

Q.3 a) Bring out the process of communication by illuminating different constituents of communication. **10**

OR

b) Elaborate different channels of communication.

Q.4 Write a detailed note on the intrapersonal skills. **10**

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:
March/April-2024
CHEMISTRY (Paper - I) (BT1102)**

Day & Date: Sunday, 12-05-2024
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

Q.1 Multiple Choice Questions.

08

- 1) If a bond is made up of many organic compounds, then the bond is termed as?
 - a) Ionic bond
 - b) Metallic bond
 - c) Covalent bond
 - d) Dipolar bond
- 2) _____ type of hybridization does a BCl_3 molecule undergo.
 - a) sp
 - b) sp^2
 - c) sp^3
 - d) sp^3d
- 3) Valence Bond Theory was developed in the year _____.
 - a) 1916
 - b) 1927
 - c) 1930
 - d) 1932
- 4) _____ interactions involves charged groups.
 - a) Hydrophobic interactions
 - b) Disulfide bond
 - c) Hydrogen bond
 - d) Ionic bond
- 5) Dissolution of limited amount of solute in solvent, the solution is a _____.
 - a) Saturated solution
 - b) Unsaturated solution
 - c) Supersaturated solution
 - d) Oversaturated solution
- 6) _____ is not an application of reverse osmosis?
 - a) Desalination
 - b) Reclamation of minerals
 - c) For dialysis in hospitals
 - d) For industrial use
- 7) _____ will lead to an increase in the rate of the reaction?
 - a) Decrease in temperature
 - b) Decreasing concentration of reactants
 - c) Addition of catalyst
 - d) Addition of inhibitor
- 8) If the pH of a substance is given by 3 then what is the pOH of the substance?
 - a) 3
 - b) 7
 - c) 14
 - d) 11

- Q.2 Answer any Four of the following.** **08**
- a) Define bond length.
 - b) Write a short note on Atomic Size.
 - c) Define osmosis.
 - d) Write a short note on buffers.
 - e) Define Dipole moment.
 - f) Define molality.
- Q.3 Write short note on any Two of the following.** **08**
- a) Describe energy of activation.
 - b) Write a note on Classification of solvents.
 - c) Write a note on pH and pOH.
- Q.4 Answer any Two of the following.** **08**
- a) Write a note on sp² hybridization with C₂H₄.
 - b) Write a note on osmotic pressure.
 - c) Write a note on buffer capacity.
- Q.5 Answer any one of the following.** **08**
- a) Describe in detail types of bonds in biomolecules.
 - b) What is Chemical kinetics? Add a note on its integrated rate expressions with suitable examples.

- Q.3 Write short notes on any two of the following.** **08**
- a) What is Monosaccharide? Enlist properties of monoacchrides.
 - b) Define RNA and Explain its types.
 - c) Explain general properties of amino acids.
- Q.4 Answer any Two of the following.** **08**
- a) Discuss in detail about Source and daily requirements of proteins.
 - b) Describe in detail secondary structure of protein
 - c) Explain Classification of protein based on its composition.
- Q.5 Answer any one of the following.** **08**
- a) Explain in detail classification of amino acids.
 - b) Define Lipid and add a detailed note on properties of fatty acids.

- Q.3 Write short notes on any two of the following.** **08**
- a) Write physicochemical properties of water.
 - b) Explain secondary structure of protein.
 - c) Discuss MWC model.
- Q.4 Answer any two of the following.** **08**
- a) Describe in detail about Scatchard plot.
 - b) Explain in detail cooperative binding.
 - c) Describe briefly nature of hydrophobic interactions.
- Q.5 Answer any one of the following.** **08**
- a) Explain in detail energy generation and energy transfer processes in biochemical reactions.
 - b) Explain in brief influence of ions on water structure making and water structure breaking.

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:
March/April-2024
Cell Biology (Paper - II) (BT1105)**

Day & Date: Saturday, 13-04-2024
Time: 12:00 PM To 02:00 PM

Max. Marks: 40

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

Q.1 Multiple choice questions:

08

- 1) This organelle functions in cellular respiration:

a) Lysosome	b) Endoplasmic reticulum
c) Mitochondrion	d) Golgi apparatus
- 2) Which of the following is found in plant cells, but not animal cells?

a) cell wall	b) vacuole
c) mitochondria	d) endoplasmic reticulum
- 3) A cell with a diploid number of 24 undergoes meiosis, how many chromosomes are in each daughter cell?

a) 6	b) 12
c) 24	d) 48
- 4) The region of a chromosome where two sister chromatids are held together is called a _____.

a) spindle	b) centromere
c) nucleosome	d) centriole
- 5) Eukaryotic cells contain a variety of specialized structures known collectively as _____.

a) Cell membranes	b) Tissues
c) Organs	d) Organelles
- 6) _____ is a quiescent state in which cells remain metabolically active but do not proliferate,

a) G ₀	b) G ₁
c) S	d) M
- 7) Cancer is related to _____.

a) Non-malignant tumor	b) uncontrolled growth of tissues
c) controlled division of tissues	d) cell death
- 8) Leukemias usually arise from _____.

a) epithelial cells	b) neurons
c) blood-forming tissues	d) epidermal cells

- Q.2 Answer any four of the following. 08**
- a) What are prokaryotes? Give an example.
 - b) Discuss the significance of mitosis.
 - c) Draw a labeled diagram of ultra structure of mitochondrion.
 - d) Differentiate between prokaryotic and eukaryotic cell.
 - e) State the principals of cell theory.
 - f) Explain Cell synchrony.
- Q.3 Write short notes on any two of the following. 08**
- a) Compartmentalization of eukaryotic cells.
 - b) Types of chromosomes based on centromere
 - c) Endoplasmic Reticulam
- Q.4 Answer any two of the following. 08**
- a) Cell cycle
 - b) Structure and function of microfilament
 - c) Characteristics and molecular basis of cancer
- Q.5 Answer any one of the following 08**
- a) Meiosis
 - b) Structure and functions of chloroplast

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:
March/April-2024
Animal Physiology (Paper - I) (BT1106)**

Day & Date: Monday, 15-04-2024
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 non-storage calculator is allowed.

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

- 1) _____ forms clots when blood vessels get damaged.
 - a) Platelets
 - b) Cellulose
 - c) Haemoglobin
 - d) RBCs
- 2) Bile acids are conjugated to _____ amino acids or taurine to form bile salts.
 - a) Glycine
 - b) Alanine
 - c) Valine
 - d) Leucine
- 3) _____ cell secretes Testosterone in Male.
 - a) Sertoli cell
 - b) sperm cell
 - c) spermatogonis
 - d) Leydig cell
- 4) _____ is the most abundant hormone produced by the anterior pituitary.
 - a) LH
 - b) TSH
 - c) ACTH
 - d) GH
- 5) In _____ part of the respiratory system, gaseous exchange takes place.
 - a) Larynx
 - b) Pharynx
 - c) Alveoli
 - d) Trachea
- 6) _____ artery passes blood to the kidney.
 - a) Common iliac
 - b) Renal
 - c) Cystic
 - d) Coeliac
- 7) The Pulmonary artery supply blood to _____ organ.
 - a) Liver
 - b) Brain
 - c) Kidney
 - d) Lung
- 8) The Myelin sheath is derived from the _____.
 - a) Microglia
 - b) Neuroglial cells
 - c) Schwann cells
 - d) Nerve cells

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

- a) Write about Digestive fluids
- b) What is Cardiac output?
- c) Write on Reproductive system.
- d) Draw neat labeled diagram of nerve cell.
- e) Explain in short Chloride shift
- f) Write role of Saliva in digestion.

- Q.3 Write short note on any two of the following.** **08**
- a) Describe mechanism of coagulation of blood.
 - b) Add a note on Oxygen dissociation curve.
 - c) Describe in brief Composition of bile.
- Q.4 Answer any two of the following.** **08**
- a) Add a note on Composition of blood.
 - b) Explain the structure of Kidney.
 - c) Explain mechanism of digestion.
- Q.5 Answer any one of the following.** **08**
- a) Describe Pituitary gland and its hormones.
 - b) Explain female reproductive system with hormonal regulation.

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**B.Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:
March/April-2024
Developmental Biology (Paper - II) (BT1107)**

Day & Date: Tuesday, 16-04-2024
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 alternative and rewrite the following sentences. 08

- 1) _____ is the process of structural male gametes maturation from already haploid gametes.

a) Spermiogenesis	b) Spermatogenesis
c) Oogenesis	d) Oogonia
- 2) Morphogenesis is _____ structure.

a) 2D	b) 3D
c) 4D	d) 5D
- 3) The male gamete is called _____.

a) Sperm	b) Egg
c) Oocytes	d) Primary Oocytes
- 4) Fertilization is the fusion of the _____.

a) Sperms	b) Eggs
c) Both a and b	d) mitochondria of eggs
- 5) The transfer of pollen from the anther to stigma is called _____.

a) Pollination	b) Diffusion
c) Adoption	d) Fertilization
- 6) Normal mammalian gametes are _____.

a) Monoploid	b) Haploid
c) Tetraploid	d) Both a and b
- 7) During the germination of seeds, the seed coat ruptures due to _____.

a) massive imbibition of water
b) a sudden increase in cell division
c) differentiation of cotyledons
d) massive glycolysis in cotyledons and endosperm
- 8) The yolk side of an eggs is called its _____.

a) Animal pole	b) vegan side
c) vegetal side	d) vegetable side

Q.2 Answer any four of the following. 08

- a) Define Organogenesis.
- b) Define fate map construction.
- c) Define Spawning.
- d) What is Internal fertilization?
- e) Define Embryogenesis.
- f) Define Capacitation.

- Q.3 Write short notes on any two of the following.** **08**
- a) Write a note on Organization of shoot and root apical meristem.
 - b) Explain in detail about Structure and types of eggs.
 - c) Discuss about oogenesis in detail.
- Q.4 Answer any two of the following.** **08**
- a) Write a note on double fertilization in angiosperm.
 - b) Add a detailed note on Cleavage and explain three Germ Layers.
 - c) Describe about pollen development.
- Q.5 Answer any one of the following.** **08**
- a) Discuss in detail about floral meristems and floral development in Arabidopsis.
 - b) Add a detailed note on spermatogenesis.

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**B. Sc. (Biotechnology) (Semester - I) (New) (CBCS) Examination:
March/April-2024
Ecology (Paper - I) (BT1108)**

Day & Date: Thursday, 18-04-2024
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 well labelled diagram wherever necessary

Q.1 Choose the correct alternative.

08

- 1) Population density mean _____.
 - a) The number of animals and plants present in a given area
 - b) The number of individuals in a unit area in a unit time
 - c) The concentration of human population
 - d) None of the above
- 2) _____ depend only on producers.

a) Autotrophs	b) Primary consumers
c) Secondary consumers	d) Carnivores
- 3) _____ is mixture of fresh water and sea water

a) A pond	b) A wetland
c) An estuary	d) A stream
- 4) _____ is the process in which older plants and animal communities are replaced by younger ones.

a) Oxidation	b) Carbon fixation
c) Primary succession	d) Secondary succession
- 5) Autecology also known as _____ ecology.

a) Population	b) Community
c) Species	d) Autotrophs
- 6) _____ producer in marine ecosystem.

a) Trees	b) Grasses
c) Herbs	d) Phytoplankton
- 7) _____ is top carnivore in grassland ecosystem.

a) Snake	b) Lion
c) Hawk	d) Elephant
- 8) _____ is defined as the number of species represented in a specific region, landscape or ecological community.

a) Coevolution	b) Commensalism
c) Species richness	d) Population density

- Q.2 Answer the following questions briefly. (any four) 08**
- a) Define producer.
 - b) Define energy
 - c) Define density in population.
 - d) Define synecology.
 - e) Define marine ecosystem.
 - f) Define Autecology
- Q.3 Write notes on any two of the following. 08**
- a) Explain in brief commensalism and parasitism with example.
 - b) Explain in detail any 4 attributed of population.
 - c) Explain in detail desert ecosystem.
- Q.4 Write notes on any two of the following. 08**
- a) Explain about scared grooves in India with examples.
 - b) Explain in details ecological pyramids with diagrammatic presentation.
 - c) Explain effect of water, soil, oxygen and carbon dioxide effect on animals.
- Q.5 Answer any one of the following. 08**
- a) Define animal association with its types.
 - b) Explain in detail structure and adaptations in aquatic ecosystem with one example of lentic and lotic each.

