drive
- 8) \_\_\_\_\_is the example of Secondary memory.

a) Registers	b) RAM
c) ROM	d) Hard disks

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

- Define Computer
- Define Data
- Function of Central Processing Unit.
- Give any four examples of Input devices.
- What is electronic mail
- Give any four examples of Output Devices.

- Q.3 Write notes on any two of the following. 08**
- a) Explain in detail MS Word.
  - b) Internet in detail with its Uses
  - c) Describe in detail Operating System (OS).
- Q.4 Write notes on any two of the following. 08**
- a) MS-Office PowerPoint
  - b) Input output devices in detail.
  - c) Various types of Computer.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail Computer Organization with suitable diagram.
  - b) Write a note on Basics of electronic mail, creation and accessing the e-mail.



**Seat  
No.**

Day & Date: Tuesday, 14-02-2023  
Time: 12:00 PM To 02:00 PM

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

## 08

- The values recorded in an experiment or observation are called \_\_\_\_\_.
  - Analysis
  - Accuracy
  - Data
  - Report
- \_\_\_\_\_ may be defined as the logical and systematic arrangement of statistical data in rows and columns.
  - Tabulation
  - Presentation
  - Graph
  - Structure
- The name of the table is called \_\_\_\_\_.
  - Body
  - Title
  - Footnote
  - Stub
- \_\_\_\_\_ refers to the headings of vertical columns.
  - caption
  - table
  - source
  - head
- In \_\_\_\_\_ series the data are given in groups.
  - Random
  - Continuous
  - Exclusive
  - Discrete
- The number of items lying in each class is known as the \_\_\_\_\_.
  - Entity
  - Frequency
  - Average
  - Values
- \_\_\_\_\_ Diagram is also called a circle diagram.
  - Scatter
  - line
  - Pie
  - Bar
- \_\_\_\_\_ is a graph containing frequencies in the form of vertical rectangles.
  - Joint
  - Simple
  - Area
  - Histogram

## 08

- Write importance of Biostatistics.
- State merits of Median.
- Explain properties of Mean.
- Write advantages of Tabulation.
- Define 'Class mark' and give an example.
- Compute the coefficient of range for data 36, 19, 75, 61, 71, 35, 23, 8, 54.

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

- Explain parts of table in detail.
- Write a brief account on classification of Measures of Dispersion.
- Write various applications of Biostatistics in detail.

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

- Population of ducks in 100 lakes are as follows

No of Ducks	0-10	10-20	20-30	30-40	40-50	50-60
No. of lakes	9	21	27	18	19	6

Draw a histogram.

- Calculate mean from the following data:

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks	33	35	44	34	41	45	39	46	36	47

- Find out the median weight of fishes from the following data:

Weight in gms	10-20	20-30	30-40	40-50	50-60
No. of Fishes	15	17	16	19	13

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

- Find the Standard Deviation for the following data:

x	18	19	20	21	22	23	24	25	26	27
f	3	7	11	14	18	17	13	8	5	4

- Blood group 50 students are given below.

Blood Group	A	B	AB	O
No. of Students	5	20	10	15

Draw a Pie-Chart, Line Diagram, and Scatter Diagram.

**Seat  
No.**

Day & Date: Wednesday, 15-02-2023  
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 and give equations wherever necessary.

## 08

- Multiple choice questions:**
- 1) The growth of animal tissue cells in In vitro in a suitable culture medium is called \_\_\_\_\_.  
a) Gene expression                      b) Transgenesis  
c) Plant tissue culture                  d) Animal tissue culture
  - 2) \_\_\_\_\_ of the following instrument is used for sterilizing the media after it has been prepared.  
a) Incubator                                b) Inoculum Needle  
c) Autoclave                                d) Laminar air Flow Chamber
  - 3) Acelline is a \_\_\_\_\_.  
a) Multilayer culture                      b) Transformed cell  
c) Multiple growth of cell                d) Subculturing of primary culture
  - 4) \_\_\_\_\_ are anchorage dependent & propagate as a monolayer attached to cell culture vessel.  
a) Autologous cell                         b) Autosomal cell  
c) Autogenic cell                          d) Adherent cell
  - 5) \_\_\_\_\_ is the method of maintaining a whole embryo or organ excised from the host organism in an artificial medium.  
a) Organ culture                            b) Explant culture  
c) Horticulture                              d) Microbial culture
  - 6) The highest feasible temperature of batch sterilization is \_\_\_\_\_.  
a) 124° C                                    b) 120° C  
c) 122° C                                    d) 121° C
  - 7) \_\_\_\_\_ is the oldest cell line.  
a) Hela cell line                            b) CHO cell line  
c) Vero cell line                            d) BHK cell line
  - 8) \_\_\_\_\_ is easy and rapid method to interpret viability of cells in culture system.  
a) Trypan blue dye exclusion            b) Neutral red assay  
c) Neutral red assay                      d) Eosin nigrosin dye

- Q.2 Answer Any Four of the following:** **08**
- a) Write importance of Sterilization in ATC
  - b) What is an Organ Culture?
  - c) Define Cell Synchronization?
  - d) Define Karyotyping
  - e) What is meant by Primary Cell Culture?
  - f) Define Continuous cell line
- Q.3 Write short notes on any two of the following** **08**
- a) Explain Warm Trypsinization Method.
  - b) Write a brief account on Animal Tissue Culture & its Applications.
  - c) Write a note on Flow cytometry.
- Q.4 Answer any two of the following.** **08**
- a) Explain the Mechanical Cell separation Method
  - b) Write an account on Types of Organ Culture & its Application.
  - c) Draw a neat labeled diagram of CO<sub>2</sub> Incubator& its applications in Animal Tissue Culture.
- Q.5 Answer any one of the following.** **08**
- a) Give a detailed account on Laboratory Design layout in Animal Tissue culture.
  - b) Explain in detail about Natural Media & its Components.

**Seat  
No.**

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

Max. Marks: 40

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

08

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

a) 37	b) 27
c) 121	d) 4
- 2) Meristematic cells/tissue is found at the \_\_\_\_.

a) growing parts of plants	b) soil
c) air	d) water
- 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) Thermolabile components of tissue culture media can be sterilized by \_\_\_\_.

a) autoclaving	b) UV irradiation
c) filtration	d) drying
- 6) An unorganized proliferative mass of cells is known as \_\_\_\_.

a) organ	b) meristem
c) shoot	d) callus
- 7) Asexual or vegetative propagation of plants *in-vitro* is called as \_\_\_\_.

a) protoplast culture	b) haploid culture
c) micropropagation	d) callus culture
- 8) Single cells with their walls stripped off are known as \_\_\_\_.

a) protoplasts	b) hybrids
c) cybrids	d) haploids

**Q.2 Answer Any Four of the following:**

08

- What is sterilization?
- Which instruments are commonly used in Tissue Culture laboratory?
- Define totipotency.
- Explain endosperm culture.
- Differentiate between hybrids and cybrids.
- Define organogenesis.

- Q.3 Write notes on any two of the following. 08**
- a) Laboratory fumigation and surface disinfection.
  - b) Significance and importance of laboratory equipments.
  - c) Plant Tissue Culture media composition.
- Q.4 Write notes on any two of the following. 08**
- a) Callus culture technique.
  - b) Somaclonal variation.
  - c) Stages of micropropagation.
- Q.5 Answer any One of the following. 08**
- a) Give a detailed account on Plant tissue culture Lab organization.
  - b) Give a detailed account on somatic embryogenesis.

Set P

Max. Marks: 40

- Q.3 Write Short Notes. (Any Two)** **08**
- a) Explain about complementary gene interaction with one example.
  - b) what is linkage and give any four significances of its.
  - c) Explain about Chloroplast inheritance and give its example.
- Q.4 Answer the following questions. (Any Two)** **08**
- a) What is linkage & crossing over explain its types.
  - b) What is multiple allele & give one example.
  - c) Explain in detail supplementary gene interaction with example.
- Q.5 Answer the following questions. (Any One)** **08**
- a) Explain in detail about law of independent assortment with one example.
  - b) Describe in detail about bacterial gene transformation.



Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:  
Oct/Nov-2022  
Genetics – II**

Day & Date: Wednesday, 22-02-2023  
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 whenever necessary.

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

- 1) Polytene Chromosome are the permanently \_\_\_\_\_ Chromosome.
  - a) Telophase
  - b) Anaphase
  - c) Prophase
  - d) Metaphase
- 2) Aneuploidy was discovered by \_\_\_\_\_.
  - a) Fleming
  - b) Balbiani
  - c) Buckert
  - d) Bridges
- 3) Thymine dimmers are caused by \_\_\_\_\_.
  - a) UV rays
  - b) X rays
  - c) Alpha rays
  - d) Beta rays
- 4) The number of chromosomes in pea plant is \_\_\_\_\_.
  - a) 4
  - b) 23
  - c) 7
  - d) 8
- 5) Chromonemal Fibrils which can be easily separable from their coil is called \_\_\_\_\_.
  - a) Paranemic
  - b) Plectonemic
  - c) Supercoil
  - d) Double Helix Coil
- 6) Number of Barr bodies present in nucleus of female XX Chromosomes is \_\_\_\_\_.
  - a) 2
  - b) 1
  - c) 3
  - d) 0
- 7) Chromosome movement during cell division is brought by \_\_\_\_\_.
  - a) Centromeres
  - b) Centrosomes
  - c) Chromomere
  - d) Chromosomes
- 8) The "Y" Chromosome is placed in \_\_\_\_\_ of a human karyotype.
  - a) Group B
  - b) Group E
  - c) Group G
  - d) Group D

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

- a) Define Karyotype
- b) Define Meiosis
- c) Define Aneuploidy
- d) Define Transpositions
- e) Define Gene Frequency
- f) What are sex Chromosomes?

- Q.3 Write Short Notes. (Any Two) 08**
- a) Describe the structure of chromosome with a neat labeled diagram.
  - b) Explain in detail types of Mutagenic agents and its effects.
  - c) Describe in detail structure of lampbrush chromosomes.
- Q.4 Answer the following questions. (Any Two) 08**
- a) Write in detail about the numerical changes in chromosome with its application.
  - b) Write in detail about the different replicative and non-replicative transposons.
  - c) Write in detail about giant chromosomes with neat labeled diagram.
- Q.5 Answer the following questions. (Any One) 08**
- a) Write in detail Hardy-Weinberg law and its application.
  - b) Describe multiple factor hypothesis with suitable examples.

<b>Seat No.</b>	
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- Q.2 Explain any four of the following. 08**
- a) Biogenesis
  - b) Concepts of species
  - c) Viruses
  - d) Diauxic growth
  - e) Antiseptic
  - f) Archaeobacteria
- Q.3 Write short notes on any two of the following. 08**
- a) Louis Pasteur
  - b) Cell membrane
  - c) Heat sterilization
- Q.4 Answer any two of the following. 08**
- a) Explain difference between prokaryotic and eukaryotic cell.
  - b) Write in brief on aim and principles of Bacterial classification.
  - c) Describe batch and continuous culture.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail bacterial growth curve.
  - b) Describe in detail gram negative bacterial cell wall.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:  
Oct/Nov-2022  
General Microbiology-II**

Day & Date: Friday, 24-02-2023  
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 wherever necessary.

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

- 1) Which bacteria appear purple- violet after Gram staining?
  - a) Gram positive
  - b) Gram negative
  - c) Both a) and b)
  - d) None of these
- 2) Which of the following is the example of Gram negative bacteria?
  - a) Mycobacteria
  - b) E. coli
  - c) Staphylococci
  - d) Bacillus
- 3) The solidifying agent used in microbiology laboratory to solidify medium is \_\_\_\_\_.
  - a) Cellulose
  - b) Peptone
  - c) Glucose
  - d) Agar
- 4) Which part of the compound microscope helps in gathering and focusing light rays on the specimen to be viewed?
  - a) Eyepiece lens
  - b) Objective lens
  - c) Condenser
  - d) Magnifying lens
- 5) What is the order of reagents used in the Gram staining?
  - a) Crystal violet, iodine, safranin, decolorizer
  - b) Crystal violet, iodine, decolorizer, safranin
  - c) Safranin, Crystal violet, decoloriser, iodine
  - d) Crystal violet, safranin, iodine, decoloriser
- 6) In Gram staining, iodine is used as a \_\_\_\_\_.
  - a) Fixative
  - b) Mordant
  - c) Solubilizer
  - d) Stain
- 7) When the power of ocular lens is 10x and objective lens is 20x, then magnification is \_\_\_\_\_.
  - a) 30 times
  - b) 20 times
  - c) 200 times
  - d) 2000 times
- 8) Which of the following is best suited to get the surface view of an object?
  - a) SEM
  - b) TEM
  - c) Inverted microscope
  - d) Compound microscope

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

**08**

- 1) Define resolution.
- 2) Write the application of gram staining.
- 3) Write about importance of agar- agar in bacterial media preparation.

- 4) Write the applications of TEM.
- 5) Define selective media.
- 6) Write advantages of spread plate technique.

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

- a) Differential media
- b) Mechanism of Gram staining
- c) Living media

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

- a) Preservation of pure cultures of bacteria
- b) Classification of stains
- c) Scanning Electron Microscopy (SEM)

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

- a) Explain IMViC test in detail.
- b) Give a detailed account on light microscope with respect to parts and functions.



