SLR-JE-56

Seat No.	

Set P

M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2019
Biotechnology
MICROBIOLOGY

Day & Date: Monday, 18-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) Fungi can be stained by using _____ stain.
   a) Safranine b) Leishman's stain
   c) Lactophenol cotton blue d) basic fuchsin

2) A fungi in which sexual stage is unknown belongs to _____.
   a) Zygomecetes b) Basidiomycetes
   c) Mastigomycetes d) Deuteromycetes

3) _____ is not a temperate phage.
   a) S1 b) Lambda
   c) P22 d) ΦX174

4) Out of the following, _____ kills bacteria by producing nascent oxygen.
   a) Iodine b) Ethylene oxide
   c) Chlorine d) Heavy metals

5) The significant characteristic of an electron responsible for maximum resolution in electron microscope is _____.
   a) Small size b) High velocity
   c) Less wavelength d) Negative charge

6) Positive sense single stranded RNA is present in _____ virus.
   a) Lambda b) Polio
   c) Hepatitis d) Influenza

7) Sulfolobus is a _____ organism.
   a) Thermophilic b) Metallophilic
   c) Acidophilic d) Thermoacidophilic

8) The method for preservation of biological component by dehydrating it at lower temperature is called as _____.
   a) Liquid nitrogen method b) cryopreservation
   c) lyophilization d) subculturing

9) Hepatitis virus infects its host by attacking _____ cells.
   a) Liver b) Neural cells
   c) RBCs d) T4

10) The symbiotic association between fungi and algae is called as _____.
   a) Lichens b) Rhizopus
   c) Mycorrhiza d) Fungirrhiza

11) Streaking technique for bacterial isolation was discovered by _____.
   a) Robert Koch b) Fransisco Redi
   c) Joseph Lister d) Louis Pasteur

12) Out of the following, _____ cannot be used for viral vaccine production.
   a) Embryonated egg b) diploid cell line
   c) Live animal d) Continuous cell line

13) The alcohol at _____% concentration is generally used as a disinfectant.
   a) 20 b) 40
   c) 70 d) 100

14) _____ staining method plays important role in diagnosis of Tuberculosis disease.
   a) Gram's b) Negative
   c) Ziehl Neelson's d) Maneval's

Q.2 A) Define the following questions. (Any Four) **08**
1) What transmission electron microscopy?
2) What is simple staining?
3) Define Lyophilization.
4) What is Mycorrhiza?
5) Define Phylogenetic clade.

B) Write Notes. (Any Two) **06**
1) Explain in brief reproduction of polio virus.
2) Explain Differential media used in microbiology.
3) Give account on industrial applications of fungi.

Q.3 A) Answer the following questions. (Any Two) **08**
1) Explain reproduction of influenza virus.
2) Describe PHYLIP software.
3) Describe origin, habitat, and molecular adaptations of Halophiles.

B) Answer the following questions. (Any One) **06**
1) Cell wall staining & Capsule staining.
2) Write general characters of gram negative pathogenic bacteria.

Q.4 A) Answer the following questions. (Any Two) **10**
1) Write a note on fungal symbiosis.
2) Describe acid fast staining.
3) Explain Polyphasic taxonomy.

B) Answer the following questions. (Any One) **04**
1) Reproduction of HIV.
2) Modern methods for Prokaryotic identification.

Q.5 Answer the following questions. (Any Two) **14**
a) Explain lytic cycle with the example of T_4.
b) Explain the methods of sterilization.
c) Describe in detail photosynthetic bacteria.

SLR-JE-57

Seat No.	

Set P

M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2019
Biotechnology
CONCEPT OF BIOCHEMISTRY

Day & Date: Tuesday, 05-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) _____ enzyme catalyze the hydrolysis of stored triacylglycerols.
   a) lipases b) oxidases
   c) reductase d) transferase

2) In eukaryotes, most mRNAs are _____.
   a) polycistronic b) monocistronic
   c) tricistronic d) dicistronic

3) The first amino acid discovered was _____.
   a) glutamate b) alanine
   c) asparagine d) proline

4) _____ enzyme is found on the luminal side of the endoplasmic reticulum Of hepatocytes and renal cells.
   a) fructose 1, 6 bisphosphatase b) fructose 6 phosphatase
   c) glucose 6 phosphatase d) glucose 1,6 bisphosphatase

5) The active site of pyruvate dehydrogenase El enzyme has bound _____.
   a) TPP b) FAD
   c) NAD d) lipoate

6) _____ Proteins Fe atom is coordinated to two His residues.
   a) iron sulfur b) cytochrome
   c) Rieske iron sulfur d) flavo

7) The Chemiosmotic model was proposed by _____.
   a) Peter Mitchell b) Efraim Racker
   c) John Walker d) Paul Boyer

8) Glycolysis under anaerobic conditions yields only _____ ATP.
   a) 4 b) 3
   c) 2 d) 1

9) Glycogen storage disorder pomes are also known as _____.
   a) type II b) type I
   c) type III d) type IV

10) The characteristic pH at which the net electric charge is zero is called the _____.
   a) zwitterions b) isoelectric point
   c) anion d) cation

11) _____ are intermediaries, carrying genetic information from one or a few genes to a ribosome.
a) m- RNA b) r- RNA
c) t- RNA d) Ribozyme

12) The Watson-Crick structure is also referred to as _____ of DNA.
a) C form b) A form
c) B form d) D form

13) _____ is the heat content of the reacting system.
a) Enthalpy b) Entropy
c) free energy d) activation energy

14) All aminotransferases have the _____ prosthetic group.
a) NAD b) FAD
c) pyridoxal phosphate d) lipoate

Q.2 A) Answer the following questions. (Any Four) **08**
1) Define gluconeogenesis.
2) Explain transamination reaction.
3) Write example of aldopentose and ketopentose.
4) Give the function of gibberellin.
5) Define photophosphorylation.