- Q.2 Answer the following. (Any Four) 08**
- a) Write the contribution of Karry Mullis.
 - b) What is Yellow Revolution?
 - c) What are edible vaccines? Give its benefits.
 - d) Define Vaccination and Immunization.
 - e) List the National Institutes of Biotechnology in India.
 - f) Define surrogate Motherhood.
- Q.3 Write short notes on any two of the following. 08**
- a) Write in brief biotechnological use in developing food crops.
 - b) Write note on transgenic pioneers - Nancy and Ethal.
 - c) Explain in brief active immunity.
- Q.4 Write notes on any two of the following. 08**
- a) Describe Red Biotechnology.
 - b) Write note on knock out mice.
 - c) Give the Importance of medical plants in therapeutics.
- Q.5 Answer any one of the following. 08**
- a) Explain effects, prevention and control measures of Pneumonia.
 - b) Explain interdisciplinary scope of biotechnology with Pharmacy and Robotics.

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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024
ENGLISH (Comp.)
Communication Skill (BT1201)**

Day & Date: Friday, 10-05-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Choose the correct options.

08

- 1) Who according to the author has only one year of schooling?
 - a) Jay Gould
 - b) John Rockefeller
 - c) Sir Henry
 - d) Bertrand Russell
- 2) In India what great epic of the soul of our _____.
 - a) The Ramayana
 - b) The Mahabharata
 - c) The Arthashastra
 - d) Buddhacarita
- 3) _____ according to the poet will rise again.
 - a) Pollution
 - b) Rivers
 - c) The sun
 - d) Humans
- 4) How old is Pope believed to be when he wrote 'Ode on Solitude'?
 - a) 11
 - b) 13
 - c) 12
 - d) 14
- 5) What does the poet wish to hear from the lover in the poem - 'Remember'?
 - a) Marriage plans
 - b) His work
 - c) His family
 - d) Future plans
- 6) Choose the correct opposite for the word – Clean.
 - a) Dirty
 - b) Bright
 - c) Gloomy
 - d) Though
- 7) Use future tense form in the following sentence.
Ram _____ (go) to Pune next month.
 - a) goes
 - b) will go
 - c) go
 - d) was going
- 8) She _____ the movie yesterday. (Use past tense form of see)
 - a) will see
 - b) saw
 - c) has seen
 - d) is see

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

12

- a) What opinion does the author have of the education system of his time?
- b) What are the people in the West flattered into believing?
- c) What is the true sense of freedom?
- d) Discuss the theme of the poem, 'Our Earth Will Not Die'.
- e) What is the theme of the poem, 'Remember'?
- f) Why is the poet giving so much emphasis on solitude in the poem and what does it mean to him?

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

- a) Write a letter to your father requesting him to send 5,000/- as your class trip is going on to visit North India. Mention the details of four tour and place to visit.
- b) Write a formal letter to your college librarian as you lost your library card. Request him also to issue a duplicate library card to you. Mention all details of yourself like Name, Class, Roll No and how you lost the card.

Q.4 Answer the following questions.**10**

How your interpersonal intelligence skills will help you to achieve your goal?

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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024
Metabolism (Paper – I) (BT1202)**

Day & Date: Saturday, 11-05-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Multiple choice questions.

08

- 1) The conversion of pyruvate into acetyl-Co A is carried out by _____ enzyme.
 - a) Hexokinase
 - b) Pyruvate dehydrogenase
 - c) Pyruvate kinase
 - d) Aldolase
- 2) Synthesis of glucose from non-carbohydrate precursor is called as _____.
 - a) Glycolysis
 - b) Gluconeogenesis
 - c) Hexose Shunt Pathway
 - d) Glycogenesis
- 3) _____ is the precursor for glycogen synthesis.
 - a) UDP- Glucose
 - b) ATP-Glucose
 - c) ADP- Glucose
 - d) GTP- Glucose
- 4) _____ enzyme is used for Glycogen branching.
 - a) Branching enzyme
 - b) Debranching enzyme
 - c) Hexokinase
 - d) Pyruvate Kinase
- 5) _____ is the end product of purine degradation in mammals.
 - a) Urea
 - b) Uric acid
 - c) Ammonia
 - d) Xanthin
- 6) The urea cycle is also referred to as _____ cycle.
 - a) EMP
 - b) HMP
 - c) Krebs-Henseleit
 - d) TCA
- 7) _____ enzyme catalyses first step of glycolysis.
 - a) PFK 1
 - b) Pyruvate Kinase
 - c) Enolase
 - d) Hexokinase
- 8) _____ is the inhibitor of complex I of ETC.
 - a) Dimercaprol
 - b) Antimycin
 - c) Cyanide
 - d) Rotenone

Q.2 Answer any four of the following.

08

- a) Write a note on triacylglycerol.
- b) Define activator with one example.
- c) What is the function HGPRT?
- d) Define bioenergetics.
- e) Enlist the significance of HMP shunt.
- f) Define anabolism.

- Q.3 Write short notes on any two of the following. 08**
- a) Laws of thermodynamics.
 - b) ATP synthase complex and ATP synthesis.
 - c) Transamination and deamination reaction.
- Q.4 Answer any Two of the following. 08**
- a) Write a note on fate of pyruvate.
 - b) Give an account on urea cycle.
 - c) Note down the sources of atoms of nucleotide structure.
- Q.5 Answer any one of the following. 08**
- a) Explain in detail outline of amino acid biosynthesis.
 - b) Write a note on components and process of electron transport chain.

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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024
Enzymology (Paper - II) (BT1203)**

Day & Date: Monday, 13-05-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Multiple Choice Questions.

08

- 1) _____ of the following is produced with the combination of apoenzyme and coenzyme:
 - a) Holoenzyme
 - b) Enzyme substrate complex
 - c) Prosthetic group
 - d) Enzyme product complex
- 2) Blocking of enzyme action by blocking its active site is called as _____.
 - a) Allosteric inhibition
 - b) Feedback inhibition
 - c) Competitive inhibition
 - d) Non-competitive inhibition
- 3) Enzymes are made Up of _____.
 - a) Fats
 - b) Proteins
 - c) Nucleic acids
 - d) Vitamins
- 4) Activity of allosteric enzymes are influenced by _____.
 - a) Allosteric modulators
 - b) Allosteric site
 - c) Catalytic site
 - d) Binding site
- 5) An enzyme brings about _____.
 - a) Reduction in activation energy
 - b) Increase in reaction time
 - c) Increase in activation energy
 - d) Stop the reaction
- 6) _____ of the following is NOT a matrix used for entrapment.
 - a) Agar
 - b) Collagen
 - c) Glutaraldehyde
 - d) Diatomaceous earth
- 7) _____ cell organelles filled with hydrolytic enzymes.
 - a) Mitochondria
 - b) Nucleus
 - c) Lysosome
 - d) ER
- 8) The coenzyme is _____.
 - a) Often a metal
 - b) always a protein
 - c) Often a vitamin
 - d) always an inorganic compound

Q.2 Answer the following. (Any Four)

08

- a) Write on active site.
- b) What is enzyme commission number?
- c) Explain enzyme activity.
- d) Describe in short Vmax.
- e) Write about Allosteric enzymes.
- f) Describe Enzyme substrate interaction.

- Q.3 Write Short Notes. (Any Two) 08**
- a) Add a note on types of enzymes.
 - b) Explain how Substrate concentration affecting enzyme activity with suitable example.
 - c) Explain activators and inhibitors with suitable examples.
- Q.4 Answer the following. (Any Two) 08**
- a) Explain in brief Lineweaver Burk plot.
 - b) Describe Non-genetic regulation of enzyme activity.
 - c) Describe different types of immobilizations.
- Q.5 Answer the following. (Any One) 08**
- a) Write about Nomenclature of Enzyme.
 - b) Explain isoenzymes of lactate dehydrogenase and its application in disease diagnosis.

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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024**

Cell Physiology (Paper – I) (BT1204)

Day & Date: Tuesday, 14-05-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Choose the correct alternatives from the options.

08

- 1) _____ is the process by which cells interact and attach to neighboring cells through specialized molecules of the cell surface.
 - a) Cell Migration
 - b) Cell Division
 - c) Cell Development
 - d) Cell adhesion
- 2) _____ link extracellular matrix to keratin intermediate filaments.
 - a) Integrins
 - b) Cadherins
 - c) Immunoglobulins
 - d) Selectins
- 3) Epinephrine causes an increase in _____.
 - a) blood glucose levels
 - b) surface receptors
 - c) rhodopsin pigments
 - d) mast cells
- 4) In _____ part of the respiratory system, gaseous exchange takes place.
 - a) Larynx
 - b) Pharynx
 - c) Alveoli
 - d) Trachea
- 5) Na⁺ glucose transporter is an example of _____.
 - a) Symport
 - b) Antiport
 - c) Facilitated diffusion
 - d) ATP driven active transport
- 6) The transfer vesicle from RER fuse with _____ region of golgi complex.
 - a) Protein arms
 - b) Medial
 - c) Cis
 - d) Trans
- 7) Binary fission in bacteria does not involve _____.
 - a) spindle formation
 - b) DNA duplication
 - c) Cytokinesis
 - d) Cell elongation
- 8) _____ is a type of endocytosis.
 - a) Pinocytosis
 - b) Phagocytosis
 - c) Receptor-mediated endocytosis
 - d) All of the mentioned

- Q.2 Answers Any Four of the following. 08**
- a) Write a note on endocytosis.
 - b) Give importance of gap junction.
 - c) Define neurotransmitters.
 - d) What is cell communication?
 - e) Name any four examples of ion channels.
 - f) Write a note on bacterial chemotaxis.
- Q.3 Write short notes on Any Two of the following. 08**
- a) Give an account on secondary messengers.
 - b) Explain role of Golgi and ER in protein synthesis.
 - c) Describe structure of neuron and its function.
- Q.4 Answers Any Two of the following. 08**
- a) Write and account on cell adhesion molecules.
 - b) Explain strategies of cell division in microorganism.
 - c) Write note on lipid bilayer and add an account on membrane transport.
- Q.5 Answers Any One of the following. 08**
- a) Explain epinephrine signaling in glycogen metabolism.
 - b) Describe active and passive transport.

Seat No.	
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Set P

**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024
Bioinstrumentation (Paper – II) (BT1205)**

Day & Date: Wednesday, 15-05-2024
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 & well labeled diagram wherever necessary.

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

- 1) Usually in _____ chromatography stationary phase is Water.
 - a) Paper
 - b) thin layer
 - c) Affinity
 - d) Gel Permeation
- 2) Chromatography is _____ method for separation of compounds.
 - a) Mechanical
 - b) Physical
 - c) Biological
 - d) Chemical
- 3) Purpose of using _____ gel is to Concentrate Proteins in SDS PAGE.
 - a) Starch
 - b) Separating
 - c) Stacking
 - d) Agarose
- 4) Wavelength range used for visible spectrophotometer is _____ To _____.
 - a) 100, 200
 - b) 200, 300
 - c) 300, 400
 - d) 400, 700
- 5) Northern blotting is also known as _____ Blotting.
 - a) RNA
 - b) DNA
 - c) Protein
 - d) lipid
- 6) pH of Separating gel is _____.
 - a) 2.3
 - b) 8.3
 - c) 1.3
 - d) 7.3
- 7) _____ is used for measurement of radioactivity.
 - a) UV counter
 - b) VIS counter
 - c) GM counter
 - d) Nano counter
- 8) Biosensors are used in food industry to _____.
 - a) detect mustard gas
 - b) detect acid alcohol
 - c) determine fatugue
 - d) sense taste

Q.2 Answer any Four of the following 08

- a) Define Beer Lambert's law.
- b) Enlist the applications of UV spectroscopy.
- c) Enlist the applications of MRI SCAN.
- d) Write a note on ultracentrifugation.
- e) Define centrifugation.
- f) Define biosensor.

- Q.3 Write notes on any Two of the following. 08**
- a) Explain southern blotting.
 - b) Discuss maintenance of autoclave.
 - c) Describe principle of X RAY in imaging.
- Q.4 Write notes on any Two of the following. 08**
- a) Describe agarose gel electrophoresis.
 - b) Describe Principle of ECG.
 - c) Give a brief account autoradiography.
- Q.5 Answer any One of the following. 08**
- a) Explain in detail paper chromatography.
 - b) Explain instrumentation of colorimeter.