- Q.3 Write short note on any two of the following. 08**
- a) Anther and Microspore Culture with significance.
  - b) Embryo Culture with categories and applications.
  - c) Describe in detail Greenhouse Technology in detail with their types and applications?
- Q.4 Write note on (Any Two) 08**
- a) Micropropagation.
  - b) Define Cryopreservation. Explain germplasm Conservation in detail?
  - c) Define Androgenesis and Gynogenesis. Explain factors affecting Gynogenesis.
- Q.5 Answer any one of the following. 08**
- a) Write a note on haploid plant production through androgenesis.
  - b) Explain principle, stages and applications of Cryopreservation.



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# Plant Biotechnology - II

Max. Marks: 40

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

## 08

- The biofertilizers present in roots of legumes is \_\_\_\_\_.
  - Rhizobium
  - Azospirillum
  - Anabaena
  - Nostoc
- VAM is Vesicular Arbuscular Mycorrhiza \_\_\_\_\_.
  - Bacteria
  - Fungi
  - Both Bacteria & fungus
  - Plant
- Direct DNA uptake by Protoplasts can be stimulated by \_\_\_\_\_.
  - PEG
  - Decanal
  - Luciferin
  - PAG
- Insect resistance transgenic cotton has been developed by inserting a piece of DNA from \_\_\_\_\_.
  - an insect
  - Wild relative of cotton
  - a virus
  - a soil bacterium
- The hairy root culture for secondary metabolite production are induced by transforming plant cells with \_\_\_\_\_.
  - Virus
  - Agrobacterium tumefaciens
  - Bacillus thuringiensis
  - Agrobacterium rhizogenes
- Microinjection involves \_\_\_\_\_.
  - Injection of DNA into bigger cells
  - Injection of large amount DNA
  - Injection of small amount of DNA
  - Injection with needle having diameter greater than cell diameter
- \_\_\_\_\_ bacteria is used as biopesticide first on commercial scale in the world?
  - Bacillus thuringiensis
  - E.coli
  - Pseudomonas aeruginosa
  - Agrobacterium tumefaciens
- SCP Stands for \_\_\_\_\_.
  - Single cell Protein
  - Stress Cultivated plant
  - Somatic Cultivated Plantlet
  - Soma Clonal plant

- Q.2 Answer any four of the following. 08**
- a) What are Mushrooms? Enlist Types of Mushrooms.
  - b) What is Elicitation?
  - c) Define Vectors.
  - d) Define genetic Engineering
  - e) What is Edible vaccine?
  - f) Draw a neat label diagram of VAM
- Q.3 Write short notes on any two of the following. 08**
- a) Explain the Particle gun mediated gene transfer.
  - b) Write a brief account on Bt Cotton & its Applications.
  - c) Write a note on Single Cell Protein.
- Q.4 Answer any two of the following. 08**
- a) Explain the mechanism of shikimate (shikimic acid) pathway.
  - b) Write note on Electroporation method & its advantages.
  - c) Write a note on Transgenic technology for production of golden rice.
- Q.5 Answer any one of the following 08**
- a) Explain the Indirect Method of DNA Transfer
  - b) What are Biofertilizers? Explain in detail its types & give its Applications.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
Oct/Nov - 2022  
Molecular Biology (Paper - I)**

Day & Date: Tuesday, 21-02-2023  
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 Rewrite the following sentences by choosing the correct alternative: 08**

- 1) In eukaryotes the other name of PCNA is \_\_\_\_\_.  
 a) Sliding clamp loader                      b) Translesional DNA polymerase  
 c) Sliding clamp                                d) Replicative DNA polymerase
- 2) The bases are held together in a DNA double helix by hydrogen bonds. These bonds are \_\_\_\_\_.  
 a) Covalent bonds                                b) Non-covalent bonds  
 c) Ionic bonds                                      d) Van der Waals forces
- 3) In case of mitochondrial genetic code UGA is a \_\_\_\_\_ codon.  
 a) Arginine                                        b) Stop  
 c) Tryptophan                                      d) Proline
- 4) \_\_\_\_\_ shows DNA renaturation reaction.  
 a)  $Cot_{1/2}$     b) Tan 30  
 c) Sec 60    d) Cot 40
- 5) In case of eukaryotes replication initiates at \_\_\_\_\_.  
 a) TATA    b) C<sup>P</sup>G islets  
 c) AUG    d) ARS
- 6) The type of coiling in DNA is \_\_\_\_\_.  
 a) Zig-zag    b) Opposite  
 c) Left-handed                                      d) Right-handed
- 7) The DNA polymerase involved in base excision repair is \_\_\_\_\_.  
 a) DNA polymerase  $\gamma$                               b) DNA polymerase  $\sigma$   
 c) DNA polymerase  $\alpha$                               d) DNA polymerase  $\beta$
- 8) DNA replication is \_\_\_\_\_.  
 a) conservative  
 b) conservative and discontinuous  
 c) semi-conservative and discontinuous  
 d) semi-conservative and semi discontinuous

**Q.2 Answer Any four of the following: 08**

- 1) Topoisomerases
- 2) Draw structure of DNA with proper labelling.
- 3) Central Dogma
- 4) RNA priming
- 5) DNA ligase
- 6) DNA damage

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

- 1) Write a note on Photoreactivation.
- 2) Add a note on types of DNA.
- 3) Explain replication of linear ds-DNA.

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

- 1) Write a note on Nucleotide Excision repair system in Eukaryotes.
- 2) Explain in detail on Organization of DNA in Eukaryotes.
- 3) Discuss Prokaryotic DNA Replication.

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

- 1) Explain Replication of DNA in Eukaryotes.
- 2) Add a note on Miescher to Watson and Crick historic perspective.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
Oct/Nov - 2022  
Molecular Biology (Paper – II)**

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

Max. Marks: 40

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

**Q.1 A) Multiple Choice Question.****10**

- 1) In eukaryotes \_\_\_\_\_ is responsible for transcribing rRNA.  
a) RNA Polymerase  $\alpha$                       b) RNA Polymerase II  
c) RNA Polymerase III                      d) RNA Polymerase I
- 2) In prokaryotic transcription process mRNA is elongated by \_\_\_\_\_.  
a) Sigma factor                                  b) Rho factor  
c) Pol- $\alpha$     d) core enzyme
- 3) \_\_\_\_\_ enzyme is involved in folding of proteins.  
a) Aminoacyl tRNA synthetase              b) DNA glycosylase  
c) Peptidyl disulphide isomerase          d) Peptidyl transferase
- 4) In prokaryotes Shine-Dalgarno sequences are also known as \_\_\_\_\_.  
a) tRNA binding site                          b) Ribosome binding site  
c) rRNA binding site                          d) snRNA binding site
- 5) In *trp* operon, *trpB* gene encodes \_\_\_\_\_ enzyme.  
a) Anthranilate synthetase component I  
b) Tryptophan synthetase  $\beta$   
c) Tryptophan synthetase  $\alpha$   
d) Anthranilate synthetase component I
- 6) In eukaryotes \_\_\_\_\_ sequences provide binding site for activators.  
a) Promoter                                      b) Operator  
c) Silencer                                        d) Enhancer
- 7) In eukaryotes \_\_\_\_\_ removes introns from pre-mRNA molecules.  
a) Editosome                                      b) Spliceosome  
c) Centrosome                                    d) Exosome
- 8) Guide RNA (*gRNA*) is responsible for addition for \_\_\_\_\_ during RNA editing.  
a) poly-G stretch                              b) poly-A stretch  
c) poly-U stretch                                d) poly-C stretch

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

- a) What are the enhancer sequences?
- b) What are exons?
- c) Define Attenuation.
- d) Define Proteosome.

- e) What are guide RNA?
- f) What are heat shock proteins?

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

- 1) Describe mRNA processing in eukaryotes.
- 2) Explain regulation of translation with suitable examples.
- 3) Explain protein folding and cleavage with neat labeled diagram.

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

- 1) Explain mechanism of translation in prokaryotes.
- 2) Explain RNA editing with suitable examples.
- 3) Explain regulation of *lac* operon.

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

- a) Explain mechanism of transcription in prokaryotes.
- b) Describe the regulations of *trp* operon with neat labeled diagram.

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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
Oct/Nov - 2022  
Immunology (Paper – I)**

Day &amp; Date: Thursday, 23-02-2023

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 and labeled diagram wherever necessary.  
 4) Use of algorithmic table and calculator is allowed.

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

- 1) Non-antigen specific host defenses that exist prior to exposure to an antigen known as \_\_\_\_\_.  
 a) Adaptive immunity                      b) Acquired immunity  
 c) Innate immunity                        d) MALT
- 2) A state of protection from a particular infectious disease called as \_\_\_\_\_.  
 a) Immunity                                  b) Antigen  
 c) Hapten                                      d) Adjuvant
- 3) \_\_\_\_\_ is a process of the formation and differentiation of blood cells.  
 a) Programmed cell death                  b) Apoptosis  
 c) Hematopoiesis                          d) Hemagglutination
- 4) \_\_\_\_\_ cell is an intermediate cell committed to the lymphoid lineage from which all lymphocytes arise.  
 a) Lymphoid progenitor                      b) Myeloid progenitor  
 c) Erythroid                                  d) Dendritic
- 5) \_\_\_\_\_ is secondary lymphoid organ where old erythrocytes are destroyed and blood-borne antigens are trapped.  
 a) Thymus                                      b) Bone marrow  
 c) Spleen                                        d) Liver
- 6) The site on an antigen that is recognized and bound by a particular antibody, TCR/MHC- peptide complex, or TCR ligand- CD1 complex is called as \_\_\_\_\_.  
 a) immunogen                                b) epitope  
 c) hapten                                        d) adjuvant
- 7) Fab region on an antibody is \_\_\_\_\_.  
 a) fragment antigen binding              b) fragment antibody binding  
 c) fiber    d) follicle
- 8) \_\_\_\_\_ is a group of genes encoding cell-surface molecules that are required for antigen presentation to T cells and for rapid graft rejection.  
 a) MHC    b) CD  
 c) FADD                                        d) FAS

- Q.2 Answer Any Four of the following:** **08**
- a) What is hematopoiesis?
  - b) Write in brief about B lymphocyte.
  - c) Define antigen.
  - d) Explain lymphatic system.
  - e) What is an antibody?
  - f) What is Major Histocompatibility Complex?
- Q.3 Write short notes on any Two of the following.** **08**
- a) Skin as a barrier at the portal of entry
  - b) Mononuclear phagocytes
  - c) Properties of immunogen
- Q.4 Write short notes on any Two of the following.** **08**
- a) Cellular Processes in nonspecific defense mechanism
  - b) Role of biological system in immunogenicity
  - c) Basic structure of antibody
- Q.5 Answer any One of the following.** **08**
- a) What is a complement system? Explain classical pathway of complement activation.
  - b) Give a detailed account on structure and functions of thymus.



Seat No.	
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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
Oct/Nov-2022  
Immunology (Paper – II)**

Day &amp; Date: Friday, 24-02-2023

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 diagram 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) Host defenses that are mediated by antibody present in the plasma, lymph, and tissue fluids known as \_\_\_\_\_ immunity.
  - a) Adaptive
  - b) Acquired
  - c) Humoral
  - d) Lymphoid
- 2) Host defenses that are mediated by antigen-specific T cells called as \_\_\_\_\_ immunity.
  - a) Adaptive
  - b) Acquired
  - c) Cell mediated
  - d) Lymphoid
- 3) \_\_\_\_\_ are a group of disorders caused by the action of one's own antibodies or T cells reactive against self-proteins (self-antigens).
  - a) HIV
  - b) SCID
  - c) AIDS
  - d) Autoimmune diseases
- 4) \_\_\_\_\_ is a preparation of immunogenic material used to induce immunity against pathogenic organisms.
  - a) Antigen
  - b) Adjuvant
  - c) Vaccine
  - d) Antibody
- 5) Maturation of T-lymphocytes occurs in \_\_\_\_\_.
  - a) Bone marrow
  - b) Thymus
  - c) Spleen
  - d) Lymph node
- 6) \_\_\_\_\_ is a common autoimmune disorder caused by self-reactive antibodies (rheumatoid factors), which mediate chronic inflammation of the joints.
  - a) Rheumatoid arthritis
  - b) Grave's disease
  - c) SLE
  - d) anemia
- 7) \_\_\_\_\_ involves competitive binding of radiolabeled antigen or antibody.
  - a) ELISA
  - b) Immunofluorescence
  - c) Radioimmunoassay
  - d) Immunodiffusion
- 8) \_\_\_\_\_ is a technique in which an antigen mixture is first separated into its component parts by electrophoresis and then tested by double immunodiffusion.
  - a) Immunoelectrophoresis
  - b) Ouchterlony
  - c) Mancini
  - d) ELISA

- Q.2 Answer Any Four of the following:** **08**
- a) What is thymus-independent antigen?
  - b) By which pathway is Endogenous antigen processed?
  - c) Define hypersensitivity.
  - d) Differentiate between Live-attenuated and killed vaccine.
  - e) Define agglutination.
  - f) Which are organ specific autoimmune diseases?
- Q.3 Write short notes on any Two of the following.** **08**
- a) B cell – maturation
  - b) Mechanism of CTL mediated cytotoxicity
  - c) Hashimoto's thyroiditis
- Q.4 Write short notes on any Two of the following.** **08**
- a) Types of vaccines (any 4)
  - b) Immunodiffusion
  - c) Introduction to Hypersensitivity
- Q.5 Answer any One of the following.** **08**
- a) Discuss applications of antigen-antibody interaction with special emphasis on ELISA.
  - b) Explain in detail processing of Endogenous Antigens by The Cytosolic Pathway.

