SLR-UE-84

Seat No.		Set	P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Biotechnology
MICROBIOLOGY

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Part-I question 1 is compulsory.
2) Answer any four questions from Part-II.
3) Figures to the right indicate full marks.
4) Answer to the Part-I and Part-II are to be written in same answer booklet only.

PART – I

Q.1 A) Rewrite the sentence after choosing answer from the given alternatives:- **07**

1) The basic taxonomic group of bacterial taxonomy is _____.
   a) Species b) Genus
   c) Family d) Sub Species

2) _____ lacks a cell wall.
   a) Methanogens *b) E. coli*
   c) Mycobacteria d) Mycoplasma

3) _____ phage is a virulent bacterial virus.
   a) Lysogenic b) Bacteria
   c) Algae d) Lytic

4) _____ is an example of a physical method of sterilization,
   a) Bacteriostasis b) Sanitizing
   c) Germicide d) Autoclaving

5) _____ bacteria is a group of archaea which produces methane.
   a) Halophilic b) Alkalophilic
   c) Methanogenic d) Aerobic

6) _____ are composite organism composed of fungi and algae.
   a) Lichen b) Nematodes
   c) Mycorrhiza d) TMV

7) _____ name is considered as universal name of bacteria.
   a) Scientific b) National
   c) Traditional d) Common

B) Define the following terms: **07**

1) Cell capsule
2) Sterilization
3) Morphology
4) Pathogenic
5) Flagella
6) Thermophiles
7) Bacteriophages

PART – II

Answer any four of the following:-

Q.2 Explain in detail about different types of bacterial culture collection units. **14**

Q.3 Define Anoxygenic photosynthesis. Explain in detail about anoxygenic photosynthetic microbes. **14**

Q.4 Write a note on Psychrophiles. **14**

Q.5 **Write short note on any two:-** **14**

a) Acidophiles
b) Transmission electron microscopy
c) Replication of Viruses

Q.6 **Explain in detail about any two:-** **14**

a) Lytic cycle
b) Mycotoxins
c) PHYLIP software

SLR-UE-85

Seat No.	

Set P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Biotechnology
CONCEPT OF BIOCHEMISTRY

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) Multiple Choice Questions: **07**

1) The pleated sheets in secondary structure of protein are stabilized by _____ bonding between beta strands.
   a) peptide b) disulfide
   c) glycosidic d) hydrogen

2) A thermodynamic reaction can occur spontaneously only if the ΔG is ___.
   a) positive b) constant
   c) negative d) maximum

3) In Ramchandran plot, the _____ angles represent the bond angles in C-N bond.
   a) psi b) phi
   c) gamma d) delta

4) In Gauchers disease which is a genetic disorder, there is accumulation of _____ in organs and tissues.
   a) cerebroside b) glucocerebroside
   c) corticosteroid d) dopamine

5) In Calvin cycle the Rubisco enzyme condenses CO2 molecule with _____ to produce 3 phosphoglycerate.
   a) Ribose 5 phosphate b) Ribulose 5 phosphate
   c) Ribose 1,5 bisphosphate d) Ribulose 1,5 bisphosphate

6) Synthesis of fructose 2,6 bisphosphate from fructose 6 phosphate which stimulates glycolysis is catalyzed by _____.
   a) Aldolase b) PFK-1
   c) PFK – 2 d) Enolase

7) The precursor molecule for the synthesis of steroid hormones and bile salts is _____,
   a) Acetyl COA b) Cholesterol
   c) Squalene d) Glycogen

B) Define the following terms: **07**

1) Gluconeogenesis
2) Metabolism
3) Secondary messenger
4) Entropy
5) Protein energy malnutrition
6) Protein stability
7) Cytokinins

Section – II

Q.2 Add a detail account on 'Inborn errors of metabolism'. **14**

Q.3 Add a detail account on glycogen metabolism. **14**

Q.4 Give the general classification of hormones. Explain in detail the mechanism of action of any one hormone. **14**

Q.5 **Answer any Two of the following:** **14**

a) Explain structure and role of cAMP.
b) Describe hormonal control of pregnancy and lactation.
c) Describe the structural levels in protein. Add a note 'Ramchandran Plot'.

Q.6 **Answer any Two of following:** **14**

a) Describe diabetis as a metabolic disorder
b) Describe Z Scheme of noncyclic phosphorylation.
c) Describe the laws of thermodynamics. Explain the concept of 'free energy'.

SLR-UE-86

Seat No.		Set	P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Biotechnology
INHERITANCE BIOLOGY

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Part-I, Questions-1 is compulsory.
2) Attempt any-4 question from part-II
3) Figures to the right indicate full marks.
4) Answer to the Part-I and Part-II are to be written in same answer booklet only.