- Q.2 Answer the following (any four) 08**
- 1) what is photophosphorylation?
 - 2) write about calvin cycle.
 - 3) What is nitrogen fixation.
 - 4) What is the growth curve
 - 5) what is mean by seed dormancy
 - 6) Draw a plant cell and label it.
- Q.3 Write short notes on any two of the following. 08**
- 1) CAM pathway
 - 2) Stomata
 - 3) Nitrogen fixation
- Q.4 Answer any two of the following. 08**
- 1) Write about the plant growth hormone.
 - 2) Write about ammonium assimilation in plant.
 - 3) Write about leaf anatomy.
- Q.5 Answer any one of the following 08**
- 1) Write in detail note on micro and micro nutrients in plant.
 - 2) Write in detail information about plant water relation.

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Set **P**

**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024
Tissue Culture (Paper – II) (BT1207)**

Day & Date: Friday, 17-05-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) Who is known as father of tissue culture?
 - a) Bonner
 - b) Laibach
 - c) Haberlandt
 - d) Gautheret
- 2) Name the type of culture which is prepared by inoculating directly from the tissue of an organism to culture media?
 - a) Primary cell culture
 - b) secondary cell culture
 - c) cell lines
 - d) Transformed cell culture
- 3) What is cell line?
 - a) multilayer culture
 - b) transformed cells
 - c) multiple growth of cells
 - d) subculturing of primary culture
- 4) Viability of cells in animal cell culture can be determined by _____.
 - a) Both b and d
 - b) Trypan Blue assay
 - c) Comet assay
 - d) MTT assay
- 5) Which of the following is not the part of the growth medium for animal culture?
 - a) starch
 - b) serum
 - c) carbon source
 - d) inorganic salts
- 6) In the secondary culture cells are obtained from _____.
 - a) primary culture
 - b) the organism
 - c) organ culture
 - d) phenotypic culture
- 7) The following are methods of sterilization except _____.
 - a) dry heat sterilization
 - b) autoclaving
 - c) sterilization filters
 - d) laminar air flow
- 8) _____ is the advantage of animal tissue culture.
 - a) it is cost effective
 - b) no skilled person is required
 - c) tissue cultures can be stored for long time
 - d) maintenance of environmental conditions is easy

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

- a) Define tissue culture.
- b) Define primary cell culture.
- c) Define organ culture.
- d) Write the applications of animal cell culture.
- e) What are non-anchorage dependent cell?

- Q.3 Write notes on any Two of the following.** **08**
- a) Measurement of viability.
 - b) Characteristics of animal cell culture.
 - c) Secondary and transformed cell lines.
- Q.4 Answer any Two of the following.** **08**
- a) Explain the physic-chemical properties of media.
 - b) Analysis of cell cycle by Tritiated thymidine pulse method.
 - c) What is the criteria for subculture?
- Q.5 Answer any One of the following.** **08**
- a) Explain methods of organ culture.
 - b) Explain in brief about the equipments required for animal cell culture.

Seat
No.

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**B.Sc. (Biotechnology) (Semester - II) (New) (CBCS) Examination:
March/April-2024
Computer Science (Paper-I) (BT1208)**

Day & Date: Saturday, 18-05-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

- Instructions:** 1) All questions are compulsory.
2) Draw neat diagram 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) Who is the father of computer?

a) James Gosling	b) Charles Babbage
c) Dennis Ritchie	d) Bjarne Stroustrup
- 2) What is the full form of CPU?

a) Computer Processing Unit	b) Computer Principle Unit
c) Central Processing Unit	d) Control Processing Unit
- 3) Which of the following is the smallest unit of data in computer?

a) Bit	b) KB
c) Byte	d) GB
- 4) Microsoft word is _____ software.

a) Application	b) System
c) Compiler	d) GB
- 5) File extension of MS power point is _____.

a) .ppp	b) .mpp
c) .mp3	d) .ppt
- 6) The most widely used operating system is _____.

a) Unix	b) Windows
c) DOS	d) None
- 7) To copy, short cut key is used _____.

a) ctrl+ C	b) ctrl+V
c) ctrl+ S	d) ctrl+ X
- 8) The processed data is called _____.

a) Data	b) Software
c) Information	d) operating system

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

- a) Enlist output devices.
- b) Define computer.
- c) Define input devices with examples.
- d) Explain about number system.
- e) Define Bits and Bytes.
- f) Explain Microsoft Office

- Q.3 Write short notes on any two of the following. 08**
- a) Uses of Internet.
 - b) History of Computer
 - c) Octal number system with example.
- Q.4 Answer any two of the following. 08**
- a) Explain about types of computer.
 - b) Explain about hardware and software.
 - c) Explain about search engine.
- Q.5 Answer any one of the following. 08**
- a) Draw the block diagram to illustrate basic organization of computer system and explain various units.
 - b) Explain about MS office with its application.

- Q.3 Write Short Notes on Any Two of the following.** **08**
- a) Write a note on Correlation and explain its types.
 - b) Explain parts of table in detail.
 - c) Describe ANOVA in detail with its types.
- Q.4 Answer Notes on Any Two of the following.** **08**
- a) Write a brief account on classification of Measures of central tendency.
 - b) Describe brief account on Hypothesis testing.
 - c) Define probability and explain related terms with applications in biotechnology fields.
- Q.5 Answer Any One of the following.** **08**
- a) Write brief account on History and Application of Biostatistics.
 - b) Write and explain measures of dispersion and its types.

Seat
No.

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:
March/April-2024
Genetics – I (BT1301)**

Day & Date: Wednesday, 24-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) Percentage of crossing over is more when _____.
 - a) linked genes are located far apart from each other
 - b) genes are located in a different cell
 - c) linked genes are located close to each other
 - d) genes are not linked
- 2) The Phenomenon of two or more than two genes affecting the expression of each other is called _____.
 - a) Crossing over
 - b) Linkage
 - c) Gene interaction
 - d) Pairing
- 3) Colour blindness is an _____ linked recessive trait.
 - a) Z chromosome
 - b) X chromosome
 - c) Y chromosome
 - d) None of the above
- 4) Genes which are present in the homologous region of X and Y chromosomes are called _____.
 - a) Autosomal
 - b) Partially sex linked
 - c) Unlinked
 - d) Sex linked
- 5) Test cross determines _____.
 - a) whether two traits are linked or not
 - b) the genotype of F₂ plant not
 - c) number of alleles in a gene
 - d) whether the two species will breed successfully or not
- 6) ABO blood grouping in humans is an instance of _____.
 - a) codominance
 - b) complete dominance
 - c) pseudoscience
 - d) incomplete dominance
- 7) The ability of cells to uptake DNA fragments from the surroundings is known as _____.
 - a) Competence
 - b) Fitness
 - c) Fecundity
 - d) HFR
- 8) Linkage _____ as the distance between two genes _____.
 - a) Increases, Increases
 - b) Decreases, Increases
 - c) Decreases, decreases
 - d) Unaffected, Decreases

- Q.2 Answer any Four of the following. 08**
- a) What is unordered and ordered Tetrads.
 - b) Define Gene Mapping.
 - c) Define Transduction.
 - d) What is Complementation test.
 - e) Explain Back cross.
 - f) Define Genotypic and phenotypic ratio.
- Q.3 Write short notes on any Two of the following. 08**
- a) Define Linkage and Write a note on types and significance of linkage.
 - b) Explain Complete and incomplete sex linked genes.
 - c) Add a note on Mendel's experiment.
- Q.4 Answer any Two the following. 08**
- a) Define Multiple alleles and add a note on ABO blood group system.
 - b) Describe self- incompatibility in plants.
 - c) Write a detailed note on Law of independent Assortment with suitable example.
- Q.5 Answer any One of the following. 08**
- a) Define Epistasis and explain complementary gene interaction with suitable example.
 - b) Write a detailed note on transformation.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:
March/April-2024
Genetics – II (BT1302)**

Day & Date: Thursday, 25-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Choose the correct alternatives from the options.

08

- 1) The term chromosome was named by _____.
 - a) J.G. MENDEL
 - b) T.H. MORGAN
 - c) W. Waldeyer
 - d) T. Boveri
- 2) In Metacentric chromosomes the centromere is situated at the center and chromosome appears _____ shaped.
 - a) "V"
 - b) "L"
 - c) Rod
 - d) "Z"
- 3) In man chromosome "Y" is _____.
 - a) metacentric
 - b) Submetacentric
 - c) Acrocentric
 - d) Telocentric
- 4) In pericentric inversion the inverted segment of the chromosome has _____.
 - a) Telomere
 - b) Centromere
 - c) Adenine
 - d) Guanine
- 5) Microsatellite was discovered by _____.
 - a) Litt and Luty
 - b) Boveri & Sutton
 - c) Tjio & Lavan
 - d) Morgan and Sutton
- 6) The arithmetic mean [average] of the following number is _____.
7,8,4,5,2,10,12,16,4
 - a) 8.4
 - b) 7.5
 - c) 9.5
 - d) 5.8
- 7) _____ process leads to the formation of polytene chromosome.
 - a) Mitosis
 - b) Meiosis
 - c) Endomitosis
 - d) Cell division
- 8) The ultimate source of genetic variability is _____.
 - a) Migration
 - b) Genetic drift
 - c) Mutation
 - d) Selection

Q.2 Answer any Four of the following.

08

- a) Define Mitosis
- b) Define Polyploidy
- c) Define Transposition
- d) Define Migration
- e) Define Variance
- f) Define Aneuploidy.

- Q.3 Write short notes on any Two of the following. 08**
- a) Sex Chromosome
 - b) Biological Mutagen
 - c) Microsatellite
- Q.4 Answers any Two of the following. 08**
- a) Explain Hardy Weinberg law with Examples and its applications.
 - b) Explain Multiple Factor Hypothesis with Example
 - c) Explain the different types of Bacterial Transposons.
- Q.5 Answers any One of the following. 08**
- a) Write in detail about the Giant Chromosome with neat labelled Diagram.
 - b) Explain in detail about the Numerical alteration in chromosome.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:
March/April-2024
General Microbiology – I (BT1303)**

Day & Date: Friday, 26-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Choose the correct alternative.

08

- 1) First microscope was invented by _____.
a) Alexander Fleming b) Francesco Redi
c) Martinus Beijerinck d) Antonie-van Leeuwenhoek
- 2) Antigenic preparations used for disease prevention are known as _____.
a) Antibiotics b) Vaccines
c) Drugs d) Antiseptics
- 3) In the eukaryotic organisms _____ is absent.
a) Golgi complex b) Mitochondrion
c) Pili d) Endoplasmic reticulum
- 4) Carl Woese has proposed _____ kingdom classification systems.
a) three b) four
c) five d) six
- 5) The flagellum of Gram-positive bacteria possesses _____ rings in basal body.
a) 2 b) 3
c) 4 d) 5
- 6) _____ is a eukaryotic, saprophytic, non-photosynthetic and unicellular or multicellular.
a) Bacteria b) Algae
c) Protozoa d) Fungus
- 7) Dry heat sterilization is achieved by using _____.
a) Incubator b) Autoclave
c) Hot air oven d) Fermenter
- 8) In the tincture of iodine concentration of iodine is _____%.
a) 10 b) 0.1
c) 2 d) 20

- Q.2 Write Short Answers. (Any Four) 08**
- a) What is immunology?
 - b) What is antibiotic?
 - c) What is alga?
 - d) What is diauxic growth?
 - e) Enlist the names of Halogen.
 - f) What are taxa?
- Q.3 Write Short Notes (Any Two) 08**
- a) Scope of microbiology
 - b) Whittaker's five kingdom classification
 - c) Spontaneous generation vs. biogenesis
- Q.4 Answer any two of the following. 08**
- a) Explain in brief the contributions of Louis Pasteur.
 - b) Describe in brief the difference between prokaryotes and eukaryotes.
 - c) Write in brief on structure and functions of cell membrane.
- Q.5 Answer any one of the following. 08**
- a) Write in detail on microbial response to environmental parameters.
 - b) Explain in detail the physical agents of sterilization.

Seat
No.