B) Write Notes. (Any Two) **06**
1) Write notes on ATP synthase enzyme.
2) Write notes on Pyruvate dehydrogenase enzyme complex.
3) Write notes on function of Vitamin A and Vitamin K.

Q.3 A) Answer the following questions. (Any Two) **08**
1) Explain glycogen storage disorders.
2) Describe synthesis of starch in plants.
3) Write a note on phosphorylation potential.

B) Answer the following questions. (Any One) **06**
1) Explain secretion, transport and mechanism of action of thyroid gland hormones.
2) Write a note on structure and role of m- RNA and t- RNA.

Q.4 A) Answer the following questions. (Any Two) **10**
1) Write in detail free energy change.
2) Explain z scheme of noncyclic photophosphorylation.
3) Write a note on structure and function of carbohydrates.

B) Answer the following questions. (Any One) **04**
1) Write a note on structure and role of c- AMP.
2) Describe coupled reactions.

Q.5 Answer the following questions. (Any Two) **14**
a) Describe biosynthesis of fatty acids.
b) Explain in detail oxidative phosphorylation.
c) Write a note on redox potential and phosphorylation potential.

SLR-JE-58

Seat No.	

Set P

M.Sc.(Semester - I) (CBCS) Examination Oct/Nov-2019
Biotechnology
INHERITANCE BIOLOGY

Day & Date: Thursday, 07-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. 14

1) Females have a pair of identical sex chromosomes called x chromosomes hence they are called as _____.
   a) Homomorphic b) Heteromorphic
   c) Automorphic d) Gynandromorphic

2) The ideal DNA markers for genetic mapping and population studies are _____.
   a) Minisatellites b) Microsatellites
   c) LINES d) SINES

3) Gene interaction that involves the masking of the gene effects is _____.
   a) Supplementary Genes b) Complementary Gene
   c) Epistasis d) Pleiotropy

4) The term Organic Evolution was coined by _____.
   a) H. Spencer b) A. L. Oparin
   c) Aristotle d) Plato

5) The production of toxic substance Paramecin is controlled by cytoplasmic particles called _____.
   a) Kappa particles b) Alpha particles
   c) Beta particles d) Delta particles

6) _____ is a very efficient method of mapping in bacteria.
   a) Transduction b) Transformation
   c) Conjugation d) Transfection

7) _____ is a disease caused due to mutation in mt DNA.
   a) Mycoelonic Epilepsy b) Bleeder's disease
   c) Down's syndrome d) None of these

8) The length of chromosomes in humans is _____.
   a) $4 - 6\mu$ b) $6 - 8\mu$
   c) $1 - 2\mu$ d) $2 - 4\mu$

9) A property common to all types of heterochromatin is _____.
   a) Late Translation b) Late Transcription
   c) Late Replication d) Late Nuclear Division

10) A cross between individuals with dominant and recessive phenotypes is called _____.
   a) Self-cross b) Test cross
   c) Back cross d) Allele cross

11) The unit of measurement for genetic linkage is _____.
   a) Centimeter b) Centimorgan
   c) Kilometer d) Kilobase

12) Minisatellites are located near _____.
   a) Centromeres b) Chromosomes
   c) Telomeres d) Acromere

13) Leucoplasts are present in _____.
   a) Leaves b) Flowers
   c) Roots d) Pollen

14) Jumbo Macintosh apples is an example of _____.
   a) Tetraploid b) Triploid
   c) Diploid d) Monoploid

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

1) Define Allele.
2) Define Genotype.
3) Define Euchromatin.
4) Define paranemic coiling.
5) Define Homologous Organs.

B) Write Notes on (Any Two) **06**

1) Law of Co dominance with example.
2) Structure of sex chromosomes
3) F-Plasmid

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

1) Write in detail about the law of segregation.
2) Write about the pattern of inheritance in Mirabilis jalapa.
3) Write about Generalized transduction.

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

1) Write in details about Darwin's theory of Evolution.
2) Write in details about Hardy Weinberg Law and its significance.

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

1) Write in detail about the mechanism of Transformation and its significance.
2) Write in detail about Lampbrush chromosome with neat diagram.
3) Write in detail about Minisatellite and its importance.

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

1) Write in detail about Neo-Darwinism.
2) Write in detail about the concept of Gene.

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

a) Write in detail about the structural aberrations in chromosomes.
b) Heterochromatin is Genetically inactive explain with example.
c) Explain in detail about the complementary Gene interaction with example.

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Seat No.	

Set P

M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2019
Biotechnology
BIOSTATISTICS AND BIOINFORMATICS

Day & Date: Saturday, 09-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. 14

1) The student's T test is _____ test.
   a) Nonparametric b) Aparametric
   c) Parametric d) Comparing variances

2) _____ refers to percentage of matches of same amino acid residue between two aligned sequences.
   a) Similarity b) Homology
   c) Xenology d) Identity

3) Mean of a set of Values is based on _____.
   a) all values b) fifty percent values
   c) first and last value d) max and min values

4) _____ is method of protein modeling based on same folds as protein of known structures.
   a) Pairwise energy b) Fold recognition
   c) Homology d) Comparative

5) Number of fruits in a tree is a _____ variable.
   a) Discrete b) Absolute
   c) Continuous d) Quantitative

6) Blast and fasta is heruristic _____ method for fast pairwise sequence alignment.
   a) Word b) Progressive
   c) Scoring d) Graphical

