

Seat No.	
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M.Sc. (Semester - I) (CBCS) Examination Nov/Dec-2018
Biotechnology
MICROBIOLOGY

Time: 2½ Hours

Max. Marks: 70

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

Q.1 Choose the correct option and rewrite the sentence:- **14**

- 1) Influenza virus binds to _____ of the host cell membrane.
 - a) Omp
 - b) Sialic acid receptor
 - c) Polysaccharides
 - d) Glycoproteins
- 2) Electron microscope was discovered by _____.
 - a) Ernst Ruska
 - b) Robert Hook
 - c) Stanley
 - d) Michael Tswett
- 3) The number of ascospores in an ascus of Ascomycetes is _____.
 - a) 2
 - b) 8
 - c) varies with species
 - d) 16
- 4) A variant of bacterial strain with biochemical and physiological differences is called as _____.
 - a) Morphovar
 - b) Biovar
 - c) Serovar
 - d) Virovar
- 5) In Gram's staining method _____ can be used as a secondary stain.
 - a) Gram's Iodine
 - b) Congo Red
 - c) Basic Fuchsin
 - d) Malachite Green
- 6) A protein called as bacteriorhodopsin is produced by _____.
 - a) Alkalophiles
 - b) Barophiles
 - c) Halophiles
 - d) Metallophiles
- 7) Archae bacteria show _____ linkage between fatty acids and glycerol in cell membrane.
 - a) Ether
 - b) Ester
 - c) Covalant
 - d) Ionic
- 8) The method for preservation of biological component by dehydrating at lower temperature is called as _____.
 - a) Liquid nitrogen method
 - b) Cryopreservation
 - c) Lyophilization
 - d) Sub culturing
- 9) HIV infects its host by attacking _____ cells.
 - a) Epithelial
 - b) Neural Cells
 - c) RBCs
 - d) T4 helper
- 10) The symbiotic association between fungi and roots of higher plants is called as _____.
 - a) Lichens
 - b) Rhizopus
 - c) Mycorrhiza
 - d) Fungirrhiza

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M.Sc. (Semester - I) (CBCS) Examination Nov/Dec-2018

Biotechnology

CONCEPT OF BIOCHEMISTRY

Time: 2½ Hours

Max. Marks: 70

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

Q.1 Multiple choice questions:-

14

- 1) _____ is the degradative phase of metabolism in which organic nutrient molecules are converted into smaller, simpler end products.
 - a) Anabolism
 - b) Catabolism
 - c) Metabolism
 - d) Bioenergetics
- 2) The last of the 20 amino acid to be found was _____.
 - a) Threonine
 - b) Tryptophan
 - c) Tyrosine
 - d) Histidine
- 3) Complete oxidation of a glucose molecule to CO₂ yields _____ ATP.
 - a) 32
 - b) 24
 - c) 36
 - d) 38
- 4) Electrons are carried between photosystem II and photosystem I by _____ soluble protein.
 - a) Pheophytin
 - b) Ferredoxin
 - c) Plastocyanin
 - d) Cytochromes
- 5) Rubisco catalyzes the condensation of O₂ with ribulose 1, 5 biphosphatase to form _____.
 - a) Glycerin
 - b) 2-phosphoglycolate
 - c) 3-phosphoglycolate
 - d) Serine
- 6) The double bond is introduced into the fatty acid by an oxidative reaction catalyzed by _____.
 - a) mixed function oxidase
 - b) phosphatase
 - c) reductase
 - d) isomerase
- 7) Glycogen storage Cori disorders is also known as _____.
 - a) type IIa
 - b) type IIb
 - c) type IIIa
 - d) type IIIb
- 8) The light-absorbing pigments of thylakoid or bacterial membranes are arranged in functional arrays called _____.
 - a) chlorophyll
 - b) accessory pigments
 - c) photosystem
 - d) light harvesting complex
- 9) Rubisco catalyzes the condensation of O₂ with ribulose 1, 5-bisphosphatase to form 3-phosphoglycerate and _____.
 - a) 2-phosphoglycolate
 - b) 3-phosphoglycolate
 - c) glyceraldehyde 2 phosphate
 - d) glyceraldehyde 3 phosphate
- 10) The pyruvate formed by decarboxylation of malate in bundle-sheath cells is transferred back to the mesophyll cells, where it is converted to PEP by an unusual enzymatic reaction catalyzed by _____.
 - a) pyruvate kinase
 - b) phosphate kinase
 - c) pyruvate phosphate kinase
 - d) pyruvate phosphate dikinase

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M.Sc. (Semester - II) (CBCS) Examination Nov/Dec-2018
Biotechnology
CELL BIOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) All questions of Section - I are compulsory.
 2) All questions carry equal marks.
 3) Answer any Four questions from Section – II.
 4) Draw neat and labeled diagrams wherever necessary.