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:
March/April-2024
General Microbiology – II (BT1304)**

Day & Date: Saturday, 27-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) 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 lens
 - d) Magnifying lens
- 2) A bacteriological stain also known as differential stain is used for the identification of acid-fast organisms. What is the name of the stain?
 - a) Negative stain
 - b) Gram stain
 - c) Ziehl Neelsen stain
 - d) Safranin
- 3) _____ is used as both selective and differential media for primary isolation of enteric bacteria.
 - a) MacConkey's agar
 - b) Nutrient agar
 - c) SDA
 - d) All of these
- 4) Colony forming unit per mL is the unit of _____.
 - a) microscopic count
 - b) electronic enumeration
 - c) plate count
 - d) turbidometric measurement
- 5) The gas pack system is used for which of the following?
 - a) aerobic bacteria
 - b) anaerobic bacteria
 - c) facultative anaerobes
 - d) microaerophilic bacteria
- 6) Isolation of pure culture refers to _____.
 - a) purification of culture
 - b) introduction of inoculum
 - c) separation of single colony
 - d) to grow microorganisms on surface
- 7) _____ charge is present on bacterial cell surface.
 - a) Negative
 - b) Positive
 - c) Both
 - d) None of these
- 8) _____ works as a solidifying agent in culture media.
 - a) NaCl
 - b) Peptone
 - c) agar-agar
 - d) yeast extract

- Q.2 Answer any Four of the following. 08**
- a) Define culture media and mention its types.
 - b) Write the applications of gram staining and negative staining.
 - c) Define semisynthetic media give its examples.
 - d) Write the applications of SEM.
 - e) Define enrichment media and enriched media.
 - f) Differentiate between SEM and TEM.
- Q.3 Write short notes on any Two of the following. 08**
- a) Differential media.
 - b) Peptidoglycan theory to explain mechanism of gram staining.
 - c) Spread plate technique.
- Q.4 Answer any Two of the following. 08**
- a) Explain acid-fast staining.
 - b) Give a brief account on living media.
 - c) Explain cell wall staining.
- Q.5 Answer any One of the following. 08**
- a) Explain IMViC test in detail.
 - b) Give an account on compound microscope with respect to parts and functions.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:
March/April-2024
Plant Biotechnology-I (BT1305)**

Day & Date: Monday, 29-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Multiple Choice Questions.

08

- 1) Preservation of germplasm outside their natural habitat is referred as _____.
a) Germplasm preservation b) In-situ preservation
c) Ex-situ preservation d) Cryo-preservation
- 2) The early developmental stages of the embryo is _____.
a) Pro-embryo b) Adventives Embryo
c) Abortive Embryo d) Undifferentiated Embryo
- 3) Haploid plants can be developed from ovary is referred as _____.
a) Gynogenesis b) Androgenesis
c) Distant hybridization d) Irradiation
- 4) Dimethyl sulfoxide used as a _____.
a) A gelling agent b) Cryoprotectant
c) Chelating agent d) An Alkylating agent
- 5) _____ & _____ Cultured Anther and Pollen for haploid production.
a) Guha & Maheshwari b) Miller & Skoog
c) Gautheret & Nobercourt d) Caplan & Stewart
- 6) Cryopreservation means it is a process to preserve plant cells, tissue, or organ _____.
a) At very low temperature by using ether
b) At very high temperature by using liquid nitrogen
c) At very low temperature of -196 by using liquid nitrogen
d) At very low temperature by using liquid nitrogen
- 7) _____ is method in which a plant material is allowed to freeze at cooling rates of 0.5- 5°C/min.
a) Slow-freezing b) Rapid freezing
c) Stepwise freezing d) Dry freezing
- 8) A structure enclosed and used for the cultivation or protection of tender plants is _____.
a) Greenhouse b) Farmhouse
c) Nursery d) Protective House

- Q.2 Answer any four of the following.** **08**
- a) Write short note on significance of haploid production.
 - b) Difference between conventional and plant breeding.
 - c) Describe hordeum bulbosum method.
 - d) Write short note on cryoprotectant.
 - e) Write short note on embryo rescue.
 - f) Write short note on Evan's blue stain of viability test.
- Q.3 Write short note on any two of the following.** **08**
- a) Write a short note on aseptic manipulation.
 - b) Describe applications of embryo rescue.
 - c) Describe factors affecting gynogenesis.
- Q.4 Answer any two of the following.** **08**
- a) Describe microspore culture with its types.
 - b) Describe germplasm storage.
 - c) Describe types of embryo culture with its objectives.
- Q.5 Answer any one of the following.** **08**
- a) Define cryopreservation explain in detail steps involved in its method.
 - b) What is greenhouse technology? Explain its types in details.

Seat No.	
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Set **P**

**B.Sc. (Biotechnology) (Semester - III) (New) (CBCS) Examination:
March/April-2024
Plant Biotechnology – II (BT1306)**

Day & Date: Tuesday, 30-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) _____ is treated as nature & most effective genetic engineer.
 - a) *A. rhizogenes*
 - b) *A. tumefaciens*
 - c) *T. viridae*
 - d) *F. oxysporum*
- 2) Root inducing plasmids are _____.
 - a) Ti plasmid
 - b) Col plasmid
 - c) Ri plasmid
 - d) F plasmid
- 3) Transgenic chimaeras obtained in Tobacco is by the _____ method.
 - a) Liposome mediated Transformation
 - b) Agrobacterium mediated Transformation
 - c) Particle Bombardment
 - d) Microinjection
- 4) Nodulation is the symbiotic association between _____ and _____.
 - a) Cereals and Agrobacterium
 - b) Legumes and Rhizobia
 - c) Pulses and Azotobacter
 - d) Nuts and Rhizobia
- 5) The fungal Biofertilizer is _____.
 - a) Rhizobium
 - b) Azolla
 - c) Frankia
 - d) Mycorrhiza
- 6) Pigments are the chemical substances which exhibit wavelengths of _____.
 - a) Visible light
 - b) Infra-Red light
 - c) u. v. light
 - d) X-rays
- 7) Single cell protein refers to the crude or refined _____.
 - a) Edible oil
 - b) Edible proteins
 - c) Edible Fibre
 - d) Edible Vitamins
- 8) Floriculture Industry comprises of _____.
 - a) Seed Trade
 - b) Crops Trade
 - c) Flower Trade
 - d) Vegetable Trade

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

- a) Define Electroporation.
- b) Define Biotransformation.
- c) Define Vermicomposting.
- d) Define Single Cell Protein.
- e) Define Molecular pharming.
- f) Define Plantibodies.

- Q.3 Write short notes on. (Any Two) 08**
- a) Ti plasmids as Vector.
 - b) Plant growth promoting Bacteria.
 - c) Alkaloids.
- Q.4 Answer the following. (Any Two) 08**
- a) Write in detail about Particle Bombardment and its application.
 - b) Write in detail about VAM.
 - c) Write about Hydroponic culture and its application.
- Q.5 Answer the following. (Any One) 08**
- a) Explain Microinjection.
 - b) Explain Mushroom Cultivation.

- Q.3 Write short notes on any Two of the following. 08**
- a) Give account on Complementary gene interaction.
 - b) Explain unordered and ordered Tetrads.
 - c) Describe Multiple alleles with example.
- Q.4 Answer any Two of the following. 08**
- a) Write and account on Mendel's experiment.
 - b) Explain Bacterial transformation.
 - c) Give an account on Structure of Sex Chromosomes.
- Q.5 Answer any One of the following. 08**
- a) Explain Law of independent Assortment.
 - b) Describe Linkage, types and its significance.

Seat
No.

**B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination:
March/April-2024
Genetics - II (BT302)**

Day & Date: Thursday, 25-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) _____ of the following is called the sex-linked disease.
 - a) Leukemia
 - b) Alzheimer's
 - c) Malignancy
 - d) Colour blindness
- 2) Most of the genetic disorders are caused due to _____.
 - a) Mutation
 - b) The gender of an individual
 - c) The gross chromosomal abnormalities
 - d) Environment
- 3) Genomatic mutation is of how many types _____.
 - a) One
 - b) Two
 - c) Three
 - d) Four
- 4) The IS elements can be identified by the presence of _____.
 - a) Antibiotic resistance gene
 - b) Endonuclease cleavage site
 - c) 50 bp inverted repeat
 - d) Integrase site
- 5) _____ of the following statements is true about the chromatin composition.
 - a) DNA
 - b) RNA
 - c) DNA and proteins
 - d) DNA, RNA and proteins
- 6) 25 individuals in a population are homozygous dominant, then the individuals that are expected to be homozygous recessive are _____.
 - a) 100
 - b) 75
 - c) 50
 - d) 25
- 7) A cruciform structure of chromosomes during meiosis is a characteristic feature of _____.
 - a) Translocation
 - b) Inversion
 - c) Deletion
 - d) Duplication
- 8) The highest possible rate of recombination between two genes is _____.
 - a) 30
 - b) 90
 - c) 50
 - d) 20

- Q.2 Answer any Four of the following.** **08**
- a) Sat-chromosome
 - b) Aneuploidy
 - c) Retroposes
 - d) Genetic drift
 - e) Quantitative traits
 - f) Alleles
- Q.3 Write short notes on any Two of the following.** **08**
- a) Write short note on Role of chromosome in heredity.
 - b) Describe method for detection of mutants.
 - c) Write short note on types of bacterial transposons.
- Q.4 Answers any Two of the following.** **08**
- a) Explain Hardy-Weinberg law.
 - b) Explain Effects of the environment on quantitative traits.
 - c) What is Satellite DNA? Explain types of Satellite DNA with their significance.
- Q.5 Answers any One of the following.** **08**
- a) Explain in detail Karyotyping with its applications.
 - b) Explain genetics basis of evolution in crop plants.

Seat
No.

**B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination:
March/April-2024
General Microbiology - I (BT303)**

Day & Date: Friday, 26-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) Gram positive bacteria contains 40 to 90% of _____ in the cell wall.
 - a) Lipids
 - b) Mycolic acid
 - c) peptidoglycan
 - d) Lipopolysaccharides
- 2) The cocci which form a chain like pattern are called as _____.
 - a) Staphylococci
 - b) diplococci
 - c) Tetracocci
 - d) Streptococci
- 3) The structure responsible for virulence and pathogenicity of bacteria is _____.
 - a) pilli
 - b) flagella
 - c) sheath
 - d) capsules
- 4) Stationary phase is also known as _____.
 - a) period of initial adjustment
 - b) period of Steady growth
 - c) Generation time
 - d) Period of rapid growth
- 5) _____ is best to sterilize glass wares, oils and waxes.
 - a) Dry heat
 - b) Autoclave
 - c) Membrane filtration
 - d) Pasteurization
- 6) Name the type of bacteria which uses inorganic material like water, mineral salts and carbon in presence of sunlight are called as _____.
 - a) Autotrophs
 - b) Chemotrophs
 - c) Organotrophs
 - d) heterotrophs
- 7) _____ is the scientist who proposed process of wine pasteurization.
 - a) Carlo Urbani
 - b) Louis Pasteur
 - c) Robert Koch
 - d) Joseph Lister
- 8) _____ is known as the father of Microbiology.
 - a) Robert Hook
 - b) Edward Jenner
 - c) Robert Koch
 - d) Antoni van Leeuwenhoek

- Q.2 Answer any four of the following questions. 08**
- a) Antony Van Leuwenhoek contribution.
 - b) Define viruses and give examples.
 - c) Give economical importance of fungi.
 - d) Define generation time and growth.
 - e) Define antiseptic and germicide.
 - f) Define pili and give its function.
- Q.3 Write Short Notes. (Any Two) 08**
- a) Contributions of Robert Koch
 - b) Explain effect of environmental factors on growth of bacteria.
 - c) Write down rules of nomenclature in bacteria.
- Q.4 Answer any two of the following questions. 08**
- a) Explain structure and function of cell membrane in bacteria.
 - b) Write down classification of bacteria based on nutrition and energy.
 - c) Explain bacterial growth curve.
- Q.5 Answer any one of the following questions. 08**
- a) Write down structure and function of Gram-negative bacterial Cell wall.
 - b) Explain use of chemical agents for control of microorganisms.

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**B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination:
March/April-2024
General Microbiology – II (BT304)**

Day & Date: Saturday, 27-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Multiple choice questions.