**Seat  
No.**

Day & Date: Saturday, 25-02-2023  
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

**Instructions:** 1) All questions are compulsory.  
2) Figures to the right indicate full marks.  
3) Use of logarithmic table and calculator is allowed.

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

- Embryonic stem cells are \_\_\_\_\_.  
a) pluripotent                      b) small  
c) large                                d) medium-sized
- Transgenic animals have \_\_\_\_\_.  
a) foreign protein                  b) foreign amino acid  
c) foreign lipid                     d) foreign gene
- The culture of cells originated from a primary cell culture is called \_\_\_\_\_.  
a) Callus                                b) Primary cell culture  
c) Cell line                             d) Secondary Cell line
- Conservation biology uses \_\_\_\_\_ technique.  
a) nuclear transfer                b) Embryo transfer  
c) IVF                                    d) Gene transfer
- \_\_\_\_\_ refers to the varying ability of stem cells to differentiate into specialized cell types.  
a) Cell potency                      b) Cell-regeneration  
c) Cell-therapy                        d) Cell viability
- The full form of GLP is \_\_\_\_\_.  
a) Good Laboratory Promotion    b) Good Lab Practice  
c) Good Laboratory Practices    d) Good Leader Practices
- The growth of animal cells in vitro in a suitable culture medium is called as \_\_\_\_\_.  
a) Gene expression                b) Plant tissue culture  
c) Transgenesis                     d) Animal cell culture
- For nuclear transfer technique of cloning, the cells are induced to \_\_\_\_\_ phase of cell cycle.  
a) M                                      b) S  
c) G<sub>0</sub>                                      d) G<sub>1</sub>

**Q.2 Answer Any four of the following:** **08**

- a) Stem Cells
- b) Good Manufacturing Practice
- c) Recombinant Retroviruses
- d) Established Cell Lines
- e) Cell Adhesion
- f) Genetically Modified organisms

- Q.3 Write short notes on any two of the following:** **08**
- a) Write a note on Genetic manipulation of animals using Recombinant Retroviruses.
  - b) Define and explain primary cell culture.
  - c) Add a note on characteristics of stem cell.
- Q.4 Answer any two of the following:** **08**
- a) Write a note on uses of genetically modified organisms.
  - b) Explain Transfection of Embryonic Stem Cells.
  - c) Discuss in detail about In Vitro Fertilization.
- Q.5 Answer any One of the following:** **08**
- a) Write a note on Stem cell culture techniques and explain its applications.
  - b) Define Genetic manipulation and write a detailed note on Pronuclear microinjection.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
Oct/Nov-2022**

**Animal Biotechnology (Paper - II)**

Day &amp; Date: Monday, 27-02-2023

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.

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

**08**

- 1) MAbs are
  - a) Specific towards a paratope
  - b) Specific towards an epitope
  - c) Specific towards an antigen
  - d) None of these
- 2) The first transgenic cow was produced in?
  - a) 1983
  - b) 1995
  - c) 1997
  - d) 2000
- 3) What is gene therapy?
  - a) Technique of curing a disease
  - b) Introduction of a disease
  - c) Introduction of a gene in E.coli
  - d) Introduction of a gene in yeast
- 4) Dolly, the first transgenic animal was a \_\_\_\_\_.
  - a) Mouse
  - b) Dog
  - c) Sheep
  - d) Rice
- 5) \_\_\_\_\_ Standards are required to evaluate the morality of all human activities.
  - a) Pathological
  - b) Social
  - c) Ethical
  - d) Psychological
- 6) Which animal is being developed to replace the monkeys for vaccine testing?
  - a) Transgenic mice
  - b) Transgenic cow
  - c) Transgenic pig
  - d) Transgenic rabbit
- 7) Which committee has been set to keep a check on GM research and GM product?
  - a) IARI
  - b) GEAC
  - c) NCCS
  - d) AIIMS
- 8) The patents granted for biological entities and products derived from them are called \_\_\_\_\_.
  - a) ethics
  - b) patents
  - c) bio-patents
  - d) biosafety

- Q.2 Answer the following questions. (Any Four) 08**
- a) Write a short note on Theileriosis.
  - b) Define transgenic animals.
  - c) What is gene augmentation?
  - d) Define vector.
  - e) What is social issues?
  - f) Define cloning.
- Q.3 Write Short Notes. (Any Two) 08**
- a) Write a note on pharming products formed from livestock.
  - b) Describe Gene therapy in curing disease.
  - c) Write a note transgenic bird.
- Q.4 Answer the following questions. (Any Two) 08**
- a) Write a note on Coccidiosis.
  - b) What is monoclonal antibodies?
  - c) What is vector and mention its role in gene therapy.
- Q.5 Answer the following questions. (Any One) 08**
- a) Elaborate applications of Animal Biotechnology in detail.
  - b) What is Bioethics? Explain in detail ethical issues associated with genetically modified foods, animals and human genetic engineering.

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**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
Oct/Nov-2022  
ENGLISH  
Business English**

Day & Date: Friday, 27-01-2023  
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 Choose the correct alternative from the given option.**

**08**

- 1) What was Della's fear with her new haircut?
  - a) Jim wouldn't love her anymore
  - b) made her look like a nun
  - c) made her look ugly
  - d) She would look less fashionable
- 2) What was Phatik's deepest desire in the story 'The Home Coming'?
  - a) to belong and be loved
  - b) to be a ring leader
  - c) to be a boats man
  - d) to become a teacher
- 3) What makes the maidens song extraordinary?
  - a) it's musicality
  - b) it's eternal nature
  - c) it's theme
  - d) her voice
- 4) What does Queen Gulnar desire in the poem?
  - a) the Kings alteration
  - b) more jewellery
  - c) a rival
  - d) more clothes
- 5) What did the school master love above all?
  - a) discipline
  - b) learning
  - c) debate
  - d) sports
- 6) The hunter killed the tiger. (change into passive voice)
  - a) The tiger was killed by the hunter
  - b) The tiger was killed by someone
  - c) The hunter killed some tigers
  - d) The tiger killed the hunter
- 7) Her grandfather \_\_\_\_\_ after a long illness.
  - a) passed out
  - b) passed away
  - c) passes by
  - d) passed by
- 8) She \_\_\_\_\_ among all her classmates because of her intelligence and smartness.
  - a) stands away
  - b) stand above
  - c) stands out
  - d) stand by

- Q.2 Answer any four of the following Questions. 12**
- a) What did the couple in the story 'The Gift of Magi' decide to gift each other?
  - b) Why did Phatik feel suffocated in the big city?
  - c) What trouble did the poet have with the song in the poem 'The solitary reaper'?
  - d) Why is the Queen unsatisfied in the poem 'The Queens Rival'?
  - e) What is the significance of the two roads in the poem 'The Road Not Taken'?
  - f) Describe the character of the village school master.
- Q.3 Answer the following question. (Any one) 10**
- a) You are the student Secretary of Cultural department, a differences arouse among the students of Group dance ones a minor issue of dance steps. What step will you initiate to resolve the issue and ensure that harmony prevails.
  - b) What are the 21<sup>st</sup> Century Skills? Explain them in details.
- Q.4 As a native of Solapur, how will you solve the problem of deforestation (cutting down the trees) due to the construction of the National and State Highways. 10**



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**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
Oct/Nov-2022**

**BIOPROCESS TECHNOLOGY**

Day & Date: Saturday, 28-01-2023  
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.

**Q.1 A) Choose the correct alternative from the options and rewrite the sentence. 10**

- 1) The full form of LAB is \_\_\_\_\_.  
 a) Lactic acid bacteria                      b) Lactic acid Biomass  
 c) Lytic acellular bacteria                d) Lyophilized active biomass
- 2) \_\_\_\_\_ is a specific process that uses complete living cells or their components.  
 a) Bioremedy                                      b) Bioprocess  
 c) Bioremediation                              d) Biochemistry
- 3) Amylase enzyme acts on \_\_\_\_\_.  
 a) Protein    b) Starch  
 c) DNA    d) Lipids
- 4) Out of the following, \_\_\_\_\_ is a chemical bioprocess parameter analysed during fermentation.  
 a) Temperature                                  b) Product concentration  
 c) Viscosity                                        d) Turbidity
- 5) Bacterial growth curve is obtained by plotting \_\_\_\_\_.  
 a) no of cells versus time  
 b) no of spores versus time  
 c) log no of cells versus time  
 d) log no of spores versus time
- 6) Spirulina is \_\_\_\_\_.  
 a) edible fungus                                  b) biofertilizer  
 c) biopesticide                                    d) SCP
- 7) The unit of mass transfer coefficient is \_\_\_\_\_.  
 a)  $m^{-1}s$     b)  $ms^{-1}$   
 c)  $m^{-1}s^{-1}$                                         d)  $ms^{-2}$
- 8) For ethanol production, \_\_\_\_\_ is generally used as raw material for fermentation medium.  
 a) distillerssolubles                              b) molasses  
 c) corn steep liquor                              d) soyabean meal
- 9) Transfer of desired product from one liquid phase to another liquid phase is called as \_\_\_\_\_.  
 a) Downstream process                        b) Solid liquid extraction  
 c) Solvent recovery                              d) Solvent stabilization

- 10) Batch culture is a \_\_\_\_\_ culture system.
- a) open
  - b) closed
  - c) isolated
  - d) semi-closed

**B) Define following terms.**

**06**

- 1) Fermentation
- 2) Bioreactor
- 3) Effluent
- 4) Photo-bioreactor
- 5) Continuous culture
- 6) Upstream processing

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

**16**

- 1) Write any two names of microbial enzymes.
- 2) Give two examples microbial r-DNA products.
- 3) Write functions of Impeller.
- 4) Draw a neat labelled diagram of bacterial growth curve.
- 5) Give names of any two physical parameters for bioprocess control.
- 6) Give two types of centrifugation methods.
- 7) Name any two microbes involved in Amylase production.
- 8) Give any two types of bioreactors.
- 9) Name any two Lactic acid bacteria.

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

**10**

- 1) Describe methods for sterilization of fermentation media.
- 2) Write a note on inoculum development.
- 3) Write a note on computer application in fermentation process.

**B) Describe in detail Ethanol production.**

**06**

**Q.4 A) Write short note on: (Any Two)**

**08**

- 1) Sterilization of Air
- 2) SCP
- 3) Components of bioreactor

**B) Give a detailed account of downstream processing.**

**08**

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

**16**

- a) What is Microbial growth kinetics? Give a detailed account of growth kinetics in Batch & continuous culture.
- b) Write in detail about the Amylase production.
- c) Give a detailed account on bioprocess measurement and control system.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
Oct/Nov-2022**

**RECOMBINANT DNA TECHNOLOGY**

Day & Date: Monday, 30-01-2023  
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 labeled diagrams.

**Q.1 A) Multiple Choice Questions.**

**10**

- 1) In \_\_\_\_\_ method Nitrocellulose membrane is used to blot transfer the Colonies from master plate.  
a) Northern Blotting                      b) Acetate blotting  
c) Eastern Blotting                      d) colony hybridization
- 2) \_\_\_\_\_ developed as co-infection of M13 phage & plasmid to produces small version of virus.  
a) Phagemid                      b) Cosmid  
c) YAC                      d) BAC
- 3) Artificially synthesized 6-7 nucleotide sequences is called as \_\_\_\_\_.  
a) Marker                      b) Probe  
c) Adaptor                      d) Linker
- 4) Joachim Messing developed plasmid vector \_\_\_\_\_.  
a) pSC                      b) pBR  
c) pUC                      d) pNT
- 5) In PCR after 30 cycles produce approximately \_\_\_\_\_ PCR products.  
a) 13 million                      b) 123 Billion  
c) 1 Billion                      d) 1 million
- 6) Monellin Protein is \_\_\_\_\_ times sweeter than sucrose.  
a) 1000                      b) 3000  
c) 2000                      d) 4000
- 7) Human growth hormone has \_\_\_\_\_ amino acids.  
a) 100                      b) 121  
c) 191                      d) 181
- 8) Blue-white selection is \_\_\_\_\_ type of screening method.  
a) Hybridization                      b) Indirect  
c) Immunological                      d) Direct

**SLR-FY-42**

- 9)** \_\_\_\_\_ DNA polymerase don't have 5' to 3' exonuclease activity.  
a) Korenberg                      b) Kornberg  
c) Klenow                         d) Klenew
- 10)** Interferon a family is coded by \_\_\_\_\_ number of genes.  
a) 10                                  b) 11  
c) 13                                  d) 14

**B) Fill in the blanks/Definition/one sentence answer/One word answer/ 06**  
**Give the name/predict the product etc.**

- 1) First patented cloning vector is \_\_\_\_\_.
- 2) Who discover PCR?
- 3) Define transformation.
- 4) Define transduction.
- 5) Define site directed mutagenesis.
- 6) \_\_\_\_\_ Restriction endonuclease mostly used in genetic engineering.