SECTION – I**Q.1 a) Rewrite the sentences after choosing the correct answer from the given: 07**

- 1) Which of the following signals directs a protein to the lysosomes?
 - a) A lys-asp-glu-leu (KDEL) sequence in the protein
 - b) Attached carbohydrate with terminal mannose-6-phosphate
 - c) Dolichol phosphate
 - d) Attached carbohydrate with terminal mannose
- 2) At the end of spermatogenesis each primary spermatocyte gives rise to
 - a) Only one spermatid
 - b) Two spermatids
 - c) Four spermatids
 - d) Three spermatids
- 3) In the lancelet, the zygote undergoes cleavage forming a solid ball of cells of uniform size, called a _____.
 - a) Morula
 - b) Blastula
 - c) Gastrula
 - d) Coelom
- 4) Which of the following cytoskeletal structures provides tracks for guiding intracellular transport?
 - a) Intermediate filaments
 - b) Microtubules
 - c) Actin filaments
 - d) Myosin
- 5) Which of the following statements about G proteins is false?
 - a) They are involved in signal cascades
 - b) They bind to and are regulated by guanine nucleotides
 - c) They become activated when bound to GDP
 - d) They must be active before the cell can make needed cAMP.
- 6) In desmosomes, cadherins link to _____ of an adjacent cell.
 - a) Integrins
 - b) Intermediate filaments
 - c) Plasmodesmata
 - d) Connexons
- 7) Just prior to cell division, the diploid human body cell contains _____ chromatids.
 - a) 46
 - b) 23
 - c) 92
 - d) 122

b) Define the terms:-

- 1) Cell organelles
- 2) Kinesin
- 3) Cell cycle check points
- 4) Ras kinase
- 5) Calmodulin
- 6) Meiosis
- 7) Monospermy

07

SECTION – II**Answer any four of the following:-**

- Q.2** Explain in detail cascade event of Fertilization and a note on cleavage. **14**
- Q.3** Explain in detail cell structure and organization of Eukaryotic cell. **14**
- Q.4** Explain in detail signal transduction by Protein Tyrosine kinase pathway. **14**
- Q.5** **Answer any two from the following:** **14**
- a) Add a note on Process of Blastulation.
 - b) Write a note on 'Microtubular Motor Protein'.
 - c) Add a note on Gap Junction.
- Q.6** **Write short notes on. (Any two)** **14**
- a) Explain role of Cyclins and Cdks in cell cycle.
 - b) Describe cell organelle 'Lysosome'.
 - c) Explain role of 'G-protein-Coupled receptor'.

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**M.Sc. (Semester - II) (CBCS) Examination Nov/Dec-2018
Biotechnology
ENZYME TECHNOLOGY**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section I is compulsory.
2) Answer any four questions from section II.

SECTION – I

Q.1 A) Rewrite the sentences by choosing correct answer from given alternatives: **07**

- 1) To synthesize abzymes for hydrolysis of hydroxyester, the _____ is used as a transition state analogue.
 - a) Hydroxyester
 - b) δ -lactone
 - c) Phenol
 - d) Phosphonate ester
- 2) Fatty acid synthesis is an example of _____.
 - a) Abzyme
 - b) Ribozyme
 - c) Catmab
 - d) Multienzyme complex
- 3) To study enzyme kinetics by using Hanes-Woolf plot, the values of _____ are plotted.
 - a) $[S/V]$ Vs V_0
 - b) $[1/V]$ Vs $[1/S]$
 - c) $[1/S]$ Vs V_0
 - d) $[1/V]$ Vs S_0
- 4) The enzymatic reaction is stopped after incubating for specific period of time, in kinetic study by the _____ assay.
 - a) Continuous
 - b) Direct
 - c) Indirect
 - d) End point
- 5) The amino acids _____ have been found to be critical for catalytic activity of lysozyme.
 - a) Glu35 & Asp 52
 - b) Glu35 & His195
 - c) Asp52 & Tyr21
 - d) His195 & Tyr21
- 6) The increased levels of _____ in blood, is an indication of liver damage.
 - a) Glucose oxidase
 - b) SGOT
 - c) Ribonuclease
 - d) Trypsin
- 7) The ratio of bound to unbound ligand concentration is plotted against bound ligand concentration in _____ plot.
 - a) Eddie Hofstee
 - b) Hanes
 - c) Hills
 - d) Scatchard