Part – I

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

1) A diploid cell missing a single chromosome is _____.
   a) Trisomic b) Nullisomic
   c) Monosomic d) Tetrasomic

2) The bacterial strain that do not possess the Fertility Factor in conjugation process is _____.
   a) Only Females b) Only Males
   c) Both Females and Males d) Neither females nor males

3) Generalized Transduction was first discovered in _____.
   a) Phage λ b) P_{22}
   c) T_1 Phage d) att λ

4) The number of linkage groups in Brassica species is _____.
   a) 23 b) 4
   c) 9 d) 7

5) The intragenic interaction studies are done by the process of _____.
   a) Epistasis b) Duplicate Genes
   c) Incomplete dominance d) Polymeric Genes

6) Theory of Abiogenesis was supported by _____.
   a) Louis Pasteur b) J. B. S. Haldane
   c) Aristotle d) A. I. Oparin

7) A property common to all types of Heterochromatin is _____.
   a) Late Translation b) Late Transcription
   c) Late Replication d) Late Nuclear division

B) Define the following: **07**

1) Define Epistasis
2) Define Position Effect
3) Define Competency
4) Define Recombination
5) Define Physical Map
6) Define Nondisjunction
7) Define Aneuploidy

Part – II

Answer Any Four of the following:

Q.2 Discuss the genetics of ABO Blood Group system in man with its characteristic features and its applications. **14**

Q.3 Explain the concept of Linkage and crossing over giving suitable examples and its significance. **14**

Q.4 Explain the inheritance pattern in chloroplast of Mitochondria with suitable examples. **14**

Q.5 **Answer any two from the following in brief:** **14**

a) Explain 9:7 ratio with the help of suitable example.

b) Describe the morphological structure of Lampbrush chromosome with the help of neat labeled diagram.

c) Explain the Hardy Weinberg equilibrium and add a note on its significance.

Q.6 **Write short notes on any two of following:** **14**

a) Write about the structural changes in chromosomes.

b) Microsatellites

c) Transformation and Competency

SLR-UE-87

Seat No.		Set	P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Biotechnology
BIOSTATISTICS AND BIOINFORMATICS

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Section – I, is compulsory.
2) Attempt any-4 question from Sections – II
3) All questions carry equal marks.
4) Use of non-data storage calculator is allowed.

Section – I

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

1) A subset of the population selected to help make inferences on a population is called _____.
   a) a population b) inferential statistics
   c) a census d) a sample

2) A measure of the strength of the linear relationship that exists between two variables is called _____.
   a) Slope b) Intercept
   c) Correlation coefficient d) Regression equation

3) If the critical region is located equally in both sides of the sampling distribution of test-statistic, the test is called _____.
   a) One tailed b) Left tailed
   c) Right tailed d) Two tailed

4) The mean deviation about mean of data is _____.
   a) $\frac{1}{n}\sum|x_i - \bar{x}|$ b) $\frac{1}{n}\sum(x_i - \bar{x})$
   c) $\frac{1}{n}\sum(x_i - \bar{x})^2$ d) $\frac{1}{n}\sum(x_i - M)$

5) In Ramchandran plot during validation of protein structure _____ torsion angles are considered.
   a) ϕ and Ψ b) χ and δ
   c) ω and ψ d) η and φ

6) Solution to the Newton's equation of motion for the nuclei is known as _____.
   a) quantum dynamics b) molecular dynamics
   c) conformational search d) molecular trajectories

7) The study of complete genome of organism is known as _____.
   a) Proteomics b) Genomics
   c) Metabolamics d) Transcriptomics

B) Define the following: **07**

1) Variable
2) Inclusive class
3) P-value
4) SRS
5) Database
6) Global alignment
7) Docking

Section – II

Answer Any Four of the following:

Q.2 Write an essay on Homology Modeling. **14**

Q.3 Calculate the arithmetic mean, median and mode from the following data:- **14**

Age at last birthday	15-19	20-24	25-29	30-34	35-39	40-44
Number	4	20	38	24	10	9

Q.4 Answer any Two of the following:- **14**

a) Discuss about the pairwise sequence alignment.

b) Calculate the standard deviation from the following data
10, 13, 17, 22, 27, 30, 31, 32

c) Describe in detail GenBank.

Q.5 Write short note on any Two of the following:- **14**

a) Write a note on Analysis of Variance (ANOVA)

b) Molecular dynamic simulation

c) Represent the following data by histogram

No. of tillers per plant	0-6	6-12	12-18	18-24	24-30	30-36
Number of Plants	4	8	15	20	12	6

Q.6 Write Short Notes on any two of the following: **14**

a) Conformational search and docking

b) Discuss in detail about random sampling method

c) Distance based and character based approach of phylogenetic analysis

SLR-UE-88

Seat No.		Set	P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Biotechnology
CLINICAL BIOINFORMATICS

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Part - I, Questions 1 is compulsory.
2) Attempt any 4 question from part - II.
3) Figures to the right indicate full marks.
4) Answer to the Part - I and Part - II are to be written in same answer booklet only.