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

- 1) Write a note in alkaline phosphatase.
- 2) Write a note on pBR322.
- 3) Explain shuttle vector.
- 4) Write a note on ultrasonication.
- 5) Write a note on isolation of DNA.
- 6) Describe protein engineering.
- 7) Write a note on gene shuffling.
- 8) Write a note on plant as bioreactor.
- 9) Write a note on edible vaccine.
- 10) Write a note on cosmid vector.

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

- 1) Describe Genomic DNA probes.
- 2) Discuss human hormone production by genetic engineering.
- 3) Explain Reverse transcriptase PCR.

**B) Write a short note on immunological screening. 06**

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

- 1) Explain YAC vector.
- 2) Describe klenow fragments
- 3) Explain  $\text{CaCl}_2$  method of gene transfer.

**B) Describe RFLP.** **08**

**Q.5 Answer the following (Any Two).** **16**

- Give details of sangers method of DNA sequencing.
- Explain plasmids as cloning vector.
- Explain development of senescence tolerant plants.

<b>Seat No.</b>	
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**B.Sc. (Biotechnology) (Semester -V) (New) (CBCS) Examination:  
Oct/Nov-2022  
Bioinformatics**

Day & Date: Tuesday, 31-01-2023  
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) SCOP stands for structural classification of \_\_\_\_\_

a) Dna	b) Lipids
c) Carbohydrates	d) Protein
- 2) \_\_\_\_\_ is a tool for prediction of physicochemical parameters at Expasy server.

a) Protparam	b) PI
c) PSI	d) Omega
- 3) Craig \_\_\_\_\_ is the father of Genomics.

a) Henikoff	b) Martin
c) Dayhoff	d) Venter
- 4) The stepwise method for solving problems in computer science is called\_\_\_\_\_

a) algorithm	b) Alignment
c) analysis	d) Aromatic
- 5) The \_\_\_\_\_ tool compares nucleotide sequence against DNA databases.

a) Predictprotein	b) Gor
c) Clustal	d) Blastn
- 6) T is symbol of \_\_\_\_\_ nucleotide base in nomenclature.

a) Tricodon	b) Triple
c) Thymine	d) Tryptophan
- 7) Point \_\_\_\_\_ Mutation is scoring matrices used for substitution the scores in alignment.

a) acid	b) single
c) assigned	d) accepted
- 8) > is symbol which used to start the \_\_\_\_\_ format in sequence file.

a) Msf	b) Fasta
c) Pdb	d) Chem
- 9) \_\_\_\_\_ is a free computational phylogenetic package of programs for inferring evolutionary trees.

a) Phylip	b) Blast
c) Expasy	d) EMBL



Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:  
Oct/Nov-2022**

**INTELLECTUAL PROPERTY RIGHTS**

Day & Date: Wednesday, 01-02-2023  
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) Fill in the blanks by choosing correct alternatives given below. 10**

- 1) \_\_\_\_\_ of the following principles is applicable to trademarks.
  - a) A trademark should be distinctive
  - b) A trademark should be capable of distinguishing goods or services
  - c) A trademark should not cause confusion with previous trademarks
  - d) A trademark should not be deceptive
- 2) The term of copyright for an author lasts for \_\_\_\_\_.
  - a) The life of the author
  - b) The life of the author plus 60 years
  - c) 95 years
  - d) 75 years
- 3) Symbol of Maharaja of Air India is \_\_\_\_\_.
  - a) Copyright
  - b) Patent
  - c) Trademark
  - d) GI
- 4) An invention should be patented, because \_\_\_\_\_.
  - a) It gives protection to a patentable invention
  - b) It gives more income
  - c) It increases product value
  - d) Increase production rate of product
- 5) The rights of a patentee are \_\_\_\_\_.
  - a) Not to Sell
  - b) License
  - c) Never Assign the property to others
  - d) Not to distribute
- 6) The Paris Convention for the Protection of \_\_\_\_\_.
  - a) Copy rights
  - b) Artistic work
  - c) Literary
  - d) Industrial Property
- 7) Software is protected as intellectual property in India primarily under the law of \_\_\_\_\_.
  - a) industrial designs
  - b) geographical indications
  - c) trademarks
  - d) copyright
- 8) The \_\_\_\_\_ system is the stand alone system to provide protection for plant variety.
  - a) Privilege
  - b) Sovereignty
  - c) TRIPS
  - d) Sui Generis

- 9) To register a plant variety, the criteria required include \_\_\_\_\_.  
a) New                                      b) Old  
c) Random                                d) Similar
- 10) UPOV is \_\_\_\_\_.  
a) Convention for plant variety      b) United States Patent  
c) Convention for patent              d) Convention for animal variety

**B) Fill in the blanks.**

06

- 1) Long form of WIPO \_\_\_\_\_.
- 2) Long form of TRIPS \_\_\_\_\_.
- 3) Biodiversity means \_\_\_\_\_.
- 4) Darjiling tea falls under \_\_\_\_\_ IPR.
- 5) Non patentable criteria covered under \_\_\_\_\_ section.
- 6) Patent granted by \_\_\_\_\_.

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

16

- a) Define IPR.
- b) Define Patent.
- c) Define Plant Breeder Right.
- d) Enlist three necessary quality of product for patenting.
- e) Enlist any two non-patentable things.
- f) Enlist any two title of convections present under IPR.
- g) Enlist any two examples of trademark.
- h) Define Infringement.
- i) Define geographical indication.
- j) Explain pre grant opposition.

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

10

- 1) Advantages and disadvantages of IPR.
- 2) Explain copyright with example.
- 3) Write note on Paris convention 1883.

**B) Short note/Solve**

06

Write a note on types of patenting.

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

08

- 1) Explain PCT.
- 2) Patenting of biological materials with examples.
- 3) Write note on Breeders exemption.

**B) Describe/Explain/Solve**

08

Describe in detail procedure for filing patent in India.

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

16

- Explain in brief Berne convention 1886.
- Explain in detail Plant Breeder's rights with advantages and disadvantages.
- Write account on Patentability criteria and non-patentable inventions.





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

**a)** What is an Information Literacy? Explain the benefits of Information Literacy?

**OR**

**b)** Write a note on Leadership skill with its characteristics.

**Q.4** What is Environment consciousness skill? Mention habits for environment conservation. **10**

Set P

- B) Define the following.** **06**
- 1) Acids
  - 2) Emission
  - 3) Centrifugation
  - 4) Colorimeter
  - 5) Mean by HPLC
  - 6) Mean by AAS
- Q.2 Solve any Eight of the following.** **16**
- a) Write a note on Adsorption
  - b) Write a note on Nepalometer.
  - c) Explain in brief Rate zonal centrifugation.
  - d) Write note on Excitation.
  - e) Explain in brief Isoelectric focusing.
  - f) Write note on Vibrational transition.
  - g) Define Electrophoresis.
  - h) Define Alkalinity.
  - i) Principle of differential centrifugation.
  - j) IR spectroscopy.
- Q.3 A) Attempt any Two of the following.** **10**
- 1) Write a note Pulsed field Gel electrophoresis.
  - 2) Describe and Explain working and construction of turbidometer.
  - 3) Explain Ion exchange chromatography with Diagram.
- B) Short note/Solve:**
- Write a detailed note on Thin Layer Chromatography. **06**
- Q.4 A) Attempt any Two of the following.** **08**
- 1) Write Agarose gel electrophoresis.
  - 2) Rational UV visible spectroscopy.
  - 3) Operation and calibration pH electrode.
- B) Describe/ Explain/ Solve:** **08**
- Principle and working of Northern blotting.
- Q.5 Attempt any Two of the following.** **16**
- a) Principal, Construction and working of pH meter.
  - b) Describe Analytical Ultra centrifugation.
  - c) Principle of Lambert's Beers law and Deviation of law.

**Seat  
No.**

Day & Date: Monday, 06-02-2023  
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.

10

- 1) Anticodon is present in \_\_\_\_\_.  
a) DNA  
b) tRNA  
c) rRNA  
d) mRNA
- 2) \_\_\_\_\_ purine bases is present in RNA.  
a) Uracil  
b) Thymine  
c) Cytosine  
d) Guanine
- 3) The effects of protein on an entire organism is described in \_\_\_\_\_.  
a) Phenotypic function  
b) Cellular function  
c) Molecular function  
d) Structural genomics
- 4) Sequencing of genomic DNA is included in \_\_\_\_\_.  
a) Phenotypic function  
b) Cellular function  
c) Molecular function  
d) Structural genomics
- 5) The term genomics coined by \_\_\_\_\_.  
a) Thomas Cech  
b) A. H. Morgan  
c) Craig Venter  
d) Thomas Roder
- 6) \_\_\_\_\_ methodology is used to identify all the genes that are expressed as RNA in Human Genome Project (HGP).  
a) Sequence Annotation  
b) Expressed Sequence Tags  
c) Karyotyping  
d) Ammonification
- 7) \_\_\_\_\_ nucleotides are present in the human genome.  
a) 3164.7 million  
b) 2015.9 million  
c) 1982.0 million  
d) 3247.9 million
- 8) The electrophoresis technique that uses isoelectric focusing is \_\_\_\_\_.  
a) AGE  
b) 2D-PAGE  
c) PFGE  
d) SDS-PAGE
- 9) Electrophoresis is used for \_\_\_\_\_.  
a) separation of DNA fragments  
b) separation of carbohydrate from DNA  
c) separation of protein from DNA  
d) separation of lipid from DNA
- 10) Haemophilia is caused by \_\_\_\_\_.  
a) Bacteria  
b) Virus  
c) Genetic mutation  
d) Cause unknown

- B) Write one-word answer of the following.** **06**
- 1) Genomic material in *Homo sapiens* is.
  - 2) Extrachromosomal material in bacteria called as.
  - 3) DNA structure was discovered by.
  - 4) Any one computer tool used for sequencing DNA.
  - 5) Genomic size of *Arabidopsis thaliana*.
  - 6) Long form of SDS PAGE.
- Q.2 Define any eight of the following** **16**
- 1) Genomics
  - 2) Proteomics
  - 3) Macromolecules
  - 4) Electrophoresis
  - 5) Molecular taxonomy
  - 6) Nucleosides
  - 7) Chromosome
  - 8) Omics
  - 9) Breeding
- Q.3 Attempt any two of the following** **10**
- 1) Write a note on mass spectroscopy.
  - 2) Write a note on HapMap project.
  - 3) Molecular diagnosis of Sickle cell anaemia.
- B) Short note on** **06**
- Computer tools for sequencing project.
- Q.4 A) Attempt any two of following.** **08**
- 1) Write in brief about Human Genome Project.
  - 2) Explain in brief application of proteomics in plants genomics and breeding.
  - 3) Write a note on the ENCODE project.
- B) Describe in brief** **08**
- Shotgun Sequencing method of genomic material.
- Q.5 Attempt any two of following.** **16**
- a) Define proteomics and explain in brief two dimensional polyacrylamide gel electrophoresis.
  - b) Write significance of Bacteria, Yeast, Drosophila, Arabidopsis genomes.
  - c) Write brief account on the origin of macromolecules, RNA and DNA

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination  
Oct/Nov-2022  
EVOLUTIONARY BIOLOGY**

Day & Date: Tuesday, 07-02-2023  
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) Multiple choice questions.****10**

- 1) \_\_\_\_\_ is absent in free form at the time of origin of life.
  - a) Hydrogen
  - b) Oxygen
  - c) Methane
  - d) Nitrogen
- 2) Darwin proposed theory of origin of species by \_\_\_\_\_.
  - a) Mutation
  - b) Natural selection
  - c) Hybridization
  - d) Acquired character
- 3) Comparative study of haemoglobins was carried out by \_\_\_\_\_.
  - a) Zuckerkandl & Pauling
  - b) W.K. Gregory
  - c) S. B. Hedges
  - d) Sudhir Kumar
- 4) According to \_\_\_\_\_ acquired variations are non-heritable.
  - a) Weismann
  - b) Lamarck
  - c) Wagner
  - d) Darwin
- 5) A species inhabiting different geographical areas is known as \_\_\_\_\_ species.
  - a) Allopatric
  - b) Sibling
  - c) Biospecies
  - d) Sympatric
- 6) If two species have incompatible mating structures, then \_\_\_\_\_ isolation will prevent them from mating.
  - a) mechanical
  - b) sexual
  - c) gametic
  - d) temporal
- 7) Biologists who study the sequences of organisms in the fossil records are \_\_\_\_\_.
  - a) Taxonomists
  - b) Entomologists
  - c) Systematists
  - d) Palaeobiologists
- 8) The age of mammals and birds are known as \_\_\_\_\_.
  - a) Mesozoic
  - b) Coenozoic
  - c) Paleozoic
  - d) Proterozoic
- 9) The first known horse like animal which forms a starting point in equine evolution starts \_\_\_\_\_.
  - a) Hypotherium
  - b) Hyracothecacum
  - c) Hyracotherium
  - d) Hyracothema
- 10) Macroevolution is also known as \_\_\_\_\_.
  - a) Genetic drift
  - b) Random selection
  - c) Adaptive radiation
  - d) Bottlenecks effect

- Q.1 B) Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc. 06**
- 1) Define Microevolution.
  - 2) Define adaptation
  - 3) Define vestigial organs.
  - 4) Give example of missing link.
  - 5) Define endosymbiosis theory.
  - 6) Define Palaeontology.
- Q.2 Solve any Eight of the following. 16**
- 1) What are coacervates?
  - 2) What is hot dilute soup?
  - 3) Write characteristic features of primates.
  - 4) Write the names of fossil man of Europe.
  - 5) Define K-T extinction.
  - 6) What is polyploidy?
  - 7) Define clines.
  - 8) What are sibling species?
  - 9) What are living fossils?
  - 10) Write the name of various eras.
- Q.3 A) Attempt any Two of the following. 10**
- 1) Describe Lamarckism.
  - 2) Write causes and effects of mass extinction.
  - 3) Describe evolution of globin gene family.
- B) Describe Millers experiment. 06**
- Q.4 A) Attempt any Two of the following. 08**
- 1) Describe various sources of variations.
  - 2) Differentiate between allopatric and sympatric speciation.
  - 3) Explain different types of fossils.
- B) Describe adaptive radiation with suitable example. 08**
- Q.5 Attempt any Two of the following. 16**
- a) Describe evolution of horse.
  - b) Describe origin and evolution of *Homo sapiens*.
  - c) Discuss role of isolation in evolution of new species.