B) Define the terms:-

07

- 1) Turnover number
- 2) Multienzyme complex
- 3) Metabolic engineering
- 4) Biosensor
- 5) Cooperativity
- 6) Modulator
- 7) Covalent modification

SECTION – II

- Q.2** Describe in detail 'clinical aspects of enzymology.' **14**
- Q.3** Add a detail account on 'modes of enzyme regulation'. **14**
- Q.4** Describe various methods of enzyme immobilization. **14**
- Q.5 Answer any two of the following:** **14**
- a) Describe graphical procedures in enzymology
 - b) Explain catalysis by Na-K ATPases on the basis of structure function relationship.
 - c) Describe 'methods of study fast enzymatic reactions'.
- Q.6 Answer any two of the following:** **14**
- a) Add an account on chemical modification of enzymes.
 - b) Describe kinetics of allosteric enzymes based on Hill's and Scatchard plot.
 - c) Illustrate the concept of multienzyme complex with examples.

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M.Sc. (Semester - II) (CBCS) Examination Nov/Dec-2018
Biotechnology
MOLECULAR CELL PROCESSING

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) All questions of Section I is compulsory.
 2) Answer any four questions from Section II.
 3) All questions carry equal marks.
 4) Draw neat and labeled diagrams wherever necessary.

SECTION – I

Q.1 A) Rewrite the sentences by choosing correct answer from given alternatives:

07

- 1) DNA polymerase I plays important role during _____.
 i) Replication
 ii) Transcription
 iii) DNA repairs
 a) Only i
 b) Both i and iii
 c) Both ii and iii
 d) Only ii
- 2) In the experiment of Meselson and Stahl the sole source of N¹⁵ isotope in culture media was _____.
 a) NH₄Cl
 b) Glycine
 c) Guanine
 d) Cytosine
- 3) The sense strand is also called as _____.
 a) primer strand
 b) template strand
 c) coding strand
 d) antisense strand
- 4) Transcription factor H (TFIIH) has _____ activity.
 a) Polymerase
 b) DNA helicase
 c) Exonuclease
 d) Endonuclease
- 5) Calcitonin and CGRP are produced by alternative splicing of pre-mRNA in _____ respectively.
 a) Thyroid and neurons of CNS
 b) Thyroid and liver
 c) Liver and neurons of CNS
 d) Neurons of CNS and thyroid
- 6) Aminoacyl tRNA synthetase is also called as _____.
 a) tRNA mutase
 b) tRNA ligase
 c) tRNA transferase
 d) tRNA isomerase
- 7) Synthesis of _____ is the role of RNA polymerase III.
 a) mRNA
 b) primer
 c) micro RNA
 d) tRNA

B) Define the terms:-

07

1. RecA
2. Sigma factor
3. snRNA
4. Satellite DNA
5. Polyadenylation
6. DNA gyrase
7. SOS repair

SECTION – II**Answer any four of the following:-**

- Q.2** Describe the process of translation in eukaryotes. **14**
- Q.3** Explain in details the process of replication in prokaryotes. **14**
- Q.4** Describe the process of transcription in prokaryotes. **14**
- Q.5** **Answer any two of the following:-** **14**
- a) Describe mechanism of recombination
 - b) Describe prokaryote and eukaryote genome organization.
 - c) What are causes of DNA damage? Explain mismatch repair.
- Q.6** **Write notes on (any two):-** **14**
- a) trp operon
 - b) DNA as genetic material
 - c) Characteristics of genetic code.

SECTION – II**Answer any four of the following:-**

- Q.2** Define absorption explain in details factor affecting absorption and add a note on pharmacogenetics. **14**
- Q.3** Explain in detail viral and non viral methods of gene transfer. **14**
- Q.4** Explain in brief properties, types and applications of adult stem cells. **14**
- Q.5 Answer any two of the following:- 14**
- a) Give an account on phenylketonuria
 - b) Explain in brief agammaglobulinemia
 - c) Give an account on human genome project
- Q.6 Write short notes on (any two):- 14**
- a) Explain in detail Chorionic villus sampling and its applications
 - b) Give a brief account on blood and blood group antigens.
 - c) Write a brief on Parkinson's disease.