Part – I

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

1) R is an _____ language; users typically access it through a command-line interpreter.
   a) Object oriented b) Structure oriented
   c) Interpreted d) All

2) CPT is a registered trademark of the _____ Medical Association.
   a) American b) Indian
   c) Australian d) All of the above

3) International Statistical Classification of Diseases is developed by ____.
   a) Sanger b) WHO
   c) ICHI d) ICF

4) _____ is a joint scientific project between the European Bioinformatics Institute and the Wellcome Trust Sanger institute.
   a) NCBI b) Ensembl
   c) Swiss-Prot d) Bio Mart

5) _____ can be used to filter, reformat, or trim your genomic and metagenomic sequence date.
   a) HTQC b) QPLOT
   c) PRINSEQ d) FASTX

6) The first pathogen genome _____ that of was sequenced by traditional Sanger methods
   a) Haemophilus influenza b) Staphylococcus epidermidis
   c) Staphylococcus aureus d) Neisseria meningitides

7) FastQC next generation sequencing tool is tool on _____ platform.
   a) Illumina b) FASTQ
   c) GNU Glib d) CASAVA

B) Definitions: **07**

1) Epigenomics
2) Annotation
3) Neurodegenerative disorders
4) Clinical trial
5) Metabolites
6) Mapviewer
7) Pathogen

Part – II

Answer Any Four of the following:

Q.2 Define NGS. Add a note on its tools and techniques. **14**

Q.3 Write a detailed note on pathology informatics with examples. **14**

Q.4 Explain the different challenges and applications of pharmacogenomics. **14**

Q.5 **Answer any two from the following:** **14**

a) Add a note on Microarray with types.
b) Write a note on medical coding with application.
c) Explain the implication of genome projects in human health & disease.

Q.6 **Write short notes on any two of following:** **14**

a) Transcriptomics
b) System Biology
c) Pharmacoviglance

SLR-UE-89

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Biotechnology
CELL BIOLOGY

Time: 2½ Hours Max. Marks: 70

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

Section – I

Q.1 A) Rewrite the sentence after choosing the correct from the given **07**

1) _____ is absent in prokaryotic cell membrane.
   a) Cholesterol b) Phospholipid
   c) Glycolipid d) Glycorotein

2) Inner pH of lysosome is _____.
   a) 1 b) 3
   c) 5 d) 2

3) Proteins synthesized by the rough ER are
   a) For internal storage b) To build membranes in the cell
   c) For internal regulation only d) Exported from the cell

4) In each cycle the sodium-potassium pumps transfer _____.
   a) Three sodium ions out and two potassium ions in
   b) Two potassium ions in and two sodium ions out
   c) One sodium ion out and one potassium ion in
   d) One potassium ion out and two sodium ions in

5) One protein kinase cascade begins with the phosphorylation of the ___.
   a) Sap protein b) Tap protein
   c) Ras protein d) Gat protein

6) Plasmodesmata connect _____.
   a) Action fibers of one cell to the extracellular matrix of another
   b) The cytoplasm of one plant cell to that of another
   c) To intermediate fibers of the cytoskeleton
   d) Cells of a tight junction like a belt

7) Crossing-over can occur between homologues during
   a) Zygotene b) Leptotene
   c) Pachytene d) Diplotene

B) Define the terms **07**

1) Cell compartments
2) Cytoskeleton
3) Integral Protein
4) Gap junction
5) Meiosis
6) Calmodulin
7) Eukaryotic cell

Section – II

Answer any four of the following:

Q.2 Explain Signal transduction in regulation of glucose level. **14**

Q.3 Explain 'Vesicular transport from Endoplasmic reticulum of Golgi apparatus.' **14**

Q.4 Describe Structural and functional capitalization of Cell organelles – Lysosome. **14**

Q.5 **Answer any two from the following** **14**

a) Add a note on 'G-protein-Coupled receptors'.
b) Write a note on 'Kinesin'
c) Explain Cell cycle check point.

Q.6 **Write short notes on (any two)** **14**

a) Add a note on 'Myosin'.
b) Explain 'Cell Matrix interaction'.
c) Explain structure of microtubules in cilia and flagella.

SLR-UE-90

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Biotechnology
ENZYME TECHNOLOGY

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Section I is compulsory.
2) Answer any Four questions from section II.
3) All question carry equal marks.
4) Draw neat and labeled diagrams.
5) Figures to the right indicate full marks.

Section – I

Q.1 A) Rewrite the sentence after choosing the correct from the given. 07

1) The degree of inhibition for non-competitive inhibition of an enzyme catalyzed reaction of _____.
   a) Increase with increase substrate concentration
   b) Reaches with increase in substrate concentration
   c) Reaches a maxima with increase in substrate concentration and then decreases
   d) Decreases with increase in substrate concentrate

2) Enzyme papain is used with success to _____.
   a) Increase meat production b) Ripen papaya fruit
   c) Leaven bread d) Tenderize meat

3) Which one of the following reaches used for the purpose of recycling enzymes in bioprocess
   a) Isomerization b) Phosphorylation
   c) Immobilization d) Polymerization

4) Which one of the following techniques is not ideal for immobilized cell free enzymes
   a) Physical entrapment by encapsulation
   b) Physical bonding by flocculation
   c) Covalent chemical bonding by cross linking the precipitate
   d) Covalent surface bonding to surface carriers

5) Most industrial enzymes are obtained from _____.
   a) Plants b) Microbes
   c) Insects d) Animal tissues