7) A small representative fraction of population is called a _____.
   a) Data b) Sample
   c) Class d) Variable

8) _____ is conformational search methods to find all low energy conformers of molecules.
   a) Ab intio b) Exhaustive
   c) Monte carlo d) Block

9) _____ is the fundamental statistical indicator.
   a) Median b) Mean
   c) Variance d) Variable

10) The primary database or source for pfam database is _____.
   a) NRL-3D b) OWL
   c) MIPSx d) Swiss Prot

11) If mean of 6 number 41 then sum of these numbers is _____.
   a) 252 b) 250
   c) 248 d) 246

12) _____ is computation method that computes potential energy surface of particular atoms.
   a) Docking b) Molecular mechanics
   c) Free Radicals d) Optimization

13) Distribution whose outliers are higher values is considered as _____.
   a) Right skewed b) Left skewed
   c) Variable model d) Constant model

14) The _____ programming is quantitative way of scoring matrix for sequence alignment.
   a) Dot plot b) Word
   c) Iterative d) Dynamic

Q.2 A) Answer the following question. (Any Four) **08**
1) What is Bank IT?
2) Classification of data.
3) Define algorithm.
4) What is probability?
5) Expand MMDB.

B) Write Short Notes. (Any Two) **06**
1) Add a note on genomics and proteomics.
2) Define sampling. Mention the methods of sampling.
3) What is global alignment?

Q.3 A) Answer the following question. (Any Two) **08**
1) Explain the nucleic acid sequence databases.
2) Add a note on skewness and kurtosis.
3) Write the merits and demerits of standard deviation.

B) Answer the following question. (Any One) **06**
1) Write in a note on secondary databases of proteins.
2) Add a note on Z-test and T- test in statistics.

Q.4 A) Answer the following question.(Any Two) **10**
1) Explain the molecular docking methods.
2) Write a note on measures of central tendency.
3) Define homology medaling. Explain the methods in detail.

B) Answer the following question. (Any One) **04**
1) Write a note on energy minimization in molecular dynamics.
2) Add a note on regression and correlation.

Q.5 Answer the following (Any Two) **14**
a) Write a note on protein secondary structure prediction methods.
b) What is Phylip? Write a detailed note on phylogenetics.
c) Calculate standard deviation from following data of profits of companies.

Profits (Rs. In lacs)	20-30	30-40	40-50	50-60	60-70	70-80	89-90	90-100
Companies	30	58	62	85	112	70	57	26

SLR-JE-61

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019
Biotechnology
CELL BIOLOGY

Day & Date: Monday, 04-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Multiple Choice Questions. **14**

1) "All plants are made of cells". It was suggested by _____.
   a) Schleiden b) Schwann
   c) Hooke d) Virchow

2) _____ specific protein is formed in G2-phase.
   a) Histone b) DNA-polymerase
   c) Scaffold proteins d) Tubulin

3) _____ organelle is responsible for the formation of aster in cell division.
   a) Ribosome b) Centrosome
   c) Lysosome d) Chromosome

4) GPCR is comprised of _____.
   a) 7 transmembrane helices b) 8 transmembrane helices
   c) 9 transmembrane helices d) 10 transmembrane helices

5) _____ a protein does not function in cell-cell interaction.
   a) Integrin b) Cadherin
   c) N-CAM d) Cytochrome c

6) Programmed cell death is termed as _____.
   a) Metastasis b) Apoptosis
   c) Proliferation d) Mitotic termination

7) The process of regeneration was first discovered in _____.
   a) Planaria b) Hydra
   c) Salamander d) Sponges

8) 'Sensory' organs and 'nervous' system arises from the _____.
   a) Mesoderm b) Ectoderm
   c) Endoderm d) Germ cell

9) Wnt signalling pathway is also referred as _____.
   a) β catenine b) α catenine
   c) ω catenine d) δ catenine

10) "Androgen" is collective name for the _____.
   a) Male sex hormone b) Female sex hormone
   c) Growth hormone d) Leutinizing hormone

11) _____ proteins are heterotrimeric in nature and act in signal transduction.
   a) Haemoglobin b) Insulin
   c) G Protein d) Actin

12) Phenomenon of "replicative senescence" is also termed as _____.
   a) Hayflick limit b) Hooke limit
   c) Koach Iimit d) Morgans limit

13) Passage of a cell through stages of cell cycle is controlled by a protein kinase _____ that phosphorylates many different proteins at appropriate times.
a) Cdk activating kinase b) Cyclin-dependent kinase
c) Cyclins d) Tyrosine kinase

14) Contractile protein of skeletal muscle involve in ATPase activity is _____.
a) Troponin b) Myosin
c) Tubulin d) Tropomyosin

Q.2 A) Answer the following questions.(Any Four) **08**
1) Define interphase.
2) Define cadherin.
3) Define cell scenence.
4) Define intermediate filaments.
5) Define Cleavage.

B) Write notes.(Any Two) **06**
1) Write notes on Calmodulin.
2) Write notes on Meiosis.
3) Write notes on Selection.

Q.3 A) Answer the following questions. (Any Two) **08**
1) Explain in detail NOTCH Pathway.
2) Explain in detail structure of peroxisomes.
3) Give account on oncogenes and tumour suppressor genes.

B) Answer the following questions. (Any One) **06**
1) Give detail account on Chemical Composition of cell membrane.
2) Explain in detail structure and functions of microtubule.

Q.4 A) Answer the following questions. (Any Two) **10**
1) Give an account on Extracellular matrix.
2) Explain biochemical process during fertilization.
3) Give an account on actin and myosin in heart.

B) Answer the following questions. (Any One) **04**
1) Explain structure and function of Nucleus.
2) Explain cell theory.