08

- 1) The power of ocular lens is 10x and objective lens is 20x , the magnification is _____.
 - a) 30 times
 - b) 20 times
 - c) 200 times
 - d) 2000 times
- 2) Oil immersion objective lens has NA value of _____.
 - a) 0.65
 - b) 0.85
 - c) 1.00
 - d) 1.33
- 3) The dye eosinate of methylene blue belongs to _____ group.
 - a) acidic dye
 - b) basic dye
 - c) Neutral dye
 - d) oxazine dye
- 4) In pour plate method, the medium should be maintained at _____.
 - a) 37 degree C
 - b) 67 degree C
 - c) 45 degree C
 - d) 0 degree C
- 5) _____ is function of cryoprotective agents.
 - a) Long term preservation of culture formation
 - b) Prevents cell damage due to ice crystal
 - c) Prevent ice crystal formation
 - d) To trap the liquid nitrogen
- 6) Blood agar medium is example of _____.
 - a) Enriched
 - b) Enrichment
 - c) Selective
 - d) Differential
- 7) The example of indicator medium is _____.
 - a) Nutrient agar
 - b) Nutrient broth
 - c) Wilson & Blair
 - d) Czapeck Dox
- 8) In streak plate technique, the transfer of the culture from working slant on the nutrient agar medium is done by using _____.
 - a) Needle
 - b) Plastic sticks
 - c) Nichrome wireloop
 - d) Glass spreader

- Q.2 Answer any Four of the following.** **08**
- a) Define scanning and Transmission electron microscopy.
 - b) Define natural media and synthetic media.
 - c) Define mixed culture and pure culture.
 - d) Define dye and stain.
 - e) Give principle of starch hydrolysis.
 - f) Explain principle of simple staining technique.
- Q.3 Write short notes on any Two of the following.** **08**
- a) Explain Phase Contrast microscopy.
 - b) Explain Egg inoculation as living media.
 - c) Explain principle, procedure, and mechanism of staining of Metachromatic granules.
- Q.4 Answer any Two of the following.** **08**
- a) Explain streak plate and pour plate techniques of isolation of microorganisms.
 - b) Explain principle of IMViC Test.
 - c) Explain any two methods of maintenance and preservation of bacterial culture.
- Q.5 Answer any One of the following.** **08**
- a) Write down principle, procedure and mechanism of Gram staining.
 - b) Explain construction working, ray diagram and principle of compound microscope.

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**B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination:
March/April-2024
Plant Biotechnology - I (BT305)**

Day & Date: Monday, 29-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Multiple Choice Questions.

08

- 1) _____ is defined as irreversible change in structure and size of cell.
 - a) Cell division
 - b) Cell death
 - c) Cell morphology
 - d) Cell growth
- 2) For surface sterilization, _____% ethanol is used.
 - a) 100
 - b) 50
 - c) 70
 - d) 10
- 3) The ability of single cells to divide and produce all differentiated cells in the entity is called as _____.
 - a) Totipotency
 - b) Multipotency
 - c) Pluripotency
 - d) Unipotency
- 4) The pair of hormones necessary for callus to differentiate are _____.
 - a) Ethylene & Auxin
 - b) Auxin & cytokinin
 - c) Auxin & Absciscic acid
 - d) Cytokinin & Gibberellin
- 5) The autoclave is based on principle of _____ sterilization.
 - a) Dry heat
 - b) Moist heat
 - c) Flame
 - d) Filter
- 6) _____ is father of tissue culture.
 - a) Gottlieb Haberlandt
 - b) Morel and Martin
 - c) Xavier Bichat
 - d) Gregor Mendal
- 7) For cryopreservation, the temperature for storage by liquid nitrogen is _____°C.
 - a) -100
 - b) -50
 - c) -196
 - d) -296
- 8) In plant tissue culture, the Dimethyl sulfoxide is used as _____.
 - a) gelling agent
 - b) chelating agent
 - c) alkylating agent
 - d) cryoprotectant

Q.2 Answer any four of the following.

08

- a) Define Explant.
- b) Write any two media used for Plant tissue culture.
- c) Define surface sterilization.
- d) Define Embryo rescue.
- e) Enlist the cryoprotectants
- f) Define Callus

- Q.3 Write short note on any two of the following.** **08**
- a) Write a note on Aseptic Manipulation
 - b) Applications of Plant tissue culture.
 - c) Write a note on factors affecting Gynogenesis.
- Q.4 Answer any two of the following.** **08**
- a) Write terms used in plant tissue culture.
 - b) Explain advantages of greenhouse
 - c) Write a note on Viability methods.
- Q.5 Answer any one of the following.** **08**
- a) Define Haploid plants. Write a detailed account on haploid plant production with neat labelled diagram.
 - b) Define Greenhouse technology. Write an essay on Types of Greenhouse Based on Shape, Utility, Material & Constructions.

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**B.Sc. (Biotechnology) (Semester - III) (Old) (CBCS) Examination:
March/April-2024
Plant Biotechnology – II (BT306)**

Day & Date: Tuesday, 30-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

08

- 1) _____ is the source for Production of secondary metabolite.
 - a) Primary metabolite
 - b) DNA
 - c) RNA
 - d) Carbohydrates
- 2) Production of secondary metabolites by plant tissue culture technique is preferred because _____.
 - a) Production yield is very high
 - b) Product recovery is easy
 - c) Aseptic conditions can be easily maintained
 - d) No skilled person is required
- 3) _____ is the first stable product of nitrogen fixation in the root nodules of leguminous plants.
 - a) Glutamate
 - b) NO_3^-
 - c) Ammonia
 - d) NO_2^-
- 4) _____ of the following prevents the inactivation of nitrogenase by oxygen.
 - a) Cytochrome
 - b) Carotene
 - c) Xanthophyll
 - d) Leghaemoglobin
- 5) _____ of the following is not a biofertilizer.
 - a) *Mycorrhiza*
 - b) *Rhizobium*
 - c) *Agrobacterium*
 - d) *Nostoc*
- 6) _____ is edible vaccine.
 - a) Transgenic potato
 - b) BT Brinjal
 - c) Golden rice
 - d) BT cotton
- 7) The process of expression of foreign genes in a plant is called _____.
 - a) Gene expression
 - b) Transgenesis
 - c) Genetic transformation
 - d) Cell hybridization
- 8) The gene which was used to produce insect-resistant cotton plant was taken from _____.
 - a) *Anabaena azollae*
 - b) *Agrobacterium tumefaciens*
 - c) *Bacillus thuringiensis*
 - d) *Bacillus subtilis*

- Q.2 Answer the following questions. (Any Four):** **08**
- a) Vector.
 - b) Nitrogen fixation.
 - c) Secondary metabolite
 - d) Elicitor
 - e) Biofertilizer
 - f) Edible vaccine
- Q.3 Write notes on any Two of the following.** **08**
- a) Explain in detail Agrobacterium mediated gene transfer.
 - b) Explain in detail Mechanism and manipulation of shikimate pathway.
 - c) Write in brief method of vermicompost production.
- Q.4 Answer any Two of the following.** **08**
- a) Write short note on production application of Bt brinjal.
 - b) Explain different microorganisms used in SCP production.
 - c) Write a note on Hairy root culture.
- Q.5 Answer any One of the following.** **08**
- a) Write note on Direct method of gene transfer by Partical bombardment, electroporation and microinjection.
 - b) Write a brief account on method of producing herbicide resisitant plant and its advantages.

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**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:
March/April - 2024
Molecular Biology (Paper - I) (BT1401)**

Day & Date: Friday, 05-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

Q.1 Multiple choice question.

08

- 1) The pathway for flow of genetic information as the central pathway was referred by _____.
 - a) Watson
 - b) Francis Crick
 - c) T. H. Morgan
 - d) Sutton
- 2) The Bond between the Base and Sugar is _____.
 - a) Hydrogen Bond
 - b) Hydrophobic Bond
 - c) Glycosidic Bond
 - d) Phosphodiester Bond
- 3) _____ contain circular DNA Molecules.
 - a) E. Coli
 - b) Bacteriophage
 - c) Viruses
 - d) $\phi \times 174$
- 4) RNA primer is removed by the Enzyme _____.
 - a) DNA Polymerase
 - b) DNA Helicase
 - c) RNase H
 - d) RNA Polymerase
- 5) Size of Okazaki fragments in Eukaryotes is _____.
 - a) 1000 to 400 nt
 - b) 1000 nt to 4000 nt
 - c) 100 – 400 nt
 - d) 10 – 40 nt
- 6) Ionizing Radiation the X-rays cause _____ in the DNA.
 - a) Thymine Dimers
 - b) Double Stranded Breaks
 - c) Single Stranded Breaks
 - d) Phosphodiester Breaks
- 7) _____ is the Base analog of Thymine.
 - a) 5-Bromouracil
 - b) Ethidium
 - c) Acridine
 - d) Proflavine
- 8) The most important feature of DNA is it is usually composed of _____ polynucleotide chains.
 - a) 1
 - b) 2
 - c) 3
 - d) 4

- Q.2 Answer any four of the following. 08**
- a) Define Cistron.
 - b) Define Nucleoside.
 - c) Define Central Dogma.
 - d) Define Denaturation.
 - e) Define Replication Fork.
 - f) Define Okazaki Fragment.
- Q.3 Write short notes on any two of the following. 08**
- a) Molecular Nature of Gene
 - b) Semiconservative Replication
 - c) Chloroplast DNA
- Q.4 Answer any two of the following. 08**
- a) Write in detail about Hershey and Chase Experiment.
 - b) Write in detail about Rolling Circle Model.
 - c) Write in detail about Excision Repair of DNA.
- Q.5 Answer any one of the following. 08**
- a) Draw and Explain Watson and Crick Structure of DNA.
 - b) Explain DNA Replication in Prokaryotes with Diagram.

- Q.3 Write short notes on any two of the following. 08**
- a) tRNA Structure
 - b) Properties of Genetic codes
 - c) LAC Operon Concept
- Q.4 Answer any two of the following. 08**
- a) Compare and contrast the feature of Prokaryotic mRNA and Eukaryotic mRNA.
 - b) Explain Transcription in Prokaryotes with neat labelled diagram.
 - c) Explain Post Translational Modification in detail.
- Q.5 Answer any One of the following. 08**
- a) Explain Mechanism of Translation in Prokaryotes with neat diagram.
 - b) Explain Trp operon and its importance.

- Q.2 Answer the following questions briefly. (Any Four) 08**
- a) Explain mucus membrane as a barrier of First line of Defense of innate immunity.
 - b) Enlist the types of macrophages based on tissue localization.
 - c) Explain immunogenicity.
 - d) Draw a basic structure of immunoglobulin.
 - e) Which cells are class I and class II MHC restricted?
 - f) Explain adjuvant with an example.
- Q.3 Write notes on any two of the following. 08**
- a) Properties of immunogen
 - b) Structure of class I MHC molecule
 - c) Structure and functions of lymph node
- Q.4 Write notes on any two of the following. 08**
- a) Components and functions of complement system
 - b) Properties of cytokines
 - c) Basic structure of antibody
- Q.5 Answer any one of the following. 08**
- a) Discuss in detail structure and functions of primary lymphoid organs.
 - b) Give a detailed account on Cellular Processes in nonspecific defense mechanism.