Seat No.	
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Set	P
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**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination:  
Oct/Nov-2022**

**ENVIRONMENTAL BIOTECHNOLOGY**

Day & Date: Wednesday, 08-02-2023  
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 tables and calculators is allowed.

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

**10**

- 1) \_\_\_\_\_ of the following is not a Methanogenic bacteria.
  - a) Methanobacterium
  - b) Methanobrevibacter
  - c) Methanococcus
  - d) Tricoderma
- 2) \_\_\_\_\_ are the unique cofactors found only in Methanogenic bacteria.
  - a) methanopterin
  - b) methanofuran
  - c) CoM
  - d) All of these
- 3) Bioremediation \_\_\_\_\_.
  - a) usage of microbes to create new organisms
  - b) usage of anaerobic bacteria to create new antibiotics
  - c) usage of microbes to destroy environmental pollutants
  - d) usage of aerobic bacteria to create new vaccines
- 4) Ananda Chakrabarty received the first U.S. patent for a GM organism. This organism was:
  - a) A transgenic mouse expressing the growth hormone gene
  - b) Dolly the cloned sheep
  - c) Cloned E. coli
  - d) Pseudomonas engineered to degrade petroleum
- 5) The use of plants to remove contaminants from the environment and concentrate them in above-ground plant tissue is known as \_\_\_\_\_.
  - a) phytoextraction
  - b) phytostabilization
  - c) phytostimulation
  - d) phytotransformation
- 6) \_\_\_\_\_ bacterium can withstand the dosage of radiation, which are several times higher than what human cells can tolerate.
  - a) *Escherichia coli*
  - b) *Conus magus*
  - c) *Deinococcus radiodurans*
  - d) *Staphylococcus aureus*
- 7) \_\_\_\_\_ represents the amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic (oxygen is present) conditions at a specified temperature.
  - a) Biochemical oxygen demand (BOD)
  - b) Chemical oxygen demand
  - c) Nitrification
  - d) Denitrification
- 8) \_\_\_\_\_ is an asymbiotic or free living, aerobic, nitrogen fixing bacteria.
  - a) *Azotobacter*
  - b) *Clostridium*
  - c) Rhizobium
  - d) *Anabaena*

- 9) In \_\_\_\_\_ bacterial leaching a physical contact exists between bacteria and ores.
- a) direct                                      b) indirect
- c) composting                                d) xenobiotic
- 10) \_\_\_\_\_ microbes provide additional and highly effective tools for the enhanced removal of pollutants.
- a) Genetically modified                  b) Natural
- c) Sterile                                        d) Fertile

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

06

- 1) Biogas
- 2) Microbial bioremediation
- 3) Phytoremediation
- 4) Biofertilizer
- 5) Conventional fuels
- 6) Bioleaching

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

16

- 1) Explain Conventional fuels with examples.
- 2) Explain phytotransformation
- 3) Write advantages of using genetically modified microbes in environmental clean up.
- 4) What are Phosphate solubilizing bacteria?
- 5) What do you mean by VAM?
- 6) Discuss any 2 microorganisms used in bioleaching.
- 7) Explain Modern fuels with examples.
- 8) Discuss environmental impact of pesticides.
- 9) Differentiate between symbiotic and asymbiotic nitrogen fixing bacteria.
- 10) What is a genetically modified microorganism?

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

**10**

- 1) Write a note on bioremediation of pesticides.
- 2) Discuss activated sludge process for wastewater treatment.
- 3) Discuss Role of Microorganisms in process and production of Biogas.

**B) Write a Short note on Environment Protection Act (EPA)**

06

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

08

- 1) Write a note on bioremediation of petroleum products.
- 2) Discuss Role of Algal and fungal bio-fertilizers in enhancement of soil fertility.
- 3) Microbial hydrogen Production

**B) Discuss in detail Role of symbiotic and asymbiotic nitrogen fixing bacteria in the enrichment of soil**

08

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

16

- Write a detailed account on Conversion of sugars, agriculture and food industry waste (Corn starch, cotton) to alcohol
- Give a detailed account on Bioleaching
- Write a note on phytoremediation.

\_\_\_\_\_

## Max. Marks: 70

14

- Page 1 of 2

- 11) \_\_\_\_\_ is the antonym for 'folly'.
- |           |            |
|-----------|------------|
| a) Wisdom | b) Silly   |
| c) Clear  | d) Mistake |
- 12) \_\_\_\_\_ is the synonym for 'remote'.
- |           |            |
|-----------|------------|
| a) Wet    | b) Shadow  |
| c) Mobile | d) Distant |
- 13) \_\_\_\_\_ is the synonym for 'novel'.
- |          |          |
|----------|----------|
| a) New   | b) Prize |
| c) Medal | d) Old   |
- 14) \_\_\_\_\_ is the antonym for 'eager'.
- |           |              |
|-----------|--------------|
| a) Meager | b) Sugar     |
| c) Sad    | d) Reluctant |

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

- Comment on the subject matter of the poem 'My Grandmother's House'.
- What is the speaker's desire in the poem 'My Grandmother's House'?
- What awaits the Captain in the poem 'O Captain! My Captain!'?
- Analyze the metaphors used in the poem 'O Captain! My Captain!'.
- Comment on the beauty of the woman described in the poem 'She Walks in Beauty'.
- Comment on the theme of the poem 'Upagupta'.

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

- What will happen when you will meet a man who does not want money, according to Kipling?
- How should a foreigner speak when he/she wants to communicate or ask for directions, according to Shaw?
- What is meant by Prefix? Give four examples of prefixes.
- What is meant by Suffix? Give four examples of suffixes.

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

What is meant by leadership Skills? Comment on qualities of a good leader.

**OR**

What are the techniques one should follow to become an effective team member?

**Q.5 Write in detail about how to manage your time in a better way. 14**

Seat No.	
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**B.Sc. (Biotechnology) (Semester - VI) (Old) (CBCS) Examination:  
Oct/Nov-2022  
Animal Development**

Day & Date: Monday, 27-03-2023  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Rewrite the following sentences by using correct alternative.**

**14**

- 1) Bird egg is \_\_\_\_\_ type of egg.
  - a) Centrolecithal
  - b) Telolecithal
  - c) Homolecithal
  - d) Microlecithal
- 2) Fusion of male and female pronuclei is called as \_\_\_\_\_.
  - a) amplexus
  - b) Amphimixis
  - c) reunion
  - d) Copulation
- 3) Arteries and heart arises from the \_\_\_\_\_.
  - a) Ectoderm
  - b) Mesoderm
  - c) Endoderm
  - d) Meso-endoderm
- 4) If ten spermatids undergo spermeogenesis \_\_\_\_\_ sperms are produced.
  - a) 10
  - b) 20
  - c) 30
  - d) 40
- 5) Cavity present inside the blastula is called as \_\_\_\_\_.
  - a) Blastocoel
  - b) Gastrocoel
  - c) Coelom
  - d) Archenteron
- 6) Cancer develops from mesoderm tissue is called as \_\_\_\_\_.
  - a) Sarcoma
  - b) Carcinoma
  - c) Adenoma
  - d) Lymphoma
- 7) The hormone causing moulting in insects is \_\_\_\_\_.
  - a) Prolactin
  - b) Ecdysone
  - c) TSH
  - d) somatotrophin
- 8) Cancer causing genes are known as \_\_\_\_\_.
  - a) Tumor suppressor gene
  - b) Oncogene
  - c) Pseudogene
  - d) A cytotoxic protein
- 9) Testosterone secretion is function of \_\_\_\_\_ cells.
  - a) Sertoli
  - b) Leydig
  - c) Hepatocytes
  - d) Spermatogonial
- 10) Insect eggs shows \_\_\_\_\_ type of cleavage.
  - a) Complete
  - b) Superficial Meroblastic
  - c) Holoblastic
  - d) Discoidal Meroblastic
- 11) The metabolic axial gradient theory was proposed by \_\_\_\_\_.
  - a) Weismann
  - b) Roux
  - c) Driesch
  - d) Child

- 12) According to Gilchrist (1968), the prospective \_\_\_\_\_ is called "Zone of invagination".  
a) Ectodermal zone                      b) Endodermal zone  
c) Mesodermal zone                      d) Notochordal zone
- 13) \_\_\_\_\_ is not an example of asexual reproduction.  
a) Conjugation                              b) Binary fission  
c) Gemmule formation                      d) Budding
- 14) \_\_\_\_\_ is considered as aging or "wear-and-tear" pigments.  
a) Lipofuchsin                              b) Vitamins  
c) Lipids                                      d) Proteins

- Q.2 A) Answer the following questions. (Any Four) 08**  
1) Write a note on induction.  
2) Write a note on Baers law.  
3) Write a note on artificial insemination.  
4) What is epiboly?  
5) Write a note on properties of malignant cells.  
6) Write a note on Regeneration in salamander.
- B) Answer the following questions (Any Two) 06**  
1) Write a note regulative theory.  
2) Explain mitochondrial of aging.  
3) Describe process of oogenesis.
- Q.3 A) Answer the following questions. (Any Two) 08**  
1) Describe Gradient theory of Child.  
2) Describe process of spermatogenesis.  
3) Explain different types of asexual reproduction.
- B) Answer the following questions. (Any One) 06**  
1) Describe blastulation in insect egg.  
2) Describe free radical and telomere shortening theory of aging.
- Q.4 A) Answer the following questions. (Any Two) 10**  
1) Describe potency, competence, determination and differentiation.  
2) Write process and applications of IVF.  
3) Describe process of gastrulation in frog.
- B) Answer the following questions. (Any One) 04**  
1) Describe blastulation in hen eggs.  
2) Describe process of regeneration in invertebrates with suitable examples.
- Q.5 Answer the following questions. (Any Two) 14**  
a) Describe different types of cleavage with neat labeled diagram.  
b) Explain process acrosome reaction and cortical reaction.  
c) Describe metamorphosis in amphibians.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - VI) (Old) (CBCS) Examination  
Oct/Nov-2022**

**FOOD AND DAIRY TECHNOLOGY**

Day &amp; Date: Monday, 06-02-2023

Max. Marks: 70

Time: 03:00 PM To 05:30 PM

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

**Q.1 Choose the correct alternative and rewrite the sentences. 14**

- 1) A yellow color in the creamy layer of milk may be caused by \_\_\_\_\_.  
 a) *Pseudomonas synxantha*                      b) *Pseudomonas syncyanea*  
 c) *E.coli*    d) *S. marcescens*
- 2) In UHT \_\_\_\_\_ temperature and time is used for pasteurization of milk.  
 a) 120°C for 1 second                              b) 62.8 °C for 30 minutes  
 c) 80°C for 20 mints                              d) 71.7°C for 15 seconds
- 3) The principal microorganism for cheese production are of \_\_\_\_\_ families  
 a) *Lactococcus*    b) *Lactobacillus*  
 c) *Streptococcus*    d) All of these
- 4) Buttermilk is fluid product resulting from manufacturing of \_\_\_\_\_.  
 a) Cheese    b) Yoghurt  
 c) Ice cream    d) butter
- 5) Principal protein in milk is \_\_\_\_\_.  
 a) Albumin    b) Lactalbumin  
 c) Casein    d) Lactoglobulin
- 6) \_\_\_\_\_ of the following is a must in food labeling.  
 a) Name    b) Standard Specification  
 c) Place of Origin    d) All of these
- 7) A substance intentionally added that preserves flavor and improves taste is called \_\_\_\_\_.  
 a) Food additive    b) Food adulterant  
 c) Food contaminant    d) Food material
- 8) Cold sterilization refers to the preservation of food by \_\_\_\_\_.  
 a) refrigeration    b) irradiation  
 c) lyophilisation    d) dehydration
- 9) The large holes in the cheese are due to \_\_\_\_\_.  
 a) Oxygen production    b) Carbon dioxide production  
 c) Sulfur dioxide release    d) Lead dioxide release
- 10) A mineral that the body needs to work properly is \_\_\_\_\_.  
 a) Silver    b) Gold  
 c) Calcium    d) Lead
- 11) The objective of ISO-9000 family of Quality management is \_\_\_\_\_.  
 a) Customer satisfaction    b) Employee satisfaction  
 c) Skill enhancement    d) Environmental issues

- 12) Shredded cabbage is the starting product for \_\_\_\_\_ as fermented food.
  - a) Sauerkraut
  - b) Pickles
  - c) Green olives
  - d) Sausage
- 13) The \_\_\_\_\_ test is used to check the efficiency of pasteurization of milk.
  - a) Direct Microscopic Count
  - b) Phosphatase test
  - c) Most probable Number
  - d) Methylene blue reduction time
- 14) \_\_\_\_\_ of the following is responsible for musty or earthy flavor in meat
  - a) *Actinomyces spp*
  - b) *Flavobacterium spp*
  - c) *Pseudomonas synchyanea*
  - d) *E.coli*

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

- 1) Define Asepsis and different methods of asepsis.
- 2) Define milk.
- 3) Define Indicator organism and its characteristics.
- 4) Types of Hazards in food.
- 5) Give starter culture of yoghurt.