Q.5 Answer the following questions.(Any Two) **14**
a) Give an account cell cycle and its regulation.
b) Explain pathways of Apoptosis.
c) Explain GPCR signaling pathway.

SLR-JE-62

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019
Biotechnology
ENZYME TECHNOLOGY

Day & Date: Wednesday, 06-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) Enzymes are classified into _____types.
   a) Two b) Three
   c) Five d) Six

2) Non-protein organic part of the enzyme is _____.
   a) Co-factor b) Co-enzyme
   c) Apo Enzyme d) Isoenzyme

3) SI Unit for enzyme activity is _____.
   a) Bel b) mho
   c) Hertz d) Katal

4) _____ Enzyme is used in textile industry.
   a) Pectinase b) Amylase
   c) Nitrogenase d) Lipase

5) _____subclass of oxidoreductase directly incorporate O_2 into substrate.
   a) oxidase b) oxygenase
   c) dehydrogenase d) peroxidase

6) The enzyme used for the clarification of wine and fruit juice is _____.
   a) protease b) dehydrogenase
   c) chymosin d) pectinase

7) Blocking of enzyme action by blocking its active sites is _____.
   a) allosteric inhibition b) feedback inhibition
   c) competitive inhibition d) non-competitive inhibition

8) Enzyme catalyzing rearrangement of atomic groupings without altering molecular weight or number of atoms is _____.
   a) ligase b) isomerase
   c) oxidoreductase d) hydrolase

9) The term enzyme was coined by _____.
   a) Kunhe b) Schwann
   c) Pasteur d) Sumner

10) Tryptophan synthase is a multifunctional _____dependant enzyme.
   a) NAD b) flavin
   c) biotin d) pyridoxal phosphate

11) _____ type of inhibition can be reversed by increasing substrate concentration.
   a) Feedback b) Competative
   c) Uncompetative d) Non-competative

12) Km value represents _____.
   a) substrate concentration at ½ Vmax
   b) maximum substrate concentration
   c) maximum velocity
   d) rate of reaction

13) The chemical reaction of glucose with oxygen is catalyzed in presence of _____.
   a) glucose oxidase
   b) glucose dioxidase
   c) oxidoreductase
   d) carboxylase

14) Mechanism of enzyme activity is termed as _____.
   a) hydrolysis
   b) catalysis
   c) proteolysis
   d) hydration

Q.2 A) Answer the following (Any Four) **08**
1) What is enzyme?
2) What is ribozyme?
3) What is phosphorylation?
4) What is allosteric site?
5) What is metabolic engineering?

B) Write Notes on (Any Two) **06**
1) Write notes antibodies as biosensor
2) Write notes feedback control
3) Write notes ES complex formation

Q.3 A) Answer the following (Any Two) **08**
1) Write a note on tryptophan synthase enzyme.
2) Explain the terms enzyme activity, specific activity and turnover number.
3) Describe industrial application immobilized enzymes.

B) Answer the following (Any One) **06**
1) Define enzyme engineering and add a note on methods of enzyme modification.
2) Explain competitive, uncompetitive and non competitive inhibition.

Q.4 A) Answer the following (Any Two) **10**
1) Explain effect of substrate concentration on enzyme activity.
2) Write a note on clinical aspects of SGPT and SGOT
3) Write note on parameter affecting enzyme activity.

B) Answer the following (Any One) **04**
1) Give the structure and function of ribonuclease and carboxypeptidase.
2) Write note on steady state enzyme kinetics and significance of Vmax.

Q.5 Answer the following (Any Two) **14**
a) Write note on enzyme regulation by enzyme induction, enzyme repression, covalent modification and allosteric regulation.
b) Explain derivation of Michaelis - Menten equation.
c) What is enzyme stability & add a note on methods of enzyme encapsulation.

SLR-JE-63

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019
Biotechnology
MOLECULAR CELL PROCESSING

Day & Date: Friday, 08-11-2019 Max. Marks: 70
Time: 11:30 AM To 02:00 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) Each individual nucleosome core particle consists of _____number of nucleotide pairs.
   a) 145 b) 147
   c) 150 d) 180

2) _____ is an exogenous agent that damage DNA.
   a) Oxidation b) Alkylation
   c) Ionizing radiation d) Hydrolysis

3) _____ form of DNA is formed from GCGCGC stretches of nucleotide sequence.
   a) A b) B
   c) C d) Z

4) _____ position of nitrogen in purines is involved in glycosidic bond formation with ribosugar.
   a) 1^{st} b) 3^{rd}
   c) 7^{th} d) 9^{th}

5) If the sequence TACTGCCT on sense strand and ATGACGGA on antisense strand _____ sequence will be on RNA transcript.
   a) TACTGCCT b) ATGACGGA
   c) UACUGCCU d) TUCTGCCT

6) _____ codon is not recognized by any tRNAs.
   a) UAC b) UGG
   c) UAA d) UCG

7) RNA polymerase II transcribes genes encoding _____.
   a) rRNA b) tRNA
   c) 28S rRNA d) mRNA

8) Minisatellites are prominent in the _____region.
   a) Euchromatin b) Centromeres
   c) RNA d) Protein

9) _____is used for estimation of kinetic complexity of genome.
   a) RNA analysis b) Cot curve
   c) Gene analysis d) Denaturation analysis

10) L-arabinose operon contains _____structural genes.
   a) 2 b) 3
   c) 4 d) 5

11) LexA protein is involved in _____mechanism.
a) replication b) transcription
c) recombination d) repair

12) Okazaki fragments are synthesised in _____direction.
a) 3'—->5' b) 5'—->3'
c) 1'—->2' d) 2'—->3'

13) Enzymatically active RNA molecule is called _____.
a) Abzymes b) Synzymes
c) Ribozyme d) Ribosome

14) _____ subunit of DNA Ploymerase III does proofreading.
a) α b) θ
c) β d) ε

Q.2 A) Answer the following questions.(Any Four) **08**
1) What is Holiday junction?
2) What is Tau (τ) subunit?
3) What is Polymerase?
4) What is Photolyase?
5) What is microRNA?