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M.Sc. (Semester - III) (CBCS) Examination Nov/Dec-2018
Biotechnology
INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

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

Q.1 Choose the correct option and rewrite the sentence:-**14**

- 1) _____ is not an eco friendly method of sewage disposal.
 - a) Composting
 - b) Biomethanation
 - c) Pellitization
 - d) Incineration
- 2) Out of the following, _____ is not the conventional source of energy.
 - a) Fossil fuel
 - b) Mineral oil
 - c) Geothermal energy
 - d) Coal
- 3) Sulphite waste liquor is the waste of _____ industry.
 - a) Food & dairy
 - b) Alcohol
 - c) Paper & Pulp
 - d) Sugar
- 4) In Bioreactors, _____ are used to prevent vortex formation.
 - a) Spargers
 - b) Impellers
 - c) Baffles
 - d) Sensors
- 5) The production of algal biomass can be done by using _____ bioreactor.
 - a) Fluidized
 - b) Fixed bed
 - c) Pulsed
 - d) Photo
- 6) Out of the following, _____ is found ot be most carcinogenic.
 - a) PAH
 - b) Heavy metals
 - c) Textile dyes
 - d) Air Pollutants
- 7) Treatment with _____ is a biological method of cell disruption.
 - a) organic solvent
 - b) lysozyme
 - c) detergent
 - d) alkali
- 8) For commercial production of Penicillin antibiotic, _____ strain is used.
 - a) *P. candidum*
 - b) *P. crostosum*
 - c) *P. chrysogenum*
 - d) *P. digitatum*
- 9) *S. cerevisiae* is commercially used for production of _____.
 - a) Tetracycline
 - b) Ethanol
 - c) Acetic acid
 - d) SCP
- 10) Copepods in water bodies act as _____.
 - a) detoxifiers
 - b) biosensors
 - c) bioindicators
 - d) bioemulsifiers
- 11) 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

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M.Sc. (Semester - III) (CBCS) Examination Nov/Dec-2018
Biotechnology
GENETIC ENGINEERING

Time: 2½ Hours

Max. Marks: 70

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

Q.1 Choose the correct option and rewrite the sentence:- **14**

- 1) _____ classes of restriction enzymes are there?
 a) 3 b) 1
 c) 2 d) 4
- 2) pBR322 has _____ of the following selection marker.
 a) Kan^r b) Tet^r
 c) Act^r d) Str^r
- 3) The virus mediated gene transfer using genetically modified bacteriophages is called _____.
 a) Transfection b) Transformation
 c) Transduction d) Conjugation
- 4) _____ different types of chemical treatments are required in Maxam-Gilbert method.
 a) 2 b) 3
 c) 1 d) 4
- 5) _____ is the mode of action of exonuclease III.
 a) Exonuclease III acts on double stranded DNA in 3' – 5' direction
 b) Exonuclease III acts on double stranded DNA in 5' – 3' direction
 c) Exonuclease III acts on single stranded DNA in 5' – 3' direction
 d) Exonuclease III acts on single stranded DNA in 3' – 5' direction
- 6) Vectors designed to replicate in cells of two different species are called _____.
 a) Plasmid vector b) Shuttle vector
 c) Phasmid vector d) Phagemid vector
- 7) The removal of tumor causing genes from Ti plasmid is termed as _____.
 a) Gene replacement b) Insertional inactivation
 c) Disarming d) Gene cloning
- 8) Reverse transcriptase PCR uses _____.
 a) tRNA as template b) rRNA as template
 c) RNA as template d) mRNA as template
- 9) The variation in number of tandem repeats between two or more individuals is called _____.
 a) VNTR b) RFLP
 c) PCR d) Chromosome walking
- 10) The ability of cells to take up DNA fragments from surrounding is called _____.
 a) Transduction b) Transformation
 c) Transfection d) Conjugation

- 11) _____ will be the transcription product of 3'-AUCCGAGCUAAC-5' when treated with reverse transcriptase.
- a) 3'....GTTAGCTCGGAT....5' b) 3'....AUCCGAGGAUUG....5'
 c) 5'....GTTAGCTCGGAT....3' d) 5'....UAGGCUCGAUUG....3'
- 12) λ_{gt10} vector can be propagate cloned fragments up to _____.
- a) 20-25 kb b) 6-7 kb
 c) 10-20 kb d) 15-20 kb
- 13) All the following are thermostable polymerases except _____.
- a) Taq polymerase b) Pfu polymerase
 c) DNA polymerase III d) Vent polymerase
- 14) The term 'endonuclease' refers to cutting the DNA sequence from
- a) Exactly in the middle of the chain
 b) The ends of the chain
 c) Anywhere in the chain
 d) Only within the polynucleotide chain, not at the ends.