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

- 1) Explain use of high temperature for food preservation.
- 2) Explain microbial spoilage of vegetables and fruits.
- 3) Explain use of facilities and equipment's to control growth of microorganisms in food industries.

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

- 1) Explain production of sauerkraut.
- 2) Explain dye reduction tests in microbiological examination of milk.
- 3) Explain phosphatase test.

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

- 1) Explain rapid methods of detection of organisms and toxins in food.
- 2) Explain production of cheese.

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

- 1) Explain different enumeration methods for microbial examination of food.
- 2) Explain physical properties of food affecting microbial growth.
- 3) Explain microbial spoilage of milk and milk products.

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

- 1) Explain BS 5750 and ISO 9000
- 2) Microbial spoilage of meat and meat products

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

- a) Explain chemical properties of food affecting microbial growth.
- b) Explain Hazard analysis critical control point.
- c) Explain different methods of nutritional analysis of food.



Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - VI) (Old) (CBCS) Examination  
Oct/Nov-2022**

**Bioinformatics and Nanotechnology**

Day &amp; Date: Tuesday, 07-02-2023

Max. Marks: 70

Time: 03:00 PM To 05:30 PM

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

**Q.1 Rewrite the following sentences by choosing correct alternatives.**

**14**

- 1) Basic local alignment search tool is a \_\_\_\_\_ method.
  - a) Word
  - b) Number
  - c) Dot plot
  - d) Progressive
- 2) The term nanotechnology was coined by \_\_\_\_\_.
  - a) Eric Drexler
  - b) Richard Feynmann
  - c) Sumio Tijima
  - d) Richard Smalley
- 3) \_\_\_\_\_ is a type of protein secondary structure which is more conserved in evolution.
  - a) Primary
  - b) Secondary
  - c) Tertiary
  - d) Misfolded
- 4) The ratio that decides the efficiency of nanosubstances is \_\_\_\_\_.
  - a) Weight/volume
  - b) Surface area/volume
  - c) Volume/weight
  - d) Pressure/volume
- 5) The \_\_\_\_\_ is a study of to identify the evolutionary relationship between organism.
  - a) Taxonomy
  - b) Ecology
  - c) Phylogeny
  - d) Morphology
- 6) \_\_\_\_\_ are found revolving in atomic orbits.
  - a) Protons
  - b) Electrons
  - c) Neutrons
  - d) Positrons
- 7) \_\_\_\_\_ is a database for the three-dimensional structural data of large biological molecules maintained by RCSB.
  - a) MMDB
  - b) PDB
  - c) NDB
  - d) PDBsum
- 8) The size of a quantum dot is \_\_\_\_\_ nm.
  - a) 5
  - b) 10
  - c) 50
  - d) 100
- 9) In \_\_\_\_\_ database contain computationally processed sequence information derived from the primary databases.
  - a) Secondary
  - b) Primary
  - c) Composite
  - d) Tertiary
- 10) The tool used to make nano structures is \_\_\_\_\_.
  - a) Spectroscopy
  - b) Chromatography
  - c) Microscopy
  - d) Lithography

- 11) Protein Information resources was established in 1984 by \_\_\_\_\_.
  - a) NCRF
  - b) NBRF
  - c) NTRF
  - d) INSDC
- 12) Synthesis of nano particles using enzymes is \_\_\_\_\_ method.
  - a) Biological
  - b) Chemical
  - c) Physical
  - d) Hybrid
- 13) Nucleic acids can only be synthesized in vivo in the \_\_\_\_\_ direction.
  - a) 5'-to-3'
  - b) 3'-to-5'
  - c) 6'-to-5'
  - d) 3'-to-9'
- 14) Nano tubes are successfully designed using \_\_\_\_\_.
  - a) Carbon
  - b) Silver
  - c) Gold
  - d) Zinc

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

- 1) What is Pubmed?
- 2) What is Proteomics?
- 3) Define Nano particle
- 4) What is TrEMBL?
- 5) What is Bioremediation?

**B) Write a note on (Any two)** **06**

- 1) Add a note on fundamentals of nanotechnology.
- 2) Write in note on Entrez search engine.
- 3) Give a brief account on nanotechnology in drug delivery system.

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

- 1) Explain scanning probe instruments for measuring nano particles.
- 2) Write in detail on PDB structure database?
- 3) Define lithography. Add a note on its types.

**B) Answer the Following (Any one)** **06**

- 1) Explain the protein sequence secondary database in detail.
- 2) Write a note on applications of nanotechnology in environmental cleaning.

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

- 1) Explain in brief account on Genbank sequence database.
- 2) Explain molecular synthesis of nano particles.
- 3) Explain nomenclature of DNA and protein sequence in bioinformatics.

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

- 1) Explain the phylogenetic analysis and its applications.
- 2) Add a note on physical and chemical methods of nano particle synthesis.

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

- Define bioinformatics and explain various branches in life science in detail.
- Explain the biological synthesis of nano particles.
- Explain the sequence alignment techniques in bioinformatics in detail.

<b>Seat No.</b>	
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**B.Sc. (Biotechnology) (Semester - VI) (Old) (CBCS) Examination:  
Oct/Nov-2022**

## APPLICATIONS OF BIOTECHNOLOGY

Day & Date: Wednesday, 08-02-2023  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Rewrite the sentence by using correct alternative. 14**

- 1) Interferon  $\alpha$  &  $\beta$  are synthesized in cells which are exposed to \_\_\_\_\_.  
a) Viruses                                      b) Fungus  
c) Bacteria                                      d) Protozoans
- 2) \_\_\_\_\_ is an example of disease which may be cured by antisense RNA as therapeutic agent.  
a) Diabetes                                      b) Cystic fibrosis  
c) Malignant glioma                          d) Turners syndrome
- 3) \_\_\_\_\_ pioneered the work in protein engineering.  
a) Max Perutz                                    b) Carrel  
c) Zernik                                         d) Morris Gayle
- 4) \_\_\_\_\_ Of the following has Bipyradimal Crystal shape.  
a) CRY II                                         b) CRY III  
c) CRY I                                         d) CRY IV
- 5) Halogenated aromatic compounds mainly present in pesticides & herbicides are converted to \_\_\_\_\_.  
a) Pyruvic acid                                    b) Catechol  
c) Protocatechol                                d) Succinic acid
- 6) \_\_\_\_\_ is an example of manipulation by transfer of plasmid.  
a) pUC57                                         b) pBr327  
c) Superbug                                      d) pSC101
- 7) Natural rubber Cis-1-4- polyisoprene is an extensively used \_\_\_\_\_ obtained from plants.  
a) Synthetic compound                        b) Xenobiotic  
c) Chemical polymer                          d) Biopolymer
- 8) Phosphoramidate Antisense oligonucleotides have been shown to be \_\_\_\_\_ in vivo in mice.  
a) Effective                                        b) Inactive  
c) Neutral                                         d) Toxic
- 9) Molecular weight of human growth hormone is \_\_\_\_\_ Dalton.  
a) 22,125                                         b) 22,825  
c) 22,950                                         d) 22, 000
- 10) The \_\_\_\_\_ in animals appears to be related to Gene Silencing.  
a) RNA interference                            b) Sequencing  
c) Co suppression                              d) Gene Knockout



<b>Seat No.</b>	
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**B.Sc. (Biotechnology) (Semester - VI) (Old) (CBCS) Examination:  
Oct/Nov-2022**

## QUALITY STANDARD PRACTICES IN BIOTECHNOLOGY

Day & Date: Wednesday, 08-02-2023

Max. Marks: 70

Time: 03:00 PM To 05:30 PM

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

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

14

- 1) \_\_\_\_\_ is the most common used coagulant for waste water treatment.  
a) Alum                                      b) Ferric Sulphate  
c) Limestone                                d) Coal
- 2) In ultra filtration of water \_\_\_\_\_ factor is considered.  
a) Size    b) Color  
c) Taste                                        d) Smell
- 3) The moisture content of cow milk is \_\_\_\_\_.  
a) 30%    b) 50%  
c) 83%    d) 90%
- 4) The fat percentage of cow milk is \_\_\_\_\_.  
a) 9    b) 10  
c) 15     d) 4
- 5) The mastitis in cow is caused due to \_\_\_\_\_.  
a) *E. coli*                                        b) *Streptococcus agalactiae*  
c) *Staphylococcus aureus*                d) All of these
- 6) The \_\_\_\_\_ causes alkalinity as well hardness in natural water.  
a) Calcium carbonate                        b) Calcium bicarbonate  
c) Magnesium carbonate                     d) All of these
- 7) \_\_\_\_\_ is not a water borne disease.  
a) Typhoid                                      b) Scabies  
c) Cholera                                        d) Hepatitis
- 8) The objective of ISO-9000 family of Quality management system is \_\_\_\_\_.  
a) Customer satisfaction                      b) Employee satisfaction  
c) Skill enhancement                          d) Environmental issues
- 9) \_\_\_\_\_ of the following is for Environment management.  
a) ISO-9000                                      b) ISO-14000  
c) ISO-22000                                    d) ISO-31000
- 10) HACCP stand for \_\_\_\_\_.  
a) Hazard Analysis and Critical Control Points  
b) Hazard And Critical Control Points  
c) Health Analysis and Critical Control Points  
d) Hazard And Critical Cooking Points

- 11) Umbilical cord blood is rich source of \_\_\_\_\_.  
a) Protein  
b) DNA  
c) Stem cells  
d) Mast cells
- 12) IQ initials stands for \_\_\_\_\_.  
a) Internal quality  
b) Installation Qualification  
c) Internal Quotation  
d) Installation quality
- 13) GMP stands for \_\_\_\_\_.  
a) Good Manufacturing practices  
b) Good manufacturing products  
c) Good manufacturing process  
d) Good Monitored Products
- 14) Chromosomal spread picture is called as \_\_\_\_\_.  
a) Karyotype  
b) Karyograph  
c) Kymograph  
d) None of these

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

- 1) Define milk and give milk composition.
- 2) Define fecal indicator of water and give its name.
- 3) Define ISO 22000 and ISO 9001.
- 4) Define PMO and DMO.
- 5) Define antibody markers and its significance.

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

- 1) Explain WHO guidelines for drinking water.
- 2) Explain occurrence of pathogen in water.
- 3) Explain ADV and fat content of milk.

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

- 1) Explain production of butter.
- 2) Explain GMP guidelines for production of sterile pharmaceutical products.
- 3) Explain roles and responsibilities of ISO 22000.

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

- 1) Explain Good hygienic practices in food industries.
- 2) Explain seven principles of HACCP.

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

- 1) Explain industrial production of ice-cream.
- 2) Explain different steps involved in clinical trials in humans.
- 3) Explain Concept of stem cell banking.

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

- 1) Explain DNA profiling for cell identification.
- 2) Explain karyotyping.

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

- Explain different methods involved in purification of drinking water.
- Explain different methods involved in testing of milk quality.
- Explain cheese production.

<b>Seat No.</b>		<b>Marks Obtained</b>		<b>Signature of Examiner</b>		<b>Signature of Junior Supervisor</b>	
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**B.Sc. (Biotechnology) (Semester - II) (New) (First Year) Examination:  
Oct/Nov-2022**

**DEMOCRACY, ELECTIONS AND GOOD GOVERNANCE**

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

Max. Marks: 50

**सूचना :** 1) सर्व प्रश्न अनिवार्य आहेत.  
2) उजवीकडील अंक गुण दर्शवतात.

**Answer**

**प्र.1 योग्य पर्याय निवडा.**

1. महाराष्ट्रातील स्थानिक स्वराज्य संस्थांमध्ये महिलांसाठी किती जागा राखीव आहेत?

अ) 50%

ब) 33%

क) 25%

ड) 70%

2. ——— हे भारताचे सध्याचे मुख्य निवडणूक आयुक्त आहेत.