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Set **P**

**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:
March/April-2024
Immunology (Paper – II) (BT1404)**

Day & Date: Friday, 12-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) Host defences that are mediated by antibody present in the plasma, lymph, and tissue fluids are collectively known as _____.
a) Humoral immune response b) Autoimmunity
c) Allergy d) Cancer
- 2) _____ antigens are processed by cytosolic pathway.
a) Exogenous b) Endogenous
c) Phagocytic d) Inert
- 3) _____ is a hypersensitivity reaction that can include hay fever, asthma, serum sickness.
a) Allergy b) Anergy
c) Energy d) Enthalpy
- 4) _____ is an non-organ specific autoimmune disorder.
a) Grave's disease b) Rheumatoid Arthritis
c) Hashimoto's disease d) Myasthenia Gravis
- 5) _____ is an antibody that aggregates a soluble antigen, forming a macromolecular complex that yields a visible precipitate.
a) Agglutinin b) Flocculin
c) Precipitin d) Complexin
- 6) _____ is a preparation of immunogenic material used to induce immunity against pathogenic organisms.
a) Serum b) Plasma
c) Vaccine d) Antibiotic
- 7) _____ vaccines are made from a protein or other small pieces taken from a killed virus or bacteria.
a) Live-attenuated b) Killed
c) Subunit d) Conjugate
- 8) _____ is an antigen independent phase of B cell development.
a) Maturation b) Activation
c) differentiation d) Antibody secretion

- Q.2 Answer the following questions briefly. (any four) 08**
- a) Differentiate between Primary and Secondary immune response.
 - b) Enlist Components of Humoral Immunity.
 - c) Define Autoimmunity.
 - d) Explain Hypersensitivity with an example.
 - e) Enlist Types of vaccines.
 - f) Explain cross reactivity.
- Q.3 Write notes on any two of the following. 08**
- a) Specific and Nonspecific immunity to Bacteria.
 - b) Primary and Secondary immune response.
 - c) Hemolytic autoimmune disease.
- Q.4 Write notes on any two of the following. 08**
- a) Live-attenuated and killed vaccine.
 - b) ELISA
 - c) Immunodeficiency disease: AIDS.
- Q.5 Answer any one of the following. 08**
- a) Give a detailed account on precipitation reaction of antigen-antibody complex.
 - b) Processing of Endogenous Antigens by the Cytosolic Pathway.

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Set **P**

**B.Sc. (Biotechnology) (Semester - IV) (New) (CBCS) Examination:
March/April-2024
Animal Biotechnology (Paper - I) (BT1405)**

Day & Date: Saturday, 13-04-2023
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) What is a cell line?
 - a) Multilayer culture
 - b) Transformed cells
 - c) Multiple growth of cells
 - d) Sub culturing of primary culture
- 2) Embryonic stem cells are derived from the _____ of the blastocyst.
 - a) inner cell mass
 - b) ectoderm
 - c) blastocoel
 - d) mesoderm
- 3) Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as _____.
 - a) transgenic animals
 - b) animals
 - c) infected animal
 - d) Bt animals
- 4) Transgenic animals are used to study what is the function of _____ gene.
 - a) foreign
 - b) regular
 - c) same
 - d) old
- 5) Who is regarded as the father of tissue culture _____.
 - a) Harrison
 - b) Arnold
 - c) Ross
 - d) Roux
- 6) Plasmids are used as cloning vectors for which of the following reasons?
 - a) Can be multiplied in culture
 - b) Self-replication in bacterial cells
 - c) Can be multiplied in laboratories with the heir enzymes
 - d) Replicate freely outside bacterial cells
- 7) The first successfully cloned animal was _____.
 - a) monkey
 - b) gibbon
 - c) sheep
 - d) rabbit
- 8) Which of the following are commonly produced in animal cell cultures?
 - a) Interferon
 - b) mab
 - c) vaccines
 - d) all of these

- Q.2 Answer the any four of the following. 08**
- a) Define Stem cell and its Application.
 - b) What is mean by GMP?
 - c) Define Cell Adhesion.
 - d) Explain primary cell line.
 - e) Write four application of animal cell culture.
 - f) Define types of stem cell.
- Q.3 Write short note on any two of the following. 08**
- a) Good Laboratory Practice (GLP)
 - b) Cell Viability
 - c) The Cartagena Protocol
- Q.4 Answer any two of the following. 08**
- a) Write in detail about characterization of cultured cell by cell viability and cell cytotoxicity assay.
 - b) What is mean by IVF? Explain Embryo transfer techniques.
 - c) Write the uses of genetically modified organism.
- Q.5 Answer any one of the following. 08**
- a) What is the stem cell? Explain its type and application.
 - b) What is mean by animal transgenes? Explain the methods of genetic manipulation of animals.

- Q.2 Answer the any four of the following. 08**
- a) Define Theileriosis.
 - b) Define gene therapy.
 - c) Define augmentation therapy.
 - d) Define hybridoma technology.
 - e) Define genetically modified foods.
 - f) Define vector.
- Q.3 Write short note on any two of the following. 08**
- a) Write a note on Use of animals for research and testing.
 - b) Describe Foot and mouth disease.
 - c) Describe improvement of biomass.
- Q.4 Answer any two of the following. 08**
- a) Describe monoclonal antibodies.
 - b) Describe ethical issues of genetically modified animals.
 - c) Describe vectors in gene therapy.
- Q.5 Answer any one of the following. 08**
- a) What is transgenic animal? Elaborate with examples and add a note on model for tackling human disease.
 - b) What is animal biotechnology? Give its application in details.

- Q.3 Write short notes on any two of the following. 08**
- a) Explain difference between Denaturation and renaturation of DNA.
 - b) Write a note on D-loop (mitochondrial) replication model.
 - c) Discuss in detail about SOS repair mechanisms.
- Q.4 Answer any two of the following. 08**
- a) Explain Mischer to Watson and Crick historic perspective.
 - b) Write a note on mitochondrial DNA.
 - c) Describe Organization of DNA in Eukaryotes.
- Q.5 Answer any one of the following. 08**
- a) Briefly explain Replication of DNA in Eukaryotes.
 - b) Define DNA Damage and explain Mismatch repair system in prokaryotes.

- Q.2 Answer any four of the following. 08**
- a) Define transcription.
 - b) What is a repressor in Operon? Give an example of it.
 - c) Define Attenuation.
 - d) Differentiate between Promoters and Enhancers.
 - e) What are Split genes?
 - f) What do you mean by Fidelity of translation?
- Q.3 Write short notes on any two of the following. 08**
- a) Explain Ribosome structure and assembly.
 - b) Explain RNA editing with suitable examples.
 - c) Explain regulation of *trp* operon.
- Q.4 Answer any two of the following. 08**
- a) Describe post transcriptional modifications in eukaryotes.
 - b) Explain regulation of translation with suitable examples.
 - c) Explain fidelity of translation.
- Q.5 Answer any one of the following. 08**
- a) Explain mechanism of transcription in prokaryotes.
 - b) Describe the regulations of *lac* operon with neat labelled diagram.

- Q.3 Write short notes on any two of the following. 08**
- a) Explain process of phagocytosis.
 - b) Write note on properties of antigens.
 - c) Explain selective and instructive theories of antibody production.
- Q.4 Answer any two of the following. 08**
- a) Explain properties of cytokines.
 - b) Explain structure and function of lymph node.
 - c) Explain structure and function of MHC class I molecules.
- Q.5 Answer any one of the following. 08**
- a) Explain cells of immune system.
 - b) Explain classical complement pathway.

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**B.Sc. (Biotechnology) (Semester - IV) (Old) (CBCS) Examination:
March/April-2024
Immunology (Paper – II) (BT404)**

Day & Date: Friday, 12-04-2024
Time: 09:00 AM To 11:00 AM

Max. Marks: 40

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

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

- 1) In the secondary immune response _____ antibody is predominant.

a) IgM	b) IgE
c) IgG	d) IgD
- 2) In the cell-mediated immunity _____ complex plays important role in antigen presentation.

a) class I MHC	b) class II MHC
c) class III MHC	d) class IV MHC
- 3) Rheumatoid arthritis is example of _____ disease.
 - a) hemolytic autoimmune
 - b) organ specific autoimmune
 - c) Non-organ specific autoimmune
 - d) infectious
- 4) Serum sickness is example of _____ Hypersensitivity.

a) IgE dependent	b) Antibody dependent cytotoxic
c) Immune complex mediated	d) Delayed
- 5) A suitable organism for use in recombinant vaccines is _____ virus.

a) influenza	b) polio
c) smallpox	d) vaccinia
- 6) Lissamine rhodamine is used in _____ antigen-antibody test.

a) ELISA	b) immune-fluorescence
c) RIA	d) Complement fixation
- 7) To evade from immune response _____ hide or lose their antigens.

a) bacteria	b) viruses
c) fungi	d) helminthes
- 8) Mature antibody-secreting cells are called _____.

a) plasma cells	b) T cells
c) immunoblasts	d) Neutrophils

Q.2 Explain any four of the following. 08

- a) Maturation of B cell.
- b) Differentiation of T cells.
- c) AIDS
- d) Affinity
- e) Exogenous antigen.
- f) Specific antibodies.

- Q.3 Write short notes on any two of the following. 08**
- a) Agglutination.
 - b) Cytosolic pathway.
 - c) Grave's disease.
- Q.4 Answer any two of the following. 08**
- a) Explain the complement fixation test.
 - b) Describe in brief Specific and Nonspecific immunity to Bacteria.
 - c) Write in brief on non-organ specific autoimmune disease rheumatoid arthritis.
- Q.5 Answer any one of the following. 08**
- a) Describe in detail traditional vaccines.
 - b) Explain in detail Humoral immunity.

- Q.2 Answer the any four of the following. 08**
- a) What is cell adhesion?
 - b) Write a note on scope of stem cell technology.
 - c) Enlist characteristics of stem cell.
 - d) Explain Good Laboratory Practice.
 - e) Define Cell differentiation.
 - f) Define cytotoxicity.
- Q.3 Write short note on any two of the following. 08**
- a) Write a note on culture of Stem cells.
 - b) Explain in detail about Culture and maintenance of primary and established cell lines.
 - c) Add a note on Good Manufacturing Practice.
- Q.4 Answer any two of the following. 08**
- a) Write a note on applications of Stem cell culture.
 - b) Add a detailed note on In Vitro Fertilization.
 - c) Discuss in detail about Genetic manipulation of animals by Pronuclear microinjection.
- Q.5 Answer any one of the following. 08**
- a) Write a detailed note on genetically modified organisms with suitable example.
 - b) Define Stem cell and add a detailed note on Types of Stem cells.

- Q.2 Answer any Four of the following.** **08**
- a) Define transgenic animals.
 - b) Mention importance of Biotechnology in curing Foot-and-mouth disease.
 - c) Enlist vectors in gene therapy.
 - d) Discuss applications of Biotechnology in livestock-pharming products.
 - e) Define Bioethics.
 - f) Define gene augmentation.
- Q.3 Write short note on any Two of the following.** **08**
- a) Gene augmentation therapy.
 - b) Importance of Biotechnology in Animal disease - Coccidiosis.
 - c) Monoclonal antibodies.
- Q.4 Answer any Two of the following.** **08**
- a) Applications of Animal Biotechnology: Improvement of biomass
 - b) Transgenic mice model for tackling human diseases
 - c) Ethical issues associated with consumptions of genetically modified foods and human cloning
- Q.5 Answer any One of the following.** **08**
- a) Gene therapy
 - b) Applications of Animal Biotechnology

Seat
No.

**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:
March/April-2024
ENGLISH
Business English (BT501)**

Day & Date: Friday, 05-04-2024
Time: 03:00 PM To 05:00 PM

Max. Marks: 40

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

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

- 1) What did Della sell off to buy a gift for Jim?
 - a) jewellery
 - b) fur coat
 - c) her hair
 - d) combs
- 2) What did Phatik leave for his brother?
 - a) bicycle
 - b) wooden log
 - c) books
 - d) fishing rod, kite and marbles
- 3) What instrument was the girl using?
 - a) axe
 - b) spade
 - c) knife
 - d) sickle
- 4) Who has written 'The Queen's Rival' poem?
 - a) Sarojini Naidu
 - b) Robert Frost
 - c) William Wordsworth
 - d) Oliver Goldsmith
- 5) Where did the schoolmaster live?
 - a) cottage
 - b) bungalow
 - c) mansion
 - d) apartment
- 6) Where did the two roads diverge?
 - a) on the brown road
 - b) in the yellow road
 - c) on the gray road
 - d) on the green road
- 7) They sell cars. (Make passive voice)
 - a) Cars were sold by them.
 - b) Cars are sold by them.
 - c) Car is sold by them.
 - d) Car was sold by them.
- 8) He _____ with his social work despite the pandemic.
 - a) carried on
 - b) carried to
 - c) carried in
 - d) carried out

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

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- a) Why was Della sad in the beginning of the story 'The Gift of the Magi'?
- b) Why did Phatik feel suffocated in the big city?
- c) Describe the Reaper in the poem 'The Solitary Reaper'.
- d) Why is the queen unsatisfied and seeks a rival?
- e) Describe the character of Schoolmaster in the poem 'The Village Schoolmaster'.
- f) How did Phatik feel arriving at the uncle's house?