- Q.2 A) Answer the following any four:-** **08**
1. Draw the structure of M13 vector.
 2. Define ligase with examples.
 3. Write a note on cosmids.
 4. Define transgenic animals.
 5. Draw the structure of TMV.
- B) Write note on any two :-** **06**
1. Write notes on Restriction endonuclease.
 2. Write notes on Baculovirus.
 3. Write notes on c-DNA library.
- Q.3 A) Answer the following (Any Two):-** **08**
1. Explain electroporation method.
 2. Describe preparation primers and probes.
 3. Write a note on RFLP.
- B) Answer the following any one:-** **06**
1. Give a detailed account on bacteriophage.
 2. Explain in detail genetically engineered biotherapeutics.
- Q.4 A) Answer the following. (Any Two)** **10**
1. Write in detail Maxam and Gilbert method.
 2. Explain direct recombinant screening method.
 3. Write a note on CaCl & microinjection method of transformation.
- B) Answer the following any one:-** **04**
1. Write a note on southern blotting.
 2. Give a detailed account on phagemids.
- Q.5 Answer the following. (Any Two)** **14**
- a) Describe in detail gene therapy.
 - b) Explain in detail isolation and purification of vector DNA
 - c) Write a note on Microarray.

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**M.Sc. (Semester - III) (CBCS) Examination Nov/Dec-2018
Biotechnology
PLANT BIOTECHNOLOGY**

Time: 2½ Hours

Max. Marks: 70

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

Q.1 Choose the correct option and rewrite the sentence:- 14

- 1) Growth hormone producing apical dominance is _____.
 - a) Auxin
 - b) Gibberellin
 - c) Ethylene
 - d) Cytokinin
- 2) The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as _____.
 - a) Redifferentiation
 - b) Dedifferentiation
 - c) Cytodifferentiation
 - d) Reformation
- 3) Somaclonal variations are the ones _____.
 - a) Caused by mutagens
 - b) Produce during tissue culture
 - c) Caused by gamma rays
 - d) Induced during sexual embryogeny
- 4) Biolistic method is suitable for _____.
 - a) Constructing recombinant DNA by joining vectors
 - b) Transformation of Plant cells
 - c) Disarming pathogen vectors
 - d) DNA fingerprinting
- 5) Hormone pair required for a callus to differentiate are _____.
 - a) Auxin and cytokinin
 - b) Auxin and ethylene
 - c) Auxin and abscisic acid
 - d) Cytokinins and gibberellin
- 6) A medium which is composed of chemically defined compound is called _____.
 - a) Natural media
 - b) Artificial medium
 - c) Synthetic media
 - d) Supernatural medium
- 7) The culturing of cells in liquid agitated medium is called _____.
 - a) Liquid culture
 - b) Micropropagation
 - c) Agar medium
 - d) Suspension culture
- 8) Immobilized cell bioreactors are based on _____.
 - a) Cell cultures on solid medium
 - b) Cell cultures on liquid medium
 - c) Cell entrapped in gels
 - d) Culture entrapped in cell
- 9) Artificial seeds are _____.
 - a) Seeds produced in laboratory condition
 - b) Seeds encapsulated in a gel
 - c) Somatic embryos encapsulated in gels
 - d) Zygotic embryos encapsulated in gels
- 10) Hairy root cultures for secondary metabolite production are induced by transforming plant cells with _____.
 - a) Viruses
 - b) *Agrobacterium tumefaciens*
 - c) *Bacillus thuringiensis*
 - d) *Agrobacterium rhizogenes*