अ) सुनिल अरोरा

ब) तामिळ सेल्वम

क) के. उन्नीकृष्णन

ड) रामनाथ कोविंद

3. भारतीय राज्यघटनेत मूलभूत हक्कांचा समावेश ——— भागात करण्यात आला आहे.

अ) तिसऱ्या

ब) घटनादुरुस्ती

क) त्याहत्तराव्या

ड) सारांश

4. अप्रत्यक्ष लोकशाहीला ——— लोकशाही असेही म्हटले जाते.

अ) वॉईट

ब) प्रातिनिधिक

क) नकारात्मक

ड) सकारात्मक

5. जर भारतात कोणी व्यक्ती किंवा राज्यसंस्थेने मूलभूत हक्कांवर बंधने आणली तर नागरिकांना ——— दाद मागता येते.

अ) सर्वोच्च आणि उच्च न्यायालय

ब) संसदेत

क) सरकारकडे

ड) ग्रामसभेत

6. सामाजिक लोकशाहीचे उद्दिष्ट ——— प्रोत्साहन देणे होय.

अ) सामाजिक न्यायाला

ब) नोकरशाहीला

क) श्रीमंत लोकांना

ड) सुशिक्षितांना

7. भारतीय राज्यघटनेत किती मूलभूत अधिकारांचा समावेश करण्यात आला आहे.

अ) सहा

ब) एक

क) दहा

ड) बारा

8. आदिवासी रोजंदारीवरील कामगार, मच्छिमार, बांधकाम मजूर यांचा समावेश भारताच्या ——— समूहांमध्ये होतो.

अ) पुढारलेल्या

ब) वंचित

क) सत्ताधारी

ड) यापैकी सर्व

☐

9. प्रातिनिधिक लोकशाहीत ——— प्रक्रिया शासन आणि जनतेला जोडते.

अ) भ्रष्टाचार

ब) हुकूमशाही

क) निवडणूक

ड) अर्थशास्त्र

☐

10. प्रत्यक्ष लोकशाही इसवी सन पूर्व तिसऱ्या शतकात ——— येथे सुरु झाली.

अ) भारत

ब) इंग्लंड

क) अथेन्स

ड) अमेरिकेची संयुक्त संस्थाने

☐

11. खालीलपैकी कोणता अधिकार भारतीय राज्यघटनेमधील मूलभूत अधिकार आहे?

अ) शिक्षणाचा अधिकार

ब) संप करण्याचा अधिकार

क) संपत्तीचा अधिकार

ड) क्रांती करण्याचा अधिकार

☐

12. ——— ही तळपातळीवरील संसदेची छोटी प्रतिकृती आहे.

अ) लोकसभा

ब) विधानपरिषद

क) ग्रामसभा

ड) राज्यसभा

☐

13. सुशासनासाठी ——— हे आवश्यक आहे.

अ) केंद्रीकरण

ब) खाजगीकरण

क) लोकसहभाग

ड) दंगा नियंत्रक पोलीस

☐

14. भारतीय मतदार ——— सदस्य प्रत्यक्षपणे निवडतात.

अ) राज्यसभेचे

ब) लोकसभेचे

क) विधान परिषदेचे

ड) निवडणूक आयोगाचे

☐

15. 73 वी आणि 74 वी घटना दुरुस्ती ——— सरकारशी संबंधित आहेत.

अ) केंद्र

ब) राष्ट्रीय

क) राज्य

ड) स्थानिक

☐

16. लोकशाहीला घटनात्मक शासन असेही म्हटले जाते, याचा अर्थ ——— राज्य असा होतो.

अ) शक्तीचे

ब) कायद्याचे

क) सत्ताधारी शक्तीच्या लहरीप्रमाणे

ड) हुकूमशहाचे

☐

17. सार्वजनिक उत्तरदायित्व म्हणजे प्रातिनिधीने लोकांना ——— असणे होय.

अ) विरोधी

ब) बेजबाबदार

क) जबाबदार

ड) यापैकी सर्व

☐

18. स्वातंत्र्य, समता आणि बंधुता ही ——— लोकशाहीची मुख्य मूल्ये आहेत.

अ) जुन्या

ब) ग्रीक

क) सामाजिक

ड) परदेशी

☐



19. ज्या राजकीय प्रक्रियेद्वारे केंद्र सरकारकडून स्थानिक सरकारकडे प्रशासकीय अधिकार आणि जबाबदाऱ्या हस्तांतरित केल्या जातात त्याला ——— असे म्हणतात.  
 अ) विकेंद्रिकरण ब) केंद्रीकरण  
 क) हुकूमशाही ड) हस्तक्षेप
20. राजकारणाने गुन्हेगारीकरण हे भारतीय लोकशाहीपुढील मुख्य ——— आहे.  
 अ) गरज ब) आव्हान  
 क) पात्रता ड) देणगी
21. भारतात राजकीय सहभागाच्या संधी ——— मर्यादित असतात.  
 अ) महिलांना ब) नेत्यांना  
 क) श्रीमंत लोकांना ड) यापैकी नाही
22. लोकसभेत ——— सदस्य आहेत आणि ते प्रत्यक्ष पद्धतीने निवडले जातात.  
 अ) 555 ब) 250  
 क) 288 ड) 543
23. सोलापूर शहर हे ——— कार्यक्षेत्रात येते.  
 अ) महानगरपालिकेच्या ब) ग्रामपंचायतीच्या  
 क) नगरपरिषदेच्या ड) पंचायत समितीच्या
24. भारतातील स्थानिक स्वराज्य संस्थांमधील एक तृतीयांश जागा ——— राखीव असतात.  
 अ) महिलांसाठी ब) मच्छिमारांसाठी  
 क) स्थलांतरित मजुरांसाठी ड) बांधकाम मजुरांसाठी
25. महाराष्ट्र विधानसभेत ——— सदस्य निवडून येतात.  
 अ) 75 ब) 200  
 क) 288 ड) 388
26. भारतातील शासन पद्धतीमध्ये ——— स्तर आहेत.  
 अ) चार ब) तीन  
 क) दोन ड) पाच
27. उत्तरदायित्व आणि पारदर्शकता ही दोन तत्वे ——— याच्याशी संबंधित आहेत.  
 अ) वॉर्ड शासन ब) जुने शासन  
 क) झुंडशाही ड) सुशासन
28. भारतीय नागरिकांना माहितीच्या अधिकाराद्वारे ——— माहिती मागविता येते.  
 अ) खाजगी कंपन्यांकडून ब) सरकारी अधिकाऱ्यांकडून  
 क) बहुराष्ट्रीय कंपन्यांकडून ड) यापैकी सर्व
29. शिक्षणाच्या अधिकाराद्वारे राजसंस्थेने ——— या वयोगटातील बालकांना शाळेत नाव नोंदविले आहे याची खात्री करून घेणे आवश्यक बनले आहे.  
 अ) 6 ते 14 ब) 1 ते 5  
 क) 15 ते 20 ड) यापैकी नाही



41. प्रत्यक्ष लोकशाहीलाच ——— लोकशाही असेही म्हणतात.  
 अ) सहभागी ब) प्रातिनिधीक  
 क) नवीन ड) नकारात्मक ☐
42. लोकशाहीमध्ये विधिमंडळ, मंत्रिमंडळ आणि इतर समितीमधील प्रश्न सोडविण्यासाठी ——— हे तत्व वापरतात.  
 अ) अल्पमताचे नियम ब) बहुमताचा नियम  
 क) नेतृत्व ड) हुकूमशाही ☐
43. डॉ.आंबेडकर यांनी ——— लोकशाहीचा पुरस्कार केला.  
 अ) प्रत्यक्ष ब) सामाजिक  
 क) प्राचीन ड) आधुनिक ☐
44. महाराष्ट्र गांधी राष्ट्रीय ग्रामीण रोजगार हमी कायदा हे ——— योजनेचे उदाहरण आहे.  
 अ) राजकीय ब) सामाजिक कल्याण  
 क) लोकप्रिय ड) निवडणूक ☐
45. खालीलपैकी कोणते लोकशाहीचे तत्व नाही?  
 अ) सहमतीने शासन ब) सार्वजनिक उत्तरदायित्व  
 क) कायद्याचे राज्य ड) हुकूमशाही ☐
46. भारतात खुल्या आणि न्यायपूर्ण निवडणूक सातत्याने घेतल्या गेल्या. याला ——— हे वर्ष अपवाद होते.  
 अ) 2014  
 ब) 1976  
 क) 1967  
 ड) 2000 ☐
47. बलवंतराय मेहता आणि अशोक मेहता समिती या भारतातील ——— या घटकाशी संबंधित आहेत.  
 अ) जी.एस.टी ब) संसद  
 क) राज्य सरकार ड) पंचायती राज्य संस्था ☐
48. अर्थशास्त्र या प्राचीन भारतीय ग्रंथात सुशासनाची तत्वे सांगितली आहेत. अर्थशास्त्राचा लेखक कोण?  
 अ) रामचंद्रन ब) कौटिल्य  
 क) मंडन मिश्र ड) कालिदास ☐
49. स्वातंत्र्य, समता आणि बंधुता हा ——— राज्यक्रांतीचा नारा होता.  
 अ) इंडोनेशियन ब) फ्रेंच  
 क) अमेरिकन ड) रशियन ☐
50. ——— हे अधिकार पारदर्शकता आणि उत्तरदायित्वाचे उदाहरण आहे.  
 अ) माहितीचा ब) संपत्तीचा  
 क) एकत्र येण्याचा ड) धार्मिक ☐

<b>Seat No.</b>		<b>Marks Obtained</b>		<b>Signature of Examiner</b>		<b>Signature of Junior Supervisor</b>	
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**B.Sc. (Biotechnology) (Semester - II) (New) (First Year) Examination:  
Oct/Nov-2022**

## DEMOCRACY, ELECTIONS AND GOOD GOVERNANCE

Day & Date: Sunday, 12-02-2023

Max. Marks: 50

Time: 12:00 PM to 02:00 PM

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

### Answer

**Q.1 Choose the correct option and rewrite the sentence.**

- 1) How many seats are reserved for women in Local self government in Maharashtra?

- a) 50%                      b) 33%
- c) 25%                      d) 70%

7

- 2)** is the present Chief Election Commissioner of India.

- a) Sunil Arora  
b) Tamil Selvam  
c) K. Unnikrishnan  
d) Ramnath Kovind

7

- 3) In India, Fundamental Rights are enshrined in \_\_\_\_\_ of the constitution.**

- a) Part III
- b) Amendment
- c) Part 73
- d) Summary

7

- 4) Indirect Democracy is also called as** representative **democracy.**

- a) bad                                      b) representative  
c) negative                                d) positive

7

- 5) If the fundamental rights in India are abridged by any individual or the state, any citizen can move the**

- a) Supreme Court & High Courts  
b) Parliament  
c) Government  
d) Gramsabha

7

- 6) Social democracy aims to promote**

- a) social justice                      b) bureaucracy  
c) rich people                         d) educated

7

- 7) How many fundamental rights are included in the Indian Constitution?

- a) Six  
b) One  
c) Ten  
d) Twelve

7

- 8) Casual workers, Fisher folks, Construction labourers are considered as sections in India.**

- a) advanced  
b) marginalized  
c) ruling  
d) all of these

7

- 9) In representative democracy the process of \_\_\_\_\_ links the government and the people.
- |               |                 |                          |
|---------------|-----------------|--------------------------|
| a) corruption | b) dictatorship | <input type="checkbox"/> |
| c) election   | d) economics    |                          |
- 10) Direct democracy was started in \_\_\_\_\_ in 3<sup>rd</sup> century B.C.
- |           |            |                          |
|-----------|------------|--------------------------|
| a) India  | b) England | <input type="checkbox"/> |
| c) Athens | d) U.S.A.  |                          |
- 11) Which one of the following is the fundamental right in Indian constitution?
- |                       |                    |                          |
|-----------------------|--------------------|--------------------------|
| a) Right to Education | b) Right to Strike | <input type="checkbox"/> |
| c) Right to Property  | d) Right to Revolt |                          |
- 12) \_\_\_\_\_ is miniature of the Parliament of India at the grassroots level.
- |              |                   |                          |
|--------------|-------------------|--------------------------|
| a) Loksabha  | b) Vidhanparishad | <input type="checkbox"/> |
| c) Gramsabha | d) Rajysabha      |                          |
- 13) \_\_\_\_\_ is necessary for the good governance.
- |                         |                        |                          |
|-------------------------|------------------------|--------------------------|
| a) Centralization       | b) Privatization       | <input type="checkbox"/> |
| c) Public Participation | d) Riot Control Police |                          |
- 14) Indian voters directly elect the members of \_\_\_\_\_
- |                    |                        |                          |
|--------------------|------------------------|--------------------------|
| a) Rajysabha       | b) Loksabha            | <input type="checkbox"/> |
| c) Vidhan Parishad | d) Election Commission |                          |
- 15) The 73<sup>th</sup> and 74<sup>th</sup> constitutional amendments are related to the \_\_\_\_\_ government.
- |            |             |                          |
|------------|-------------|--------------------------|
| a) central | b) national | <input type="checkbox"/> |
| c) state   | d) local    |                          |
- 16) Democracy is also considered as the constitutional government which means government by \_\_\_\_\_ rather than by men.
- |                                   |             |                          |
|-----------------------------------|-------------|--------------------------|
| a) force                          | b) law      | <input type="checkbox"/> |
| c) whims and fancies of the ruler | d) dictator |                          |
- 17) Public Accountability means the representative must remain \_\_\_\_\_ to the people
- |               |                  |                          |
|---------------|------------------|--------------------------|
| a) opposite   | b) irresponsible | <input type="checkbox"/> |
| c) answerable | d) all of these  |                          |
- 18) Freedom, equality and fraternity are the core values of \_\_\_\_\_ democracy.
- |           |            |                          |
|-----------|------------|--------------------------|
| a) Old    | b) Greek   | <input type="checkbox"/> |
| c) Social | d) Foreign |                          |
- 19) The political process by which the administrative authority and responsibilities are transferred from central government to the local government is known as \_\_\_\_\_
- |                     |                          |
|---------------------|--------------------------|
| a) Decentralization | <input type="checkbox"/> |
| b) Centralization   |                          |
| c) Dictatorship     |                          |
| d) Interference     |                          |
- 20) Criminalization of politics is the basic \_\_\_\_\_ before the democracy in India.
- |                  |              |                          |
|------------------|--------------|--------------------------|
| a) need          | b) challenge | <input type="checkbox"/> |
| c) qualification | d) boon      |                          |