B) Write Notes on (Any Two) **06**
1) Write note on triplex DNA.
2) Write note on aminoacyl tRNA synthetase.
3) Write the structure of five nitrogen bases and add a note Chargaff rule.

Q.3 A) Answer the following questions.(Any Two) **08**
1) Give account on DNA proofreading.
2) Write the properties of genetic code.
3) Write note on Cot curve analysis.

B) Answer the following questions.(Any One) **06**
1) Write note on mismatch and SOS repair.
2) Explain the gal operon with neat labeled diagram.

Q.4 A) Answer the following questions.(Any Two) **10**
1) Explain the organization of eukaryotic genome.
2) Explain the post translational modification of proteins.
3) Describe the enzymes involved in replication.

B) Answer the following questions.(Any One) **04**
1) Describe the transcription termination.
2) Explain the prokaryotic gene structure.

Q.5 Answer the following questions.(Any Two) **14**
a) Explain the structure of B-DNA. Add a note on its X-ray crystallography data.
b) Explain the prokaryotic translation process.
c) Explain different RNA polymerases in eukaryote.

SLR-JE-65

Seat No.	

Set P

M.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019
Biotechnology
INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

Day & Date: Monday, 18-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) PAH stands for _____.
   a) Polycyclic Aromatic Hydrocarbons
   b) Polyhydroxy Aromatic Hydrocarbons
   c) Polyhydroxy Alkaline Hydrocarbons
   d) Polycyclic Aromatic Hydrolysate

2) Vermiculture is _____ treatment for solid waste management.
   a) Anaerobic b) Aerobic
   c) Acidic d) Disposal

3) Sulphite waste liquor is the waste of _____ industry.
   a) Food and dairy b) Alcohol
   c) Paper and Pulp d) Sugar

4) The Water Act was enacted in _____.
   a) 1980 b) 1988
   c) 1974 d) 1970

5) In bioreactors _____ are used to prevent vortex formation.
   a) Spargers b) Impellers
   c) Baffles d) Both b and c

6) For commercial production of penicillin _____ is used as inoculum.
   a) *P. candidum* b) *P. crustosum*
   c) *P. Crysogenum* d) *P. digitatum*

7) α-Amylase starch hydrolyzing enzyme can be obtained from _____.
   a) *Aspergillus oryzae* b) S. *cerevisiae*
   c) *B. thuringenesis* d) *P. aeruginosa*

8) The document produced by United Nations Conference on Environment and Development (UNCED) in 1992 is called as _____.
   a) Earth summit b) Nature summit
   c) Environment summit d) Wild life summit

9) The transfer of desired product from one liquid phase to other liquid phase is called as _____.
   a) Solute recovery b) Solid- liquid extraction
   c) Liquid- liquid extraction d) Solute-solid

10) Out of following _____ is a conventional source of energy.
   a) wind energy b) dendrothermal
   c) geothermal energy d) coal

11) _____ is not an ecofriendly method of sewage disposal.
   a) Composting b) Biomethanation
   c) Pellitization d) Incineration

12) Out of following _____ type of specialized bioreactors.
   a) polarized b) fluidized
   c) volatalized d) airlift

13) Copepods in water bodies acts as a _____
   a) Detoxifier b) Biosensor
   c) Bioindicator d) Both b and c

14) A compound that is foreign in nature to biological systems is known as _____.
   a) Foreign particles b) Drugs
   c) Environmental pollutants d) Xenobiotic compound

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

1) What is Solid waste pollution and its examples?
2) Define biotransformation with one example.
3) Diagrammatic representation of bioreactor with proper labeling.
4) Define bioindicator with two examples.
5) What is environmental policy?

B) Write notes. (Any Two) **06**

1) What is Fluidized bioreactor with well labeled diagram?
2) Hazardous waste management with two control measures
3) Explain Biosensors with their two examples.

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

1) What is batch fermentation? Give one example.
2) What is downstream processing? Give one example.
3) Write in short about ‘Forest Protection Act’.

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

1) Give brief account on solid waste management.
2) Give account on solvent extraction with suitable examples.

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

1) Give brief account on streptomycin production.
2) Explain Xenobiotic degradation.
3) Explain Methods for cell lysis.

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

1) Give account on recovery of citric acid.
2) Give account on Heavy metal tolerance in microorganisms.

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

a) Explain Effects of heavy metals on environment.
b) Write in detail about treatment of the industrial effluent with labeled diagram.
c) Define upstream processing and write in detail about production of any two antibiotics.

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Seat No.	

Set P

M.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019
Biotechnology
GENETIC ENGINEERING

Day & Date: Tuesday, 05-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) _____ DNA molecule is treated by first Exonuclease III and then followed by treatment with S1 nuclease.
   a) The molecule is shortened from both the ends
   b) The molecule is shortened only from 5' end
   c) Only Exonuclease acts and S1 doesn't acts
   d) The molecule is shortened only from 3' en.