- 11) _____ growth regulator responsible for fruit ripening.
- | | |
|---------------------|-------------|
| a) Abscisic acid | b) Ethylene |
| c) Gibberellic acid | d) Auxin |
- 12) Golden rice is rich in _____.
- | | |
|-----------------|--------------------|
| a) Vitamin E | b) Hormones |
| c) Provitamin A | d) Growth hormones |
- 13) Polyploidy is induced by _____.
- | | |
|----------------|------------------------|
| a) Irradiation | b) Mutagenic chemicals |
| c) Ethylene | d) Colchicine |
- 14) Polyethylene glycol is _____.
- | | |
|-----------------------|--------------------------------|
| a) Fusogenic chemical | b) Electrofusion stimulant |
| c) Callus stimulant | d) Differentiation stimulation |

- Q.2 a) Answer the following any four:-** **08**
- 1) Plant tissue culture.
 - 2) The concept of cybrid.
 - 3) Callus culture
 - 4) Molecular Farming
 - 5) Symmetric and asymmetric hybrids
- b) Write note on any two :-** **06**
- 1) Write a note on Artificial seeds Production.
 - 2) Explain Industrial and therapeutic enzyme production using plant biotechnology.
 - 3) Write a note on haploid plant production.
- Q.3 a) Answer the following. (Any Two)** **08**
- 1) Write the essential micro and macromolecules for plant nutrition.
 - 2) Explain organogenesis.
 - 3) Explain cell suspension culture.
- b) Answer the following any one:-** **06**
- 1) Write a note on Somaclonal variation.
 - 2) Write a note on Somatic hybridization
- Q.4 a) Answer the following. (Any Two)** **10**
- 1) Concept of organ culture.
 - 2) What are viral vectors and explain the use of virulence DNA in gene transfer mechanism.
 - 3) Explain micro propagation.
- b) Answer the following any one:-** **04**
- 1) Describe gene silencing mechanism.
 - 2) Give detailed account on tissue culture media.
- Q.5 Answer the following. (Any Two)** **14**
- a) Write in detail ‘Cryopreservation technology’.
 - b) Explain various methods of Gene transfer in Plant biotechnology.
 - c) Explain Protoplast culture in detail.

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M.Sc. (Semester – IV) (New) (CBCS) Examination Nov/Dec-2018
Biotechnology
ANIMAL BIOTECHNOLOGY AND STEM CELL TECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section I is compulsory.
 2) Answer any four questions from section II.
 3) Draw neat labeled diagram wherever necessary.

SECTION – I

Q.1 A) Rewrite the sentences by choosing correct answer from given alternatives: **07**

- 1) Medullary plate of chick Embryo was maintained by Roux in _____.
 a) Warm saline
 b) Plasma clots
 c) Agar clot
 d) Serum
- 2) E S Cell lines in culture was first obtained by _____.
 a) IVF
 b) Mouse Blastocysts
 c) Chick Embryo
 d) Germ Cells
- 3) Liquid phase temperature for very long period of storage of cells is _____.
 a) -70 °C
 b) -120 °C
 c) -196 °C
 d) -110 °C
- 4) The quality and quantity of wool can be improved in sheep by the supply of _____ aminoacids.
 a) Serine
 b) Methionine
 c) Lysine
 d) Cysteine
- 5) Neural stem cells cultured in vitro is called _____.
 a) Neuronal cells
 b) Glial cells
 c) Neurospheres
 d) EG cells
- 6) The first human cell line to be grown continuously in the laboratory is _____.
 a) Hela cell line
 b) MRC – 5
 c) 3T3 cell line
 d) HLM cell line
- 7) _____ is a favorite animal for harvesting human organ for organ transplant.
 a) Chicken
 b) Pig
 c) Sheep
 d) Goat

B) Define the terms:-

07

- 1) Passage number
- 2) Organotypic culture
- 3) Grid Technique
- 4) Gene Knock Out
- 5) Cryotubes
- 6) Cell Lines
- 7) Hayflick effect

SECTION – II

- Q.2** Write in details about the different type of cell culture media, its growth supplement and its advantages. **14**
- Q.3** Write in details about Hybridoma technique and its importance. **14**
- Q.4** Explain in detail culture of cells for production of various biological. **14**
- Q.5 Answer any two of the following:** **14**
- a) What is organ culture? Write about the techniques used in organ culture.
 - b) Discuss the importance characteristics of stem cells.
 - c) Write a note on cryopreservation methods.
- Q.6 Answer any two of the following:** **14**
- a) Explain in detail about immunoisolation techniques.
 - b) Write a note on scale up in monolayer culture with diagram.
 - c) Discuss the different types of Tissue culture and its advantages.