6) Ki indicate
   a) Reaction velocity b) Competition inhibition
   c) Denaturation of enzyme d) All the above

7) Pi indicates
   a) Isoelectric point b) Protein indicators
   c) Protein kinetics d) None of the above

B) Define the terms. **07**

1) Isoenymes
2) ATPase
3) Bisubstrate reactions
4) Km
5) Covalent bonding
6) Biosensors
7) Enzyme activators

Section – II

Q.2 Explain the multienzyme complex and properties with examples. **14**

Q.3 Explain the importance and the derivation of Michaelis-Menten equation. **14**

Q.4 What are the functional classifications of enzymes? Explain with suitable Examples. **14**

Q.5 Answer any two of the following:- **14**

a) Clinical aspects of enzymology: LDH isozymes and SGOT.
b) Effect of temperature, pH and substrate concentration on enzyme.
c) Biosensors

Q.6 Write any two of the following:- **14**

a) Elaborate multienzyme immobilization method.
b) Define allosteric regulation.
c) Differentiate between non-competitive and uncompetitive inhibitors.

SLR-UE-91

Seat No.	

Set P

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

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Section I is compulsory.
2) Answer any Four questions from section II.
3) All question carry equal marks.
4) Figures to the right indicate full marks.
5) Draw neat and labeled diagram.

Section – I

Q.1 A) Rewrite the sentence after choosing the correct from the given **07**

1) In prokaryotes, the first amino acid in the polypeptide chain is _____.
   a) Methionine b) N-formyl methionine
   c) Both a & b d) None

2) In prokaryotes, the ribosomal binding site on mRNA is _____.
   a) Hogness sequence b) Shine-Dalgarno
   c) Eukarya d) All of these

3) Transcription termination occurs by _____.
   a) Rho-dependent b) Rho-independent
   c) Sigma factor d) Both a & b

4) _____ RNA required for protein synthesis.
   a) tRNA b) mRNA
   c) rRNA d) all of these

5) RNA primer necessary for DNA replication _____.
   a) The RNA primer is necessary for the activity of DNA ligase.
   b) The RNA primer creates the 5’ and 3’ ends of the strand.
   c) DNA polymerase can only add nucleotides to RNA molecules.
   d) DNA polymerase can only add nucleotides to an existing strand.

6) During the process of transcription, _____ of the following is produced.
   a) H_2O b) ATP
   c) mRNA d) DNA

7) During DNA replication the formation of bond takes place between ____.
   a) Bases b) Sugar and bases
   c) Phosphates and bases d) Sugars and phosphates

B) Define the terms. **07**

a) Group II introns
b) Glycosylation
c) Holiday Model
d) 30S Ribosome
e) 16S rRNA
f) SOS repair
g) rec BCD pathway

Section – II

Answer any four of the following:-

Q.2 Explain the process of eukaryotic RNA editing with neat labeled diagram. **14**

Q.3 What is mutation? Explain mismatch and SOS DNA repair mechanism with neat labeled diagram. **14**

Q.4 Describe the structure, assembly and function of each subunit of DNA Pol III with neat Labeled diagram. **14**

Q.5 **Answer any two from the following:-** **14**

a) Describe the process of transcription in prokaryotes.
b) Explain the structure of eukaryotic gene.
c) Explain difference between eukaryotic and prokaryotic DNA replication.

Q.6 **Write short notes on. (Any two)** **14**

a) *E. Coli* DNA Pol I
b) Protein folding
c) tRNA, mRNA and rRNA

SLR-UE-92

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Biotechnology
MOLECULAR MEDICINE

Time: 2½ Hours Max. Marks: 70

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

Section – I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given:- **07**

1) The β-globin gene of haemoglobin is located on chromosome number _____.
   a) 11 b) 12
   c) 16 d) 18

2) _____ is the study of inherited genetic differences in drug metabolic pathway which can affect individual responses to drugs.
   a) Pharmacology b) Genetics
   c) Pharmacogenetics d) Pharmacy

3) _____ gene is mutated is cystic fibrosis.
   a) CFTR b) Actin
   c) Cadherin d) Fibrin

4) Nerve tangles in Alzheimer's disease are caused due to ____ protein.
   a) Ameloid beta b) Tau protein
   c) Sigma d) Delta

5) In DNA fingerprinting _____ repeated sequences of DNA is used.
   a) Variable number of tandem repeats
   b) Verified number of tandem repeat
   c) Versatile number of transverse repeat
   d) Variable number of transverse repeat

6) Stem cell exhibits _____ properties.
   a) Only potency b) Potency and self renewable
   c) Potency and non renewable d) Only self-renewable

7) MHC Antigen in mouse is known as _____.
   a) HLA b) H-2
   c) ASB d) HSB

B) Define the following terms. **07**

1) Potency
2) In-vivo gene therapy
3) Positional cloning
4) Pharmacogenetics
5) HLA
6) Amelyoid plaques
7) Lead optimization

Section – II

Answer any four of the following:-

Q.2 Write a note on hemoglobinopathies and explain diseases related to hemoglobin gene mutation. **14**

Q.3 Write a note on therapeutic applications of stem cells. **14**

Q.4 Explain in detail steps involved in drug discovery and its design. **14**

Q.5 **Answer any Two of the following:** **14**

a) Give an account on Huntinston's disease.

b) Explain different nature and sources of drug.

c) Explain in brief human genome project.