2) The vectors commonly used for sequencing human genome is _____.
   a) Plasmid b) YAC
   c) M13 d) λ phage

3) DNA solution injected directly into the cell using micromanipulator is called _____.
   a) Macroinjection
   b) Micromanipulator mediated DNA delivery
   c) Microinjection
   d) Microfection

4) The set of DNAs generated by using random primers in PCR reaction is called ____.
   a) AFLP b) RT PCR
   c) RFLP d) RAPD

5) The first engineered plasmid vector is _____.
   a) pSC101 b) pUC18
   c) pBR322 d) pSC100

6) Introduction of DNA into cells by exposing to high voltage electric pulse is ____.
   a) Electrofusion b) Electroporation
   c) Electrofision d) Electrolysis

7) _____ of the following statements is correct with respect to exonuclease.
   a) They only act on single stranded DNA molecules
   b) They only act on double stranded DNA molecules
   c) They remove a single nucleotide base at a time
   d) They remove nucleotide bases from the middle of polynucleotide chain

8) _____ of the following statements is correct regarding S1 nuclease.
   a) It is obtained from E. coli
   b) It acts on double stranded DNA
   c) It acts on both types of strands
   d) It acts on single stranded DNA

9) The most popular and widely used engineered plasmid vector is _____.
   a) pBR 322 b) pUC 18
   c) pSC 101 d) pBR 327

10) _____ of the following chemical enhances vir gene expression.
   a) Cyanidin b) Acetosyringone
   c) Glutenin d) Dextran

11) If DNA is digested by endonucleases in four sites giving rise to fragments of which two are equal in length ____ bands would be seen after electrophoresis.
   a) 2 b) 3
   c) 4 d) 5

12) The recognition sequence for BamHI is 5' G|GATCC 3'. The '|' represents the cutting site. _____ can be inferred about the ends from it.
   a) The ends created are double stranded
   b) To decide about the nature of the ends more information is needed
   c) The single stranded end is 3 ' in nature
   d) The single stranded end is 5' in nature

13) Type II cuts the sequence in the following way ____.
   a) At 100-1000 nucleotides away from the recognition sequence
   b) It cuts randomly
   c) At 27-30 nucleotides away from the recognition sequence
   d) Within the recognition sequence

14) Autonomously replicating sequences (ARS) is characteristics feature of _____.
   a) Yeast vector b) Cosmid vector
   c) Phage vector d) Plasmid vector

Q.2 A) Answer the following (Any Four) **08**
1) Define Gene therapy.
2) Write a note on SSR.
3) Define Primers.
4) Explain Gene cloning methods.
5) Define artificial plasmid.

B) Write Notes on (Any Two) **06**
1) Write notes on Microinjection
2) Write a note on Exonucleases
3) Write a note on Biopharming

Q.3 A) Answer the following (Any Two) **08**
1) Write a note on Genomic Library.
2) Explain DNA fingerprinting.
3) Explain Gene gun techniques.

B) Answer the following (Any One) **06**
1) Write a note on Shuttle Vectors.
2) Write a note on physical mapping techniques.

Q.4 A) Answer the following (Any Two) **10**
1) Write a note on genetically modified vaccines.
2) Write a note on Immunoscreening.
3) Explain about Properties and Structure of Natural plasmids.

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

1) Give account on RAPD.
2) Explain Colony Hybridization.

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

a) Write an acoount on genetically modified Biotherapeutics.
b) Explain in detail about transgenic Animal.
c) Explain Expression of Industrially important products.

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Seat No.	

Set P

M.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019
Biotechnology
PLANT BIOTECHNOLOGY

Day & Date: Thursday, 07-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. 14

1) The term 'Totipotency' refers to the capacity of a _____.
   a) Cell to generate whole plant b) Bud to generate whole plant
   c) Seed to germinate d) Cell to enlarge in size.

2) Organogenesis is _____.
   a) Formation of callus tissue
   b) Formation of shoots on callus tissue
   c) Formation of root on callus tissue
   d) Genesis of organs

3) Protoplast is _____.
   a) Another name for protoplasm b) An animal cell
   c) A plant cell without a cell wall d) A plant cell

4) Somachonal variations are the ones _____.
   a) Caused by mutagens
   b) Produce during tissue culture
   c) Caused by gamma rays
   d) Induced during sexual embryogeny

5) Plant tissue culture technique is a redefined method of _____.
   a) Hybridization b) Vegetative propagation
   c) Asexual Reproduction d) Selection

6) Which vector is mostly used in crop improvement?
   a) Plasmid b) Cosmid
   c) Phasmid d) Agrobacterium

7) Treatment with _____ is a biological method of cell disruption.
   a) Organic solvent b) lysozyme
   c) detergent d) Alkali

8) Somatic hybridization is achieved through _____.
   a) Grafting b) Protoplast fusion
   c) Conjugation d) Recombinant DNA technology

9) The enzymes required to obtain wall-free / naked protoplasts are _____.
   a) Cellulase and Proteinase b) Cellulase and Pectinase
   c) Cellulose and amylase d) Amylase and Pectinase

10) The first transgenic crop was _____.
   a) Pea b) Tobacco
   c) Flax d) Catton

11) A(n) _____ is an excised piece of leaf or stem tissue used in micropropagation.
a) Microshoot b) Medium
c) Explants d) Scion

12) Growth hormone producing apical dominance is ____.
a) Auxin b) Gibberellin
c) Ethylene d) Cytokinin

13) The ability of the component cells of callus to form a whole plant is known as _____.
a) Redifferentiation b) Dedifferentiation
c) Cytodiffrenciation d) reformation

14) The most widely used chemical for protoplast fusion, as fusogen is _____.
a) Manitol b) Sorbitol
c) Agar d) Polyethylene glycol

Q.2 A) Answer the following question. (Any Four) **08**
1) Cytodiffrenciation.
2) Embryo rescue.
3) Totipotency.
4) Micropropagation.
5) Synthetic seeds.