- 21) The opportunities for political participation are minimal to \_\_\_\_\_ in India
- |                |                  |                          |
|----------------|------------------|--------------------------|
| a) women       | b) leaders       | <input type="checkbox"/> |
| c) rich people | d) none of these |                          |
- 22) Loksabha has \_\_\_\_\_ members which are directly elected by the people.
- |        |        |                          |
|--------|--------|--------------------------|
| a) 555 | b) 250 | <input type="checkbox"/> |
| c) 288 | d) 543 |                          |
- 23) Solapur city comes under the jurisdiction of \_\_\_\_\_.
- |                          |                      |                          |
|--------------------------|----------------------|--------------------------|
| a) Municipal Corporation | b) Village Panchayat | <input type="checkbox"/> |
| c) Municipal Council     | d) Panchayat Samiti  |                          |
- 24) In the local governments of India one third of the seats are reserved for \_\_\_\_\_.
- |                     |                         |                          |
|---------------------|-------------------------|--------------------------|
| a) women            | b) fisher folks         | <input type="checkbox"/> |
| c) migrated workers | d) construction workers |                          |
- 25) There are \_\_\_\_\_ elected members in Maharashtra Vidhansabha.
- |        |        |                          |
|--------|--------|--------------------------|
| a) 75  | b) 200 | <input type="checkbox"/> |
| c) 288 | d) 388 |                          |
- 26) There are \_\_\_\_\_ tiers of Indian government.
- |         |          |                          |
|---------|----------|--------------------------|
| a) Four | b) Three | <input type="checkbox"/> |
| c) Two  | d) Five  |                          |
- 27) The principles of accountability and transparency are related to the \_\_\_\_\_.
- |                   |                    |                          |
|-------------------|--------------------|--------------------------|
| a) bad governance | b) old governance  | <input type="checkbox"/> |
| c) mobocracy      | d) good governance |                          |
- 28) Indians can seek information from \_\_\_\_\_ under the Right to Information Act.
- |                            |                         |                          |
|----------------------------|-------------------------|--------------------------|
| a) private companies       | b) government officials | <input type="checkbox"/> |
| c) multinational companies | d) all of these         |                          |
- 29) The Right to Education makes it mandatory for the state to ensure that all children of the \_\_\_\_\_ age group enroll themselves in schools.
- |             |                  |                          |
|-------------|------------------|--------------------------|
| a) 6 to 14  | b) 1 to 5        | <input type="checkbox"/> |
| c) 15 to 20 | d) none of these |                          |
- 30) Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is one step towards implementing the provision of \_\_\_\_\_
- |                         |                       |                          |
|-------------------------|-----------------------|--------------------------|
| a) Right to Information | b) Right to Education | <input type="checkbox"/> |
| c) Right to Work        | d) Right to Liberty   |                          |
- 31) The members of Maharashtra \_\_\_\_\_ are directly elected by the people.
- |                    |              |                          |
|--------------------|--------------|--------------------------|
| a) Vidhansabha     | b) Rajysabha | <input type="checkbox"/> |
| c) Vidhan Parishad | d) Gramsabha |                          |
- 32) \_\_\_\_\_ is the example of rural local self government.
- |                      |                     |                          |
|----------------------|---------------------|--------------------------|
| a) Village Panchayat | b) Panchayat Samiti | <input type="checkbox"/> |
| c) Zilla Parishad    | d) All of these     |                          |
- 33) Gram Sabha comprised of \_\_\_\_\_ in the village.
- |                              |                       |                          |
|------------------------------|-----------------------|--------------------------|
| a) all the registered voters | b) all the people     | <input type="checkbox"/> |
| c) only male voters          | d) only female voters |                          |

- 34) \_\_\_\_\_ by all the members of society is the basic feature of good governance.
- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| a) Unequal participation | b) violent participation | <input type="checkbox"/> |
| c) Equal participation   | d) none of these         |                          |
- 35) The Right to Information was passed in India in the year \_\_\_\_\_.
- |         |         |                          |
|---------|---------|--------------------------|
| a) 2005 | b) 1947 | <input type="checkbox"/> |
| c) 1950 | d) 2020 |                          |
- 36) Which of the following is not the fundamental right?
- |                                 |                          |
|---------------------------------|--------------------------|
| a) Right to Freedom             | <input type="checkbox"/> |
| b) Right to Property            |                          |
| c) Right to Equality            |                          |
| d) Right to Freedom of Religion |                          |
- 37) According to \_\_\_\_\_ Democracy is government of the people, by the people and for the people
- |                  |                   |                          |
|------------------|-------------------|--------------------------|
| a) John Wood     | b) Abraham Lincon | <input type="checkbox"/> |
| c) Mother Teresa | d) Donald Trump   |                          |
- 38) In \_\_\_\_\_ democracy, citizens participated in the affairs of the state directly and had a say in the governance of the city state
- |             |                  |                          |
|-------------|------------------|--------------------------|
| a) Indirect | b) Direct        | <input type="checkbox"/> |
| c) Indian   | d) none of these |                          |
- 39) The word democracy is derived from the Greek words Demos and Kratos. The meaning of Demos is \_\_\_\_\_ and Kratos means \_\_\_\_\_.
- |                    |                   |                          |
|--------------------|-------------------|--------------------------|
| a) people and rule | b) animal and God | <input type="checkbox"/> |
| c) God and Saints  | d) none of these  |                          |
- 40) A system of welfare and redistribution aimed to narrow social inequalities is called \_\_\_\_\_.
- |                |                |                          |
|----------------|----------------|--------------------------|
| a) Bureaucracy | b) Aristocracy | <input type="checkbox"/> |
| c) Democracy   | d) Technocracy |                          |
- 41) Direct democracy is also known as \_\_\_\_\_ democracy.
- |                  |                   |                          |
|------------------|-------------------|--------------------------|
| a) Participatory | b) Representative | <input type="checkbox"/> |
| c) New           | d) Negative       |                          |
- 42) In democracy all issues in legislature, cabinet, executive and other committees are resolved through the principle of \_\_\_\_\_.
- |                  |                  |                          |
|------------------|------------------|--------------------------|
| a) minority rule | b) majority rule | <input type="checkbox"/> |
| c) leadership    | d) dictatorship  |                          |
- 43) Dr. Babasaheb Ambedkar strongly advocated \_\_\_\_\_ democracy.
- |            |           |                          |
|------------|-----------|--------------------------|
| a) Direct  | b) Social | <input type="checkbox"/> |
| c) Ancient | d) Modern |                          |
- 44) The Mahatma Gandhi National Rural Employment Guarantee Act is the example of the largest \_\_\_\_\_ scheme of its kind in the world.
- |              |                   |                          |
|--------------|-------------------|--------------------------|
| a) political | b) social welfare | <input type="checkbox"/> |
| c) populist  | d) election       |                          |
- 45) Which among the following is not the principle of democracy?
- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| a) Government by consent | b) Public Accountability | <input type="checkbox"/> |
| c) Rule of Law           | d) Dictatorship          |                          |

- 46)** The free and fair elections were conducted, at regular interval, in India except in \_\_\_\_\_.  
a) 2014  
b) 1976  
c) 1967  
d) 2000

☐

- 47)** Balwantrai Mehta and Ashok Mehta committee are related to \_\_\_\_\_ in India.  
a) G.S.T.  
b) Parliament  
c) State Governments  
d) Panchayati Raj institutions

☐

- 48)** The ancient Indian book Arthshastra highlighted the principle of Good Governace. Who is the author of Arthshashtra?  
a) Ramchandran  
b) Kautilya  
c) Mandan Mishr  
d) Kalidas

☐

- 49)** "Freedom, Equality and Fraternity" was the battlecry of the \_\_\_\_\_ revolution.  
a) Indonesian  
b) French  
c) American  
d) Russian

☐

- 50)** The Right to \_\_\_\_\_ is the example of transparency and accountability.  
a) Information  
b) Property  
c) Assembly  
d) Religion

☐



<b>Seat No.</b>	
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- प्र.2 खालीलपैकी कोणत्याही चार प्रश्नांची थोडक्यात उत्तरे लिहा. 08**
- अ) पर्यावरण अभ्यासाची व्याख्या लिहा.
  - ब) वाळवंटी परिसंस्थेतील जैविक घटक
  - क) नैसर्गिक साधनसंपत्तीचे प्रकार लिहा.
  - ड) जैवविविधता संवर्धनाचे प्रकार लिहा.
  - इ) वायु प्रदूषणाचे कारणे लिहा.
  - ई) ओझोन क्षयाची कारणे लिहा.
- प्र.3 खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. 08**
- अ) पर्यावरण अभ्यासाचे महत्त्व लिहा.
  - ब) परिसंस्थेतील ऊर्जाप्रवाह
  - क) पूराची कारणे लिहा.
- प्र.4 खालीलपैकी कोणत्याही दोन प्रश्नांची उत्तरे लिहा. 08**
- अ) जल प्रदूषणाची कारणे व परिणाम स्पष्ट करा.
  - ब) जैवविविधता म्हणजे काय? जैवविविधता प्रकाराचे वर्णन स्पष्ट करा.
  - क) वन्यजीव संरक्षण कायदा स्पष्ट करा.
- प्र.5 खालीलपैकी कोणत्याही एका प्रश्नाचे उत्तर लिहा. 08**
- पर्यावरण अभ्यासाचे स्वरूप व व्याप्ती स्पष्ट करा.
- किंवा**
- लोकसंख्या वाढीचा पर्यावरणावर होणारा परिणाम स्पष्ट करा.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:  
Oct/Nov-2022  
Environmental Studies**

Day & Date: Sunday, 12-02-2023  
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 Choose the correct alternatives from the options.****08**

- 1) The word 'Environment' is derived from \_\_\_\_\_ language.
  - a) French
  - b) Roman
  - c) Latin
  - d) Greek
- 2) First World Environmental conference was held at \_\_\_\_\_.
  - a) Mumbai
  - b) Stockholm
  - c) London
  - d) Tokyo
- 3) Sahara is a example of \_\_\_\_\_ ecosystem.
  - a) Marine
  - b) Grassland
  - c) Forest
  - d) Desert
- 4) The primary source of energy is \_\_\_\_\_.
  - a) Hydal energy
  - b) Tidal
  - c) Sun
  - d) Wind
- 5) The 'Wildlife Protection Act' was passed in the year \_\_\_\_\_ in India.
  - a) 1971
  - b) 1972
  - c) 1974
  - d) 1976
- 6) Marine life is in danger due to \_\_\_\_\_ Pollution.
  - a) Land
  - b) Air
  - c) Water
  - d) Noise
- 7) In India \_\_\_\_\_ region is rich in biodiversity.
  - a) Western Himalaya – Aravali
  - b) Ajantha – Aravali
  - c) Eastern Himalaya -Western Ghat
  - d) Eastern Ghat – Koromandal
- 8) International Ozone Day is celebrated on \_\_\_\_\_ day.
  - a) 16<sup>th</sup> June
  - b) 16<sup>th</sup> July
  - c) 16<sup>th</sup> August
  - d) 16<sup>th</sup> September

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

- 1) Write a definition of environmental studies.
- 2) Biological components of desert ecosystems.
- 3) Write the types of natural resources.
- 4) Write the types of biodiversity conservation.
- 5) write the causes of air pollution.
- 6) Write the causes of ozone depletion.

- Q.3 Attempt any two of the following questions. 08**
- 1) Write the importance of environmental studies.
  - 2) Energy flow in the ecosystem
  - 3) Write down the reasons for the flood.
- Q.4 Attempt any two of the following questions. 08**
- 1) Explain the causes and effects of water pollution.
  - 2) What is biodiversity? Explain the type of biodiversity.
  - 3) Explain the Wildlife Conservation Act.
- Q.5 Attempt any one of the following questions. 08**
- 1) Explain the nature and scope of environmental studies.
  - 2) Explain the impact of population growth on the environment.