Q.6 **Write short notes on any Two of the following:** **14**

a) Give difference between adult and embryonic stem cells.

b) Explain non viral methods of gene transfer.

c) Give and account of DNA fingerprinting and its applications.

SLR-UE-93

Seat No.	

Set P

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Biotechnology
INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

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) Multiple Choice Question: **07**

1) *S. Cerevisiae* is commercially used for production of _____.
   a) Tetracycline b) Acetic acid
   c) Alcohol d) Both b & c

2) The extraction of purification of a biotechnology product from fermented broth is called as _____.
   a) Downstream processing b) Upstream processing
   c) Product recovery d) Both a & c

3) Treatment with_____, is a biological method of a cell disruption.
   a) Organic solvent b) Lysozyme
   c) Detergent d) None of these

4) Transfer of a desired product from one liquid phase to other liquid phase is called as _____.
   a) Solvent recovery b) Solid liquid extraction
   c) Liquid-liquid extraction d) Both a & c

5) Out of following _____ is an example of non-conventional energy sources.
   a) Petroleum oil b) Sunlight
   c) Coal d) Natural gas
   e) Spargers

6) Dendrothermal energy in included in _____ types of energy source.
   a) Conventional b) Renewable
   c) Non-renewable d) Both a & c

7) The forest conservation act was passed in ____ by Indian parliament.
   a) 1988 b) 1980
   c) 1981 d) 1972

B) Define the following terms: **07**

1) Single cell oil
2) Continuous fermentation
3) Biotransformation
4) Upstream Procession
5) Environmental ethics
6) Dialysis
7) Bio sorption

Section – II

Q.2 Briefly explains the design of bioreactor and its types. **14**

Q.3 Explain in detail production of any two antibiotics. **14**

Q.4 Describe about the environment protection and conservation. **14**

Q.5 **Answer any two from the following:** **14**

a) Methods of preservation of microorganism
b) Continuous fermentation
c) Waste management

Q.6 **Answer any two from the following:** **14**

a) Methods for cell lysis
b) Microbial production of glutamic acid
c) Non-conventional energy sources

SLR-UE-94

Seat No.		Set	P

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Biotechnology
GENETIC ENGINEERING

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 sentence after using correct alternative given below:- 07

1) First step of genetic engineering is
   a) Isolation of gene interest b) Insertion of gene into vector
   c) Growth of GMO d) Expression of gene

2) Which of the following cannot be used as a vector?
   a) Phage b) Plasmid
   c) Bacterium d) All can be used as vector

3) The enzyme used in the polymerase chain reaction is
   a) Restriction endonuclease b) Reverse transcriptase
   c) DNA polymerase d) RNA polymerase

4) In Cohen and Boyer's recombinant DNA experiments, restriction endonucleases were used to
   a) Isolate fragments of cloned bacterial plasmids
   b) Isolate fragments of frog DNA that contained an rRNA gene.
   c) Cleave the bacterial plasmid
   d) All of these are correct

5) A probe is used in which stage of genetic engineering?
   a) Cleaving DNA b) Recombining DNA
   c) Cloning d) Screening

6) Which of the following is not an application of genetic engineering in plants?
   a) Nitrogen fixation
   b) DNA vaccines
   c) Resistance to glyphosate
   d) Production to insecticidal proteins in plants

7) Bacterium which is able to synthesize human growth hormone is known as
   a) *E.coli* bacterium b) *H.coli* bacterium
   c) *X.coli* bacterium d) *I.coli* bacterium

B) Define the following terms. 07

1) Gene
2) Vectors
3) Probes
4) RFLP
5) Gene therapy
6) Phagmid
7) PCR

Section – II

Q.2 Explain in details vectors properties and structure of natural and artificial plasmids. **14**

Q.3 Discuss about the construction of genomic DNA and cDNA library. **14**

Q.4 Describe the Blotting techniques. **14**

Q.5 **Answer any two from the following:** **14**

a) Colony hybridization
b) Sanger's method of sequencing
c) DNA fingerprinting

Q.6 **Write short notes on. (Any two)** **14**

a) DNA manipulation enzyme
b) Mammalian Vector
c) Transformation

SLR-UE-95

Seat No.		Set	P

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Biotechnology
PLANT BIOTECHNOLOGY

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) Multiple Choice Question: **07**

1) Epigenetic variation occurs due to
   a) Tissue culture practices b) Pre existing variations
   c) Both a and b d) None of the above

2) Cybrids are _____.
   a) Cytoplasmic hybrids b) Genomic hybrids
   c) Protoplast d) None of the above

3) Totipotency refers to
   a) the ability of a plant cell to arrest the growth of a plant
   b) the ability of a plant cell to develop disease in plant
   c) the ability of a plant cell to develop into a complete plant
   d) the ability of a plant cell to develop into a callus