- Q.3 Answer any one of the following questions.** **10**
- a) What are the 21st century technology?
- OR**
- b) Write a detailed note on learning and literacy skills.
- Q.4 Describe in detail the four C's in your own words.** **10**

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Set P

**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:
March/April-2024
Bioprocess Technology (BT502)**

Day & Date: Sunday, 12-05-2024
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

- Q.1 A) Choose the correct answer from given options and rewrite the sentence. 10**
- 1) The research of a fermentation process is carried out by using ____ fermenter.

a) Batch	b) Industrial
c) Lab scale	d) Pilot plant
 - 2) The term fermentation was coined by _____.

a) Louis Pasteur	b) Grayson
c) Bushnell	d) Nyiri
 - 3) The fermentation media whose exact chemical composition is not known are called as _____ fermentation media.

a) Semisynthetic	b) Crude
c) Complex	d) Synthetic
 - 4) In bioreactors _____ are used to prevent vortex formation.

a) Spargers	b) Impellers
c) Baffles	d) probes
 - 5) *Aspergillus spp* is used for commercial production of _____.

a) Lactic acid	b) Amylase
c) Vinegar	d) Yoghurt
 - 6) During fermentation, the sterilization of air is generally carried out by _____ method.

a) Filtration	b) Heat
c) Chemical	d) Radiation
 - 7) Sulphite waste liquor is the waste of _____ industry.

a) Food & dairy	b) Alcohol
c) Paper & Pulp	d) Sugar
 - 8) In microbial cell, the process of fermentation takes place in _____.

a) Mitochondria	b) Cytoplasm
c) Cell membrane	d) Vacuole
 - 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) Inside the fermenter, the top region left as empty portion is called as ____.
- a) working space
 - b) head space
 - c) Sparger
 - d) impeller shaft

B) Define following terms.

06

- 1) Molasses
- 2) Bioreactor
- 3) Cell lysis
- 4) Antifoam agent
- 5) Continuous culture
- 6) Fermentation

Q.2 Solve any eight of the following.

16

- 1) Write any two methods for concentration of fermented broth in downstream processing.
- 2) Give two examples fermented products.
- 3) Write functions of Air sparger in bioreactor.
- 4) Draw a neat labelled diagram of bacterial growth curve.
- 5) Give names of any two chemical parameters for bioprocess control.
- 6) Give two types of chromatography methods for purification in downstream processing.
- 7) Name any two microbes involved in Lactic acid production.
- 8) Give application of photo-bioreactors.
- 9) Name the microorganism used for commercial ethanol production.

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

10

- 1) Describe Air sterilization methods.
- 2) Write a note on Components of bioreactor with neat labelled diagram.
- 3) Write a note on Carbon sources for fermentation media.

B) Attempt the following.

06

Describe in detail types of bioreactors.

Q.4 A) Write a short note on. (Any two)

08

- 1) Sterilization of Air
- 2) Nitrogen source for fermentation medium
- 3) Inoculum development

B) Give a detailed account of Batch & continuous culture.

08

Q.5 Attempt any two of the following.

16

- a) Give a detailed account of Batch & continuous culture systems.
- b) Write in detail about the Ethanol production.
- c) Give a detailed account on concentration of fermented broth in downstream processing.

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Set	P
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**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:
March/April-2024
Recombinant DNA Technology (BT503)**

Day & Date: Wednesday, 10-04-2024
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

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

- 1) _____ are inherited differences found among the individuals in more than 1% of normal population.
 - a) Molecular Markers
 - b) Polymorphism
 - c) Variations
 - d) Mutations
- 2) In colony hybridization method _____ membrane is used to blot transfer the Colonies from master plate.
 - a) DBM
 - b) Nitrocellulose
 - c) Nylon
 - d) Whatmann filter paper
- 3) _____ is a type of cloning vector developed as co-infection of M13 phage & plasmid to produces small version of virus.
 - a) BAC
 - b) YAC
 - c) Phagemid
 - d) Cosmid
- 4) The synthetic oligonucleotide 6-7 nucleotide sequences is called as _____.
 - a) Linker
 - b) Marker
 - c) Probe
 - d) Adaptor
- 5) pUC plasmid vector developed by _____.
 - a) Rutherford
 - b) Smith
 - c) Harrison
 - d) Joachim Messing
- 6) Lac Z gene encodes for _____ enzyme.
 - a) Galactosidase
 - b) Glucoronidase
 - c) Gluconase
 - d) β -Galactosidase
- 7) Pfu DNA polymerase isolated from _____.
 - a) *Pyrococcus furiosus*
 - b) *Pyrococcus litolaris*
 - c) *Thermococcus furiosus*
 - d) *Thermococcus litolaris*
- 8) A PCR reaction after 30 cycles produce approximately _____ PCR products.
 - a) 64 million
 - b) 1 Billion
 - c) 128 million
 - d) 1 million
- 9) _____ is used as animal virus vector.
 - a) CaMV
 - b) TMV
 - c) SV40
 - d) T₄ phage
- 10) Source of enzyme DNA Polymerase I is _____.
 - a) *E. Coli*
 - b) *B. substilis*
 - c) *Lambda phage*
 - d) *T3 phage*

B) Fill in the blank/One sentence answer/ One word answer. 06

- 1) Size of pBR322 is _____.
- 2) Restriction endonucleases classified in _____ groups.
- 3) Gene transfer from one bacteria to another by phage is known as _____.
- 4) PCR developed by _____.
- 5) Enzymes which cut within the DNA chain _____.
- 6) Source of Mung bean endonucleases is _____.

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

- a) Define Genetic Engineering.
- b) Define polymerases.
- c) Enlist the properties of best vector.
- d) Define ligases.
- e) Draw a neat & labeled diagram of cosmid.
- f) Explain in short transduction.
- g) Define protein engineering.
- h) Write a note on flavr savr tomato.
- i) Define probe.
- j) Write a note on real time PCR.

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

- 1) Explain development of insect resistant plants.
- 2) Describe cloning of large DNA fragments in YAC.
- 3) Discuss basic PCR.

B) Explain in short DNA transfer by Transformation. 06

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

- 1) Describe in detail RFLP as molecular marker.
- 2) Give details of restriction endonuclease type II.
- 3) Discuss selection of recombinant by blue white screening.

B) Explain colony hybridization. 08

Q.5 Answer the following. (Any two): 16

- a) Give details of sangers method of DNA sequencing.
- b) Discuss Development of herbicide resistant plants.
- c) Describe plasmids as cloning vector.

Set
No.

**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:
March/April-2024
Bioinformatics (BT504)**

Day & Date: Friday, 12-04-2024
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

Q.1 A) Rewrite the following sentences by using correct alternative. 10

- 1) _____ an is a spiral-like structure with 3.6 amino acid residues per turn.
 - a) α -helix
 - b) B sheets
 - c) coils
 - d) coiled coils
- 2) BLAST is used for _____ alignment.
 - a) Global
 - b) Local
 - c) Multiple
 - d) Global and local
- 3) PubMed provides information about _____ database.
 - a) Nucleotide
 - b) Protein
 - c) Genome
 - d) Literature
- 4) MMDB is hosted by _____.
 - a) DDBJ
 - b) NCBI
 - c) NIG
 - d) ENSEMBL
- 5) EMBL was established in _____.
 - a) 1998
 - b) 1990
 - c) 1988
 - d) 1974
- 6) _____ is a sequence submission tool in DDBJ database.
 - a) BankIt
 - b) Webin
 - c) Sequin
 - d) SAKURA
- 7) _____ is not a structure database.
 - a) SCOP
 - b) NRDB
 - c) PDB
 - d) CATH
- 8) _____ is not a part of INSDC.
 - a) ENA
 - b) DDBJ
 - c) PIR
 - d) GenBank
- 9) Based on sequence length the alignment is classified in to _____.
 - a) 2
 - b) 3
 - c) 4
 - d) 5
- 10) Secondary protein structure was predicted by using _____.
 - a) SOPMA
 - b) ProtParam
 - c) SWISSMODEL
 - d) RasMol

- B) Definition. 06**
- 1) Chou fasman
 - 2) TrEMBL
 - 3) Phylogeny
 - 4) Flat file
 - 5) FASTX and FASTY
 - 6) Conserved sequence
- Q.2 Solve any eight of the following. 16**
- a) What is Bioinformatics? Explain the components of Bioinformatics.
 - b) Describe NCBI Bookshelf.
 - c) Explain k-tuple method in bioinformatics.
 - d) Describe literature databases in-brief.
 - e) What is pl value of protein?
 - f) What is dendrogram? Mention its importance.
 - g) What is X-ray crystallographic resolution? Mention its significance.
 - h) What is Domain? Write its importance in protein classification.
 - i) What is Sequin? Mention its importance.
 - j) What are Boolean operators? Mention their importance.
- Q.3 A) Attempt any TWO of the following. 10**
- 1) Write a note on SCOP and CATH.
 - 2) Write a note on prokaryotic and eukaryotic gene prediction.
 - 3) Write a note on pairwise and multiple alignments.
- B) Write a short note on protein secondary structures. 06**
- Q.4 A) Attempt any TWO of the following. 08**
- 1) Write a note on SRS and getentry.
 - 2) Explain BLAST and its variants.
 - 3) Explain PROSITE database and applications.
- B) Explain Phylip software in detail. 08**
- Q.5 Attempt any TWO of the following. 16**
- a) What is database? Explain the protein composite sequence database.
 - b) What is cladogram? Explain the methods of phylogenetic analysis.
 - c) What is 3D structure? Explain different structural databases.

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Set **P**

**B.Sc. (Biotechnology) (Semester - V) (New) (CBCS) Examination:
March/April-2024
Intellectual Property Rights (BT505)**

Day & Date: Saturday, 13-04-2024
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) Berne Convention adopted for protection of _____ Intellectual property.
 - a) Patent
 - b) Literary and Artistic work
 - c) Industrial Design
 - d) Trade mark
- 2) According to the Patent Act 1970, from Non patentable innovations included under _____ Section from following.
 - a) 2
 - b) 4
 - c) 5
 - d) 7
- 3) 'Solapuri chaddar' comes under _____ Intellectual property rights.
 - a) Patent
 - b) Copyright
 - c) Industrial design
 - d) Geographical indication
- 4) One of the Patent office present at _____ in India.
 - a) Pune
 - b) Hyderabad
 - c) Chennai
 - d) Punjab
- 5) A company decides to use a logo that has the same shape as its competitor but with a different copy _____.
 - a) Copy rights
 - b) Trade mark
 - c) Patent
 - d) Industrial designs
- 6) _____ of the following is one of intellectual property law.
 - a) Lyrics Act, 1957
 - b) Trademark Act, 1999
 - c) Protocol Act, 2000
 - d) Customs Act, 1962
- 7) One of the rights of a patentee are _____.
 - a) License
 - b) Not to Sell
 - c) Never Assign the property to others
 - d) Not to distribute
- 8) _____ is the duration of copyright protection for a novel.
 - a) The day the author dies
 - b) 70 years from the end of the calendar year in which the author died.
 - c) The end of the calendar year in which the author died.
 - d) A novel will not gain copyright protection.

- 9) The plant breeders' rights protect the _____.
 a) Breeding procedure b) Variety
 c) Plant Organ d) Plant Character
- 10) If you file provisional specification, the complete specification is required to be filed within _____.
 a) 10 months b) 12 months
 c) 18th months d) 24 months

B) One sentence answer. 06

- 1) The patent cooperation treaty concluded in which year?
- 2) Give one example of non-patentable invention.
- 3) What is long form of UNISCO established universal copyright convention?
- 4) Who is the patentee?
- 5) Give any one disadvantage of PBR.
- 6) Give any one advantage of IPR.

Q.2 Solve any Eight of the following. 16

- a) Define Intellectual property.
- b) Define service mark with one example.
- c) Define utility patent.
- d) Define trade secrets.
- e) Define breeder.
- f) Define Non-obviousness.
- g) Define agro-biodiversity.
- h) Define restoration of patent.
- i) Define plant variety protection.
- j) Define farmer's rights.