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M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Biotechnology
ADVANCED ANALYTICAL TECHNIQUES

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section – I compulsory.
 2) Answer any four questions from section – II.

SECTION – I**Q.1 a) Rewrite the sentence using correct alternative given below: 07**

- 1) In circular dichroism, the differential absorption of _____ light is analyzed.
 - a) Polarized
 - b) Reflected
 - c) Inhibited
 - d) Deviated
- 2) Radioactive decay is measured in a _____.
 - a) Scintillation counter
 - b) AAS
 - c) UV spectrometer
 - d) Autoradiography
- 3) The first working microscope was designed by _____.
 - a) Robert Hook
 - b) Kepler
 - c) Leeuwenhoek
 - d) Watson
- 4) In Western Blotting technique _____ is transferred to the membrane.
 - a) DNA
 - b) RNA
 - c) Protein
 - d) None
- 5) Paper chromatography is a type of _____ chromatography.
 - a) Planar
 - b) Column
 - c) TLC
 - d) All of the above
- 6) The working range of a pH meter is in between _____.
 - a) 8-14
 - b) 0-14
 - c) 0-7
 - d) 1-7
- 7) The nuclear fraction is sedimented at _____ rpm.
 - a) 10,000
 - b) 1000
 - c) 8000
 - d) 12,000

b) Define the terms:-**07**

- 1) Refractive index
- 2) Sedimentation coefficient
- 3) Partition coefficient
- 4) Isoelectric focusing
- 5) pH
- 6) Radioactivity
- 7) Spectroscopy

SECTION – II

- Q.2** Explain the scanning Electron microscopy with suitable diagrams. **14**
- Q.3** What is Radioactivity? Give the working of Scintillation counting. **14**
- Q.4** Give the principle, instrumentation, working and applications of Infra Red Spectroscopy. **14**

Q.5 Answer any two of the following:

14

- a) Explain the technique of Capillary Electrophoresis.
- b) Write a note GC-MS.
- c) Write a note on UV – V is Spectrophotometry.

Q.6 Write short notes on any two of the following:-

14

- a) X-ray Crystallography
- b) Applications of radio isotopes.
- c) Ultracentrifuges

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Biotechnology
RESEARCH METHODOLOGY AND IPR

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section–1, Question 1 is compulsory.
 2) Attempt any four questions from part-II
 3) Figures to the right indicate full marks.
 4) Answers to the Section-I and Section-II are to be written in same answer booklet only.

SECTION – I

Q.1 a) Rewrite the sentences by choosing correct answer from given alternatives: 07

- 1) _____ is a preferred sampling method for the population with finite size.
 - a) Area sampling
 - b) Cluster sampling
 - c) Purposive sampling
 - d) Systematic sampling
- 2) A research problem is not feasible if _____.
 - a) It consists of independent and dependent variables
 - b) It has utility and relevance
 - c) It is new and adds something to knowledge
 - d) It is researchable
- 3) _____ type of research is designed to obtain a preliminary investigation of a new unique situation that leads to narrowing down the number of alternatives and later on focusing them to form hypothesis?
 - a) Exploratory
 - b) Conclusive
 - c) Descriptive
 - d) Experimental
- 4) The technique of extracting useful, novel and understandable patterns from database is known as _____.
 - a) Data mining
 - b) Data addition
 - c) Data insertion
 - d) Data inclusion
- 5) The term 'Intellectual Property Rights' covers _____.
 - a) Copyrights
 - b) Patent
 - c) Trade dress
 - d) All of the above
- 6) In India, the literary work is protected until _____.
 - a) Lifetime of author
 - b) 25 years after the death of author
 - c) 40 years after the death of author
 - d) 60 years after the death of author
- 7) _____ of the following is (are) included in Geographical indications of Goods.
 - a) Handicraft
 - b) Foodstuff
 - c) Manufactured
 - d) All of the above

b) Define the terms:-

- 1) Trademark
- 2) ANOVA
- 3) Fundamental research
- 4) Impact factor
- 5) Sample Size
- 6) UPOV
- 7) PBR

SECTION – II**Answer any four of the following:-**

- Q.2** What is research methodology? Explain in detail objectives of research and types of research. **14**
- Q.3** What is sampling? Explain in detail types of sampling. **14**
- Q.4** Explain the different guideline for choosing title and abstract for preparation of manuscript. **14**
- Q.5** **Write short notes on any two of the following:-** **14**
- a) Research Design
 - b) Geographical indications.
 - c) Plant variety protection in India.
- Q.6** **Answer any two of the following:** **14**
- a) Write a note on patenting of biological material.
 - b) Write a note on advantages and limitations data collection.
 - c) Write a note on preparation of power point for oral presentation in conference.