4) Green fluorescence protein is a _____.
   a) Selectable marker gene b) Reporter gene
   c) A gene from animal cell d) All of the above

5) Gold/Tungsten nano particles are widely used for coating of DNA fragments in _____
   a) Electroporation b) Gene gun
   c) Micro injection d) All of the above

6) Protoplasts can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with
   a) Celluloytic enzyme b) Pectinolytic enzymes
   c) Both a and b d) Protease

7) CaMv is
   a) DNA containing virus
   b) RNA containing virus
   c) Protein containing virus
   d) Both DNA and RNA containing virus

B) Define the following terms: **07**

1) Gene gun
2) Haploid plant
3) Embryos
4) Cholchicine
5) Viral vectors
6) Reporter gene
7) Acclimatization

Section – II

Q.2 Discuss in brief role of Micronutrients and Phyto-hormones in plant growth? **14**

Q.3 What do you mean somaclonal variation? Explain in detail mechanism behind somaclonal variation. **14**

Q4 Discuss in brief about Mechanism of DNA transfer and role of Virulence gene in Agro bacterium mediated gene transfer? **14**

Q5 **Answer any two from the following** **14**

a) Edible Vaccine production
b) Biotic stress resistance in plants
c) CaMv as a cloning vector.

Q.6 **Write short notes on any Two of the following:** **14**

a) Initiation and maintenance of callus
b) Cell and plant tissue culture lab set up
c) Plant hormones

SLR-UE-97

Seat No.		Set	P

M.Sc. (Semester - III) (Old) (CBCS) Examination Mar/Apr-2018
Biotechnology
ADVANCED ANALYTICAL TECHINQUES

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 sentence after choosing the correct answer from the given alternatives: **07**

1) The name of the protein staining dye is _____.
   a) Safranine b) Diphenyle amine
   c) Basic fuchsin d) Coomasie brilliant blue

2) The _____ used in centrifugation is a self forming gradient.
   a) Ficoll b) Sucrose
   c) Maltose d) All of the above

3) In electron microscopy the source of illumination is _____.
   a) Light b) Tungsten filament
   c) Nichrome wire d) Black Rod

4) The _____ is used as a ligand in affinity chromatography of antibodies.
   a) Substrate b) Antigen
   c) PEG d) All of the above

5) The membrane used in blotting of DNA is _____ membrane.
   a) Dialysis b) Nitrocellulose
   c) Polyethylene d) All of the above

6) In circular dichorism, the differential absorption of _____ light is analyzed.
   a) Polarized b) Reflected
   c) Inhibited d) Deviated

7) Radioactively labeled nucleotides can be visualized in situ by _____.
   a) Flow cytometer b) AAS
   c) UV Spectrometer d) Autoradiography

B) Define the following terms. **07**

1) Electrode
2) RCF
3) Stationary phase in Chromatography
4) Capillary electrophoresis
5) Electromagnetic Radiation
6) Scintillation
7) Refractive index

Section – II

Q.2 Write a note on the methods of measurement of Radioactivity? Give their advantages and restrictions. **14**

Q.3 Give the principle, instrumentation, working and applications of Atomic Absorption Spectroscopy. **14**

Q.4 Explain the different types of Electron microscopy with suitable diagrams. **14**

Q.5 **Answer any two from the following:** **14**

a) Write a note on GC-MS.
b) Explain the technique of SDS-PAGE.
c) Explain the technique of NMR.

Q.6 **Write short notes on any two of following:** **14**

a) Ultracentrifuges
b) Support material used in the technique of Chromatography.
c) Applications of radio isotopes In Biological sciences.

SLR-UE-102

Seat No.	

Set P

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

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Section I compulsory.
2) Answer any Four questions from section II.

Section – I

Q.1 A) Multiple choice Questions:- **07**

1) First cloned animal was _____.
   a) Dolly sheep b) Dog
   c) Mule d) Cat

2) Transgenic goats have been used to produce the protein used to dissolve blood clots for _____.
   a) Amyloid precursor protein
   b) α1-antitrypsin (AAT)
   c) Caesin
   d) A variety of human tissue type Plasminogen activator

3) The Father of Animal cell culture was _____.
   a) Ross Harrison b) Whatson
   c) Johnson d) Chris Harris

4) Animal cell cultures are used widely for the production of _____.
   a) Insulin b) Somatostatin
   c) MABS d) Thyroxine

5) The first vaccine developed from animal cell culture was for _____.
   a) Hepatitis B b) Influenza
   c) Small Pox d) Polio

6) Recombinant proteins are _____.
   a) Proteins synthesized in animals
   b) Proteins synthesized by transgene in hose cells by r DNA technique
   c) Proteins synthesized in cells that are produced by protoplast fusion
   d) Proteins synthesized in mutated cell line

7) Interferons are _____.
   a) Antibacterial proteins b) Anti Viral proteins
   c) Bacteriostatic proteins d) All of these

B) Define the following terms:- **07**

1) Suspension culture
2) Scaffolds
3) Scaling up
4) Cell line
5) Cryopreservation
6) Stem cells
7) Xenograft

Section – II

Q.2 Briefly explains the design of an animal cell culture bioreactor and its types. **14**

Q.3 Define Organotypic culture and write in detail how they are made. **14**

Q.4 Describe in detail the types of grafts used for organ transplantation and its applications. **14**

Q.5 **Answer any two from the following** **14**

a) Methods of preservation of cell cultures.
b) Serum free media.
c) CO2 incubator.