B) Write Notes. (Any Two) **06**
1) Write the concept of cell culture
2) Explain organ culture.
3) Describe the concept of gene silencing mechanism.

Q.3 A) Answer the following question. (Any Two) **08**
1) Write a note on tissue culture media.
2) Explain various plant viral vectors used for gene transfer mechanism.
3) Explain secondary metabolite production and their applications.

B) Answer the following question. (Any One) **06**
1) What is plant tissue culture? Write applications of plant biotechnology in detail.
2) Explain haploid plantlet production in detail.

Q.4 A) Answer the following question. (Any Two) **10**
1) Explain agrobacterium mediated gene transfer mechanism.
2) Explain the concept of somaclonal variation in detail.
3) Write micro propagation in detail.

B) Answer the following question. (Any One) **04**
1) Explain protoplast culture
2) Write a note on metabolic engineering.

Q.5 Answer the following questions. (Any Two) **14**
a) Write in detail about callus culture.
b) Explain the concept of somatic embryogenesis in detail.
c) Write a brief account of cryopreservation technology.

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Seat No.	

Set P

M.Sc.(Semester - IV) (CBCS) Examination Oct/Nov-2019
Biotechnology
ANIMAL BIOTECHNOLOGY AND STEM CELL TECHNOLOGY

Day & Date: Monday, 04-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. 14

1) Stem cells show property of _____.
   a) Only potency b) only self-renewal
   c) both potency and self renewal d) non potent and non-renewable

2) Feeder layer used for cell culture are made up of _____.
   a) epithelial cell b) fibroblast cell
   c) lymphocytic cell d) embryonic cell

3) In natural media most widely used biological fluid as media is _____.
   a) Plasma clot b) Serum
   c) Coconut milk d) Clots

4) When all the cells in culture are in same phase of growth; the process is known as _____.
   a) Trypsinization b) Primary cell culture
   c) Cell synchronization d) Apoptosis

5) Most cell lines grow well at pH _____.
   a) 7.1 b) 7.2
   c) 7.3 d) 7.4

6) DNA synthesis occur in _____ phase of cell cycle.
   a) G1 b) M
   c) G2 d) S

7) _____ is often added to the cell suspension before viable counting.
   a) Gram stain b) Trypan blue
   c) Crystal violet d) Fluorescin

8) The _____ Content of diploid cells is usually constant, although variations can occur in other content of cell through the cell cycle.
   a) Protein b) Lipid
   c) DNA d) Carbohydates

9) A colorimetric assay for viable cells has been developed by using _____ dye.
   a) CTT b) GTT
   c) MIT d) None of the above

10) _____ technique is well known in forensic science but is gradually adopted as a standard reference technique for cell line identity in culture collection.
   a) DNA fingerprinting b) Karyotyping
   c) LDH assay d) Lowry assay

11) _____ involves the exposure of the cell suspension to a high voltage electrical impulse.
a) Encapsulation b) Electroporation
c) Liposome d) Protoplast

12) Cells removed from animal tissue will continue to grow if supplied with nutrients & growth factors, process is known as _____.
a) Animal cell culture b) Plant cell culture
c) Yeast cell culture d) Fungus cell culture

13) Hella cell line is derived from _____ cell line.
a) Stomach cancer b) Cervical cancer
c) Lung cancer d) Blood cancer

14) Which of the following behavior not shown by normal cell in culture?
a) Contact inhibition b) Monolayer formation
c) Uncontrolled cell division d) Encourage dependent

Q.2 A) Answer the following questions. (Any Four) **08**
1) Define induced pluripotent stem cell.
2) Define tripsinization.
3) Define immunoisolation.
4) Define monoclonal antibodies.
5) Define karyotyping.

B) Write Notes on. (Any Two) **06**
1) What is meant by scaffold?
2) Explain cell division.
3) Define transgenic animals.

Q.3 A) Answer the following questions. (Any Two) **08**
1) Explain cell division pattern in stem cell.
2) Write an account on morphogenesis.
3) Define complete medium and enlist components of it.

B) Answer the following questions. (Any One) **06**
1) Write a note on Bioreactor with any two examples.
2) Write detailed account on natural media.

Q.4 A) Answer the following questions. (Any Two) **10**
1) Explain hematopoietic stem cell with application.
2) Define gene knockout and explain its methodology.
3) Write account on history of animal tissue culture

B) Answer the following questions. (Any One) **04**
1) Explain common cell culture contaminants.
2) Write an account on balanced salt solution.

Q.5 Answer the following questions. (Any two) **14**
a) Give detailed account on Adult stem cell and its types.
b) Explain hybridoma technology.
c) Define tissue engineering and explain stem cell in heart regeneration.

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Seat No.	

Set P

M.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019
Biotechnology
ADVANCED ANALYTICAL TECHNIQUES

Day & Date: Wednesday, 06-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) Ultrastructure of biological specimens was studied by using _____ microscope.
   a) SEM b) Simple
   c) Compound d) Invered

2) Chromatography is used to separate _____.
   a) Solution b) Mixtures
   c) Molecules d) Atoms

3) _____ is the technique suited for the separation of large DNA fragments.
   a) AGE b) PAGE
   c) PFGE d) SDS-PAGE

4) Electrophoresis is not used for _____.
   a) Proteins b) DNA
   c) Amino acids d) Lipids

5) _____ is used for detection of amino acid in paper chromatography.
   a) DNSA b) Nynhydrin
   c) DPA d) Orcinol

6) Beer's law states that the intensity of light decreases with respect to _____.
   a) Concentration b) Distance
   c) Composition d) Volume