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

- 1) Explain about Universal Copyright Convention, 1952.
- 2) Write a note on Copyright and the right provided for copyright holder.
- 3) Describe in detail about TRIPS agreement, 1994.

b) Write short note on pharmaceutical product and process patenting. 06

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

- 1) Explain in detail implementation of the Berne Convention.
- 2) Explain in detail pre grant opposition for patent.
- 3) Define plant breeders right and enlist facilities provided under it.

b) Describe patenting of biological material with one suitable example. 08

Q.5 Attempt any Two of the following. 16

- a) Define Patenting and explain step wise procedure for granting patent in India and Abroad.
- b) Describe in detail about UPOV and its contribution in plant breeder's rights.
- c) Describe in detail patentable and non-patentable criterias.

- Q.3 Answer the following question. (Any One)** **10**
- a)** Write a note on global awareness and health literacy. Add their importance.
 - b)** Write a note on literacy skill? Describe three life-saving situations due to the use of literacy skills.
- Q.4** Write a detail note on life skills (FLIPS) and importance of any two life skills. **10**

- B) Fill in the blank/One sentence answer/ One word answer. 06**
- 1) The range of electromagnetic signals consisting of all frequencies is known as _____.
 - 2) _____ used the word potenz which means power.
 - 3) _____ is the pH value of saliva after meal.
 - 4) _____ rpm is the speed of centrifuge when we centrifuge the blood.
 - 5) _____ is used as a medium for density gradient centrifugation.
 - 6) Northern blotting is also known as _____.

- Q.2 Answer the following. (Any Eight) 16**
- a) Separating gel in SDS-PAGE.
 - b) Sample application in GLC.
 - c) Write a note on electromagnetic wave.
 - d) Enlist applications of Paper chromatography.
 - e) Define pH indicators.
 - f) Write a note on native gel.
 - g) Write a note on Isopycnic centrifugation.
 - h) Define blotting.
 - i) Write a note on chromatography.
 - j) Write a note on deviation from beers law.

- Q.3 A) Answer the Following. (Any two) 10**
- 1) Explain glass electrode.
 - 2) Describe calibration of pH electrode.
 - 3) Explain applications of Colorimetry.
- B) Explain in short rate zonal centrifugation. 06**

- Q.4 A) Answer the Following. (Any Two) 08**
- 1) Describe Agarose gel electrophoresis.
 - 2) Give details gel filtration chromatography.
 - 3) Describe Isoelectric focussing.
- B) Explain northern screening. 08**

- Q.5 Answer the following. (Any two) 16**
- a) Give details of IR spectroscopy.
 - b) Discuss ion exchange chromatography.
 - c) Describe principles of autoradiography.

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Set P

**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination:
March/April-2024
Genomics and Proteomics (BT603)**

Day & Date: Wednesday, 24-04-2024
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

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

- 1) At an isoelectric point, the net charge on a protein is _____.
 - a) positive
 - b) negative
 - c) double
 - d) zero
- 2) Free radicals generated during polymerization of SDS-PAGE gel, can be stabilized by _____.
 - a) APS
 - b) TEMED
 - c) acrylamide
 - d) bis-acrylamide
- 3) The Human Genome Project was declared essentially complete in the year _____.
 - a) 1983
 - b) 2020
 - c) 2000
 - d) 2003
- 4) In _____ technique, organisms may be differentiated by analysis of patterns derived by cleavage of their DNA.
 - a) RFLP
 - b) RAPD
 - c) RAT
 - d) RTPCR
- 5) According to the RNA world hypothesis _____ was the first genetic material.
 - a) DNA
 - b) RNA
 - c) Phosphate
 - d) Protein
- 6) Overwinding or underwinding of DNA is regulated by _____ enzymes.
 - a) Helicases
 - b) Gyrases
 - c) Polymerases
 - d) Topoisomerases
- 7) The _____ method of genome sequencing involves mapping of chromosomes prior to sequencing.
 - a) Clone Contig
 - b) Shotgun
 - c) Artificial plasmid
 - d) Chromosome walking
- 8) In the _____ genome project, researchers aimed to sequence the genomes of a large numbers of people from different ethnic groups worldwide.
 - a) HapMap
 - b) ENCODE
 - c) dbSNP
 - d) 1000
- 9) In 2D PAGE, the first dimension is of _____.
 - a) SDS-PAGE
 - b) DNA melting
 - c) isoelectric focusing
 - d) probe binding

- 10) The _____ is a full range of mRNA molecules expressed in an organism.
- a) Genome
 - b) Metabolome
 - c) Transcriptome
 - d) Proteome

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

- 1) Which stain can be used for electrophoretic bands of nucleic acids?
- 2) What was the aim of the ENCODE project?
- 3) What is IEF?
- 4) What is structural genomics?
- 5) Define proteomics.
- 6) What is native PAGE?

Q.2 Solve any Eight of the following. 16

- a) Explain polymerization of polyacrylamide gel.
- b) What is the difference between genetics and genomics?
- c) What is 2 DE?
- d) What was the aim of the HapMap project?
- e) Enlist the computer tools used in genome sequencing.
- f) Give examples of genetic disorders.
- g) How is the genome organized in prokaryotes?
- h) Enlist different omics approaches.
- i) What is the role of APS in SDS- PAGE?

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

- 1) Describe RNA world and DNA world.
- 2) Write a note on Omics and its importance.
- 3) Describe mass spectrometry based identification of proteins.

B) Short note/Solve. 06

Write an account on molecular marker based taxonomy.

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

- 1) Write general features of the genome.
- 2) Explain significance of bacterial and yeast genome.
- 3) Describe molecular diagnosis of genetic diseases.

B) Describe/Explain/Solve. 08

Describe the genome sequencing by clone contig and whole genome shotgun method.

Q.5 Attempt any Two of the following. 16

- a) Write an account on genome sequencing projects.
- b) Describe principle and methodology of 2 DE. Comment on its image analysis.
- c) Write an account on applications of genomics and proteomics.

Seat No.	
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**B.Sc. (Biotechnology) (Semester - VI) (New) (CBCS) Examination:
March/April-2024
Evolutionary Biology (BT604)**

Day & Date: Thursday, 25-04-2024
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) _____ demonstrated that life originated from pre-existing cells.
 - a) Louis Pasteur
 - b) Hugo de Vries
 - c) Charles Darwin
 - d) Stanley Miller
- 2) _____ called humans as Homo sapiens wiseman.
 - a) Hugo de Vries
 - b) Carolus Linnaeus
 - c) Joseph Walter
 - d) Charles Darwin
- 3) Primates originated during _____ Era.
 - a) Mesozoic
 - b) Cenozoic
 - c) Paleozoic
 - d) Azoic
- 4) _____ fitness was the fitness referred by Darwin for natural selection.
 - a) Reproductive
 - b) Health
 - c) Survival
 - d) Physical
- 5) Evolution is a _____ process.
 - a) Quick
 - b) Stochastic
 - c) Slow
 - d) Fast
- 6) Species which have diverged after origin from common ancestor giving rise to new species adapted to new habitats and ways of life is called as _____.
 - a) Adaptive radiation
 - b) Divergent evolution
 - c) Convergent evolution
 - d) Mutation
- 7) The earliest geological time period among the following is _____.
 - a) Quaternary
 - b) Permian
 - c) Jurassic
 - d) Cambrian
- 8) A new species emerges from this geographic range of its ancestor as per _____ theory of speciation.
 - a) Sympatric speciation
 - b) Parapatric speciation
 - c) Allopatric speciation
 - d) None of these
- 9) Most evident source of evolution comes from _____.
 - a) Analogy
 - b) Physiology
 - c) Embryology
 - d) Paleontology

- 10) An insect stuck in amber is an example of _____ type of fossil.
- a) Original remains
 - b) Mold
 - c) Trace
 - d) Cast

B) Definition. 06

- 1) Chemogeny
- 2) Fossil
- 3) Variation
- 4) Extinction
- 5) Evolution
- 6) Speciation

Q.2 Solve any Eight of the following. 16

- a) Define RNA world.
- b) Name Any two Sources of variations.
- c) Define Mass extinction.
- d) Define Species.
- e) Define Organic evolution.
- f) Define Mesozoic.
- g) Any two example of primates.
- h) Any two example of globin gene family.
- i) Define macroevolution.
- j) Any two unique hominin characteristics.

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

- 1) Write an account on Lamarckism.
- 2) Explain types of fossils.
- 3) Write note on Molecular evolution.

B) Write short note on Darwinism. 06

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

- 1) Give brief account on geological time scale.
- 2) Explain Socio-cultural evolution of man.
- 3) Write note on evolution of horse.

B) Describe Speciation and modes of speciation. 08

Q.5 Attempt any Two of the following. 16

- a) Describe causes and effects of mass extinctions.
- b) Explain molecular analysis of human origin.
- c) Describe Evolution of prokaryotes and eukaryotes.

Seat
No.

**B.Sc. (Biotechnology) (Semester -VI) (New)(CBCS) Examination:
March/April-2024
Environmental Biotechnology (BT605)**

Day & Date: Monday, 22-04-2024
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

Q.1 A) Rewrite the sentence by using correct option. 10

- 1) Out of the following _____ is not the example of conventional fuel source.
 - a) Natural gas
 - b) Coal
 - c) Biomass
 - d) Solar energy
- 2) The term Mycorrhiza is coined by _____.
 - a) A. B. Frank
 - b) M. Beijerinck
 - c) Winogradsky
 - d) L. Pasteur
- 3) In India, Environmental protection Act was passed at _____ by Indian Parliament.
 - a) 1986
 - b) 1949
 - c) 1960
 - d) 2003
- 4) Lichens is the symbiotic association between _____.
 - a) Plants & bacteria
 - b) Algae & fungi
 - c) Algae & bacteria
 - d) Plants & fungi
- 5) After the fermentation, Alcohol is purified by the process of _____.
 - a) Distillation
 - b) Filtration
 - c) Autoclaving
 - d) Chemical treatment
- 6) Out of the following, _____ is the biological process of waste water treatment.
 - a) Coagulation
 - b) Straining
 - c) Activated sludge process
 - d) Flootation
- 7) The enzyme involved in nitrogen fixation is _____.
 - a) Carboxylase
 - b) Nitrogenase
 - c) Dehydrogenase
 - d) Nitrate reductase
- 8) Out of the following, _____ denotes the chalcopyrite ore.
 - a) CuFeS_2
 - b) FeS_2
 - c) Cu_2S
 - d) CuS
- 9) The conference held in 1972 by United Nations in Stockholm is known as _____.
 - a) Earth summit
 - b) Nature conference
 - c) Environmental summit
 - d) Stockholm conference
- 10) The first superbug was created by _____ by plasmid transfer method.
 - a) Dr. A. M. Chakrawarty
 - b) Dr. D.C. Khurana
 - c) Dr. Brijmohan Upadhyay
 - d) Beijerinck

- B) Define following terms. 06**
- 1) Gasohol
 - 2) Rhizofiltration
 - 3) Bioleaching
 - 4) Environmental biotechnology
 - 5) Oil spill
 - 6) Mycorrhiza
- Q.2 Solve any Eight of the following. 16**
- 1) Write any two names of fungi involved in VAM.
 - 2) Give two examples of asymbiotic Nitrogen fixing bacteria.
 - 3) Write significance of Mycoremediation.
 - 4) Give any two examples of leguminous plants.
 - 5) Give names of any two bacteria involved in herbicide bioremediation.
 - 6) Give two examples of non conventional energy sources.
 - 7) Write the chemical reaction of nitrogen fixation.
 - 8) Give the names of any two Petroleum products.
 - 9) Name any two chemical methods for industrial effluent treatment.
 - 10) Name the bacteria involved in Gold bioleaching.
- Q.3 A) Attempt any Two of the following. 10**
- 1) Describe Biogas production.
 - 2) Write a short note on bioremediation of cellulose.
 - 3) Write a note on physical methods for industrial effluent treatment.
- B) Describe the process of Alcohol production by using sugar industry waste. 06**
- Q.4 A) Write a short note on (Any two) 08**
- 1) The Air Act
 - 2) Production of Bio-hydrogen
 - 3) Bioremediation of radioactive waste
- B) Explain in detail Symbiotic nitrogen fixation for soil enrichment. 08**
- Q.5 Attempt any Two of the following. 16**
- a) Give a detailed account of Bioremediation of insecticide & pesticide.
 - b) Write in detail about the biological methods of wastewater treatment.
 - c) What is bioleaching? Explain in detail bioleaching of copper.