Q.6 **Answer any two of the following :-** **14**

a) Primary culture.
b) Mode of cell and tissue delivery.
c) Applications of animal cell culture in day to day life.

SLR-UE-103

Seat No.		Set	P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-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 after choosing the correct answer from the given alternatives: **07**

1) The nuclear fraction is sedimented at _____ rpm.
   a) 10,000 b) 1000
   c) 8000 d) 12,000

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) In circular dichorism, the differential absorption of ___ light is analyzed.
   a) Polarized b) Reflected
   c) Inhibited d) Deviated

B) Define the following 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 in detail Electron Microscopy and its types with the help of suitable diagrams. **14**

Q.3 Write a note on the advantages and restrictions of Radio tracer techniques. **14**

Q.4 Comment on the different types of Rotors with the help of suitable diagrams. **14**

Q.5 **Answer any two from the following:** **14**

a) Pulse Field Gel Electrophoresis
b) Write a note on HPLC.
c) Write any five differences between Turbidimetry and Nephalometry.

Q.6 **Write short notes on any two of following:** **14**

a) Applications of MALDI Tof in Biological sciences.
b) Explain the technique of detection of ionization in Geiger Muller counter.
c) Use of centrifuges for molecular weight determination.

SLR-UE-104

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Biotechnology
RESEARCH METHODOLOGY AND IPR

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Part-I, Questions-1 is compulsory.
2) Attempt any-4 question from part- II.
3) Figures to the right indicate full marks.
4) Answer to the Part- I and Part- II are to be written in same answer booklet only.

Part – I

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

1) When citation includes more than _____ authors in the text, only the surname of the author is cited followed by et. al.
   a) 2 b) 4
   c) 5 d) 6

2) Which of the following is not one of the seven major parts to the research report _____
   a) Results b) Abstract
   c) Method d) Footnotes

3) What is the purpose of doing research?
   a) To identify problem b) To find the solution
   c) Both a & b d) None of these

4) In group interview there are _____
   a) One interviewer and one interviewee
   b) More than one interviewer and one interviewee
   c) One interviewer and more than one interviewee
   d) More than one interviewer and more than one interviewee

5) Which of the following is not an essential element of report writing?
   a) Research Methodology b) References
   c) Conclusions d) None of these

6) Which of the following is non-probability sampling?
   a) Snowball b) Random
   c) Cluster d) Stratified

7) It is in this section that you fully interpret & evaluate your results _____.
   a) Introduction b) Method
   c) Results d) Discussion

B) Definitions: **07**

1) Trade secret
2) IPR
3) Impact factor
4) Correlation
5) Chi square test
6) Farmer's right
7) Copyright

Part – II

Answer Any Four of the following:

Q.2 What is data collection? Explain different method of data collection. **14**

Q.3 Define research? Note on meaning, objectives and motivation of research. **14**

Q.4 Explain in detail the author instructions required for preparing manuscript to publish in Indian journal of biotechnology (IJBT). **14**

Q.5 **Answer any two from the following:** **14**

a) Write a note on plant variety protection in India.
b) Write a note on criteria for selecting research problem.
c) Write a note on technology transfer and its types.

Q.6 **Write short notes on any two of following:** **14**

a) ANOVA
b) Review of literature
c) WIPO

SLR-UE-105

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Biotechnology
MEDICAL BIOTECHNOLOGY AND BIO-NANOTECHNOLOGY

Time: 2½ Hours Max. Marks: 70

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

Section – I

Q.1 A) Multiple Choice Questions:- **07**

1) Arabinose is a test-tube test used for
   a) Enterococci b) Salmonella
   c) G-bacteria d) Neisseriae

2) Choose the incorrect statement about Endo agar:
   a) Only some G+ bacteria can grow on it selectively
   b) Can be used to differentiate lactose fermentation
   c) Is similar to McConkey medium
   d) Combines selective and diagnostic properties

3) Choose the correct statement about Antigen detection:
   a) It is an indirect method
   b) Negative result means presence of microbe in the patient's body
   c) It is carried out in the laboratory using antibodies of animal origin
   d) Uses a sample of patients saliva

4) Which of the following media is used for culturing Salmonella?
   a) VL-broth b) Sabouraud agar
   c) Slanetz Bartley d) Selenite Broth

5) nanometer=_____ cm.
   a) $10^{(-9)}$ b) $10^{(-8)}$
   c) $10^{(-7)}$ d) $10^{(-6)}$

6) The most important property of nanomaterials is _____.
   a) Force b) Friction
   c) Pressure d) Temperature

7) Nanotechnology, in other word, is _____.
   a) Carbon engineering b) Atomic engineering
   c) Small technology d) Microphysics