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Biotechnology
MEDICAL BIOTECHNOLOGY AND BIO-NANOTECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section I is compulsory.
 2) Answer any four questions from Section II.

SECTION – I

Q.1 A) Rewrite the sentences by choosing correct answer from given alternatives: 07

- 1) Each of the following organisms is an important cause of urinary tract infections except:

a) <i>Klebsiellapneumoniae</i>	b) <i>Escherichia coli</i>
c) <i>Bacteriodesfragilis</i>	d) <i>Proteus mirabilis</i>
- 2) Which of the following disease is best diagnosed by serologic means?

a) Pulmonary tuberculosis	b) Gonorrhoea
c) Actinomycosis	d) Q Fever
- 3) The coagulase test is used to differentiate

a) <i>Staphylococcus epidermidis</i> from <i>Neisseria meningitidis</i>
b) <i>Staphylococcus aureus</i> from <i>Staphylococcus epidermidis</i>
c) <i>Streptococcus pyogenes</i> from <i>Staphylococcus aureus</i>
d) <i>Streptococcus pyogenes</i> from <i>Enterococcus faecalis</i>
- 4) Attachment of erythrocytes to surface of virally infected cell is termed as

a) Interference	b) Hemadsorption
c) Neutralization	d) Complement fixation
- 5) 10 nm = _____ m

a) 10^{-8}	b) 10^{-7}
c) 10^{-9}	d) 10^{-10}
- 6) Duration during which a specific antibody develops and becomes detachable in blood is known as _____

a) Serology	b) Blood culture
c) Seroconversion	d) Antibody production
- 7) Which of the following is correct about micro biosensors?

a) Implantation in human body and are suitable for in-vivo measurements
b) Can be integrated on one chip and are useful for measuring various substrates in a small amount of sample solution simultaneously
c) It is possible to develop disposable transducers for biosensors through mass production
d) All of these

B) Define the terms:-

- 1) Infection
- 2) *E coli*
- 3) Biochemical test
- 4) Antibiotic
- 5) Vaccine
- 6) Nanotechnology
- 7) Micelle

SECTION – II

- Q.2** Discuss about the epidemiology study and pathogenesis of *Escherichia coli* disease. **14**
- Q.3** Explain in details of methods involved in the diagnosis of diseases. **14**
- Q.4** Define chemotherapy? Explain the mode of action of antibiotic with suitable example. **14**
- Q.5 Answer any two of the following:** **14**
- a) Application of phage in therapeutics
 - b) Gene therapy
 - c) Application of Nanotechnology
- Q.6 Write short notes on any two of the following:-** **14**
- a) Chemical method for synthesis of nanoparticles.
 - b) Recent trends in Nano-biotechnology
 - c) Pathology of *Candida sps*

SECTION – II

- Q.2** Write in details about the different type of cell culture media, its growth supplement and its advantages. **14**
- Q.3** Write in details about Hybridoma technique and its importance. **14**
- Q.4** Explain in detail culture of cells for production of various biological. **14**
- Q.5 Answer any two of the following: 14**
- a) What is organ culture? Write about the techniques used in organ culture.
 - b) Discuss the importance characteristics of stem cells.
 - c) Write a note on cryopreservation methods.
- Q.6 Answer any two of the following: 14**
- a) Explain in detail about immunoisolation techniques.
 - b) Write a note on scale up in monolayer culture with diagram.
 - c) Discuss the different types of Tissue culture and its advantages.

Seat No.	
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M.Sc. (Semester - IV) (Old) (CBCS) Examination Nov/Dec-2018
Biotechnology
MEDICAL BIOTECHNOLOGY AND BIO-NANOTECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section I is compulsory.
 2) Answer any four questions from Section II.

SECTION – I

Q.1 A) Rewrite the sentences by choosing correct answer from given alternatives: 07

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a) <i>Klebsiellapneumoniae</i>	b) <i>Escherichia coli</i>
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- 2) *E coli*
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- 5) Vaccine
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SECTION – II

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