B) Define the following terms. **07**

1) Normal flora
2) Coagulase A
3) Biochemical test
4) Biosensor
5) Bactermeia
6) Nanotubes
7) Miscelle

Section – II

Q.2 Discuss about the epidemiology study and pathogensis of *E.coli* diseases. **14**

Q.3 Briefly explains of conventional method for the detection of diseases. **14**

Q.4 Define the interferon and discuss the induction of interferon and types of inducers. **14**

Q.5 **Answer any Two of the following.** **14**

a) Antibiotics
b) Gene therapy
c) HIV

Q.6 **Write any Two of the following.** **14**

a) Diagnosis of parasitic
b) Antiviral agents
c) Physical method for synthesis of nanoparticles

SLR-UE-108

Seat No.		Set	P

M.Sc. (Semester - IV) (Old) (CBCS) Examination Mar/Apr-2018
Biotechnology
INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Section -1 is compulsory.
2) Attempt any - 4 question from part- II.

Section – I

Q.1 A) Multiple Choice Questions **07**

1) The organism used in the fermentation of Beer is _____.
   a) S. cerevisiae b) Aspergillus
   c) Fusarium d) Penicillium

2) Purification of biotechnological product from fermented broth is known as _____.
   a) Product recovery b) Downstream processing
   c) Upstream processing d) Both A & B

3) Preservation of biological products at lower temperatures is called _____.
   a) Cryopreservation b) Lyophilisation
   c) Freezing drying d) Low temperature

4) Large scale cultivation of algae is carried out in _____
   a) Fixed bioreactors b) Fluidized reactors
   c) Photo bioreactors d) Pulse reactors

5) Phenyl acetic acid is used as a precursor in _____ production.
   a) Penicillin G b) Penicillin V
   c) Penicillin M d) Cyclosporine

6) _____ is used in bioreactors for oxygen/air supply in bioreactors.
   a) Baffles b) Impellers
   c) Spargers d) Both B & C

7) *Corynebacterium glutamicum* is used in the production of _____.
   a) Alcohol b) Amylases
   c) Acetic acid d) Glutamic acid

B) Define the following terms: **07**

1) Fermentors
2) Batch fermentation
3) Biotransformation
4) Downstream Processing
5) Environmental ethics
6) Xenobiotics
7) Bioindicators

Section – II

Q.2 Explain in brief the chromatographic techniques for purification of desired product from fermented broth. **14**

Q.3 What is scale up process? Write in detail production of any two antibiotics. **14**

Q.4 Discuss in detail about the environment protection and conservation. **14**

Q.5 **Answer any two from the following:** **14**

a) Liquid liquid separation
b) Continuous fermentation
c) Penicillin production

Q.6 **Answer any two from the following:** **14**

a) Non-conventional energy sources
b) Physical and chemical methods for effluent treatment
c) Wine production

SLR-UE-109

Seat No.		Set	P

M.Sc. (Semester - IV) (Old) (CBCS) Examination Mar/Apr-2018
Biotechnology
PLANT BIOTECHNOLOGY

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Section -1 is compulsory.
2) Attempt any - 4 question from part- II.

Section – I

Q.1 A) Multiple Choice Questions **07**

1) Colchicine is a specific inhibitor of _____.
   a) Spindle fiber b) DNA Replication
   c) Protein metabolism d) Carbohydrate synthesis

2) Ti plasmid induceses crown gall disease in
   a) Dicots b) Monocots
   c) Grasess d) Embryoids

3) Meristem culture helps in developing
   a) Hybrid plants b) Virus free plants
   c) Disease resistant plants d) Tall plants

4) Somatic embryos are _____
   a) embryos developed from zygote after fertilization
   b) embryos developed from egg without fertilization
   c) embryo like structure developed from the cells of callus
   d) embryo developed by ovules

5) Totipotency refers to
   a) the ability of a plant cell to arrest the growth of a plant
   b) the ability of a plant cell to develop disease in plant
   c) the ability of a plant cell to develop into a complete plant
   d) the ability of a plant cell to develop into a callus

6) Deficiency of Magnesium in plants results in
   a) Cholorosis b) Necrosis
   c) Both a and b d) Elongation of internodes

7) Gene silencing refers to
   a) Over-expression of gene b) No expression of Trans gene
   c) Protein synthesis d) All of the above

B) Define the following terms: **07**

1) Phytohormones
2) 35 S promoter
3) Male Gametophyte
4) Ti Plasmids
5) Secondary Metabolites
6) Micropropagation
7) Cloning

Section – II

Q.2 Discusses in brief about Plant nutrients with their roles in plants. **14**

Q.3 Add a brief note on basics of tumor formation in plants. **14**

Q.4 Discuss in brief about vector less (Direct gene transfer) transformation in plant? **14**

Q.5 **Answer any two from the following:** **14**

a) Application of plant biotechnology.
b) Answer in detail steps involved in Micropropagation.
c) Protoplast Isolation.

Q.6 **Write short notes on any two of following:** **14**

a) Soma-clonal Variation / In vitro mutagenesis
b) Shoot tip culture
c) Molecular Farming