7) SDS is _____ chemical.
   a) Cationic b) Ionic
   c) chromophore d) Anionic

8) _____ is radioactive compound.
   a) Potassium uranylsulphate b) Thorium
   c) Uranium d) Radium

9) β mercaptoethanol reduces _____ in protein structure.
   a) Ethyl group b) Disulphide linkage
   c) Carboxyl bonding d) Hydrogen bonding

10) _____ is referred as capacity of an instrument to separate two points which are closer together.
   a) Focal length b) Magnification
   c) Working Distance d) Resolving power

11) Visible region ranges from _____nm.
   a) 200 to 300 b) 400 to 700
   c) 100 to 400 d) 700 to 900

12) HPTLC methods include _____.
   a) high-performance thin liquid chromatography
   b) high-preparative thin layer chromatography
   c) high-performance thin layer chromatography
   d) hight-performance thin layer chromatogram

13) Western Blotting is used for ____ blotting.
   a) Dot b) Protein
   c) RNA d) DNA

14) _____instrument is used to measure radioactivity.
   a) Scintillation counter b) Gel Dcok
   c) FTIR d) UV spectroscopy

Q.2 A) Answer the following question.(any four) **08**
1) Define Fluorescence.
2) Enlist different columns used in HPLC.
3) Define Isoelectric.
4) Define trace element.
5) Define TEMED.

B) Write Notes on. (Any Two) **06**
1) Write note high speed refrigerated centrifuges.
2) Write note on ion exchange chromatography.
3) Write note on different buffers used DNA electrophoresis.

Q.3 A) Answer the following question.(any two) **08**
1) Give details of zone electrophoresis and applications.
2) Explain clark oxygen electrode.
3) Discuss history of Microscopy.

B) Answer the following question. (Any One) **06**
1) Describe compound microscope.
2) Explain column chromatography.

Q.4 A) Answer the following question. (Any Two) **10**
1) Discuss Solid Scintillation Counter.
2) Explain properties of electromagnetic radiations and their interactions with matter.
3) Describe atomic spectroscopy.

B) Answer the following question. (Any One) **04**
1) Describe turbidometry and nephelometry.
2) Write a note on 2-D gel electrophoresis.

Q.5 Answer the following question. (Any two) **14**
a) Explain the applications- of radio isotopes in biological sciences.
b) Explain fluorescence microscope with its applications.
c) Explain nuclear magnetic resonance spectroscopy with its applications.

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Seat No.	

Set P

M.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019
Biotechnology
RESEARCH METHODOLOGY AND IPR

Day & Date: Friday, 08-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) The _____ data is the information collected by an investigator himself for a specific research.
   a) Primary b) Secondary
   c) Significance d) co-relation

2) World Intellectual Property Organization was established in _____.
   a) 14 March, 1959 b) 14 July, 1967
   c) 14 August 1965 d) 14 October, 1960

3) The _____ is a word, design or symbol that identifies and distinguishes the source of a product from others.
   a) copyright b) patent
   c) trade secret d) trademark

4) When citation includes more than _____ authors in the text, only the surname of the author is cited followed by et. al.
   a) 2 b) 3
   c) 4 d) 5

5) The _____ is the statement of expectation or prediction that would be tested by research.
   a) literature review b) hypothesis
   c) Abstract d) manuscript

6) The sampling error usually _____ with increase in sample size.
   a) disappears b) varies
   c) increases d) decreases

7) _____ is a preferred sampling method for the population with finite size.
   a) Area sampling b) Cluster sampling
   c) Purposive sampling d) Systematic sampling

8) The _____ provide and promote an effective system of plant variety protection.
   a) WIPO b) UPOV
   c) UNO d) PSLV

9) The product that indicates the origin of a given place comes under _____ form of protection.
   a) Trade design b) Geographical indication
   c) Copy right d) Trade secrete

10) A significant difference between expected frequencies and observed frequencies is determined by _____ test.
a) ANOVA b) Chi square
c) Probability d) SPSS

11) Protection of a plant variety is offered by UPOV system in the form of _____.
a) Breeders right Technology transfer
c) Geographical indication Copyright

12) _____ research gives solution to an immediate problems arising in society.
a) Fundamental b) Applied
c) Descriptive d) Historical

13) Books, music, artistic work comes under _____ protection of IPR.
a) Patent b) Trademark
c) Copy right d) Trade secret

14) The US claim on patent of turmeric in wound healing was challenged and won due to efforts of Dr _____.
a) A. Kakodkar b) R. Mashelkar
c) J. Naralikar d) A. Agharkar

Q.2 A) Answer the following questions. (Any Four) 08
1) What is primary and secondary data?
2) What is correlation coefficient?
3) What is impact factor?
4) What is trade secret?
5) What is research design?

B) Write Notes. (Any Two) 06
1) Write note on types of research.
2) Describe ANOVA test.
3) Write note on applied research.

Q.3 A) Answer the following questions. (Any Two) 08
1) Write note on review of literature.
2) Explain the concept of breeder's exemption.
3) Explain the characteristics of research.

B) Answer the following questions. (Any One) 06
1) Explain the types of technology transfer.
2) Describe the use of audiovisual aids in research.

Q.4 A) Answer the following questions. (Any Two) 10
1) Explain author instructions for preparing manuscript.
2) Explain guidelines for writing materials & methods in preparation of manuscript.
3) Describe the sampling methods.

B) Answer the following questions. (Any One) 04
1) Write note on oral presentation of a scientific paper.
2) Write note on selection of research problem.

Q.5 Answer the following questions. (Any Two) 14
a) Describe statistical methods used in research.
b) What are different forms of protection of research? Explain with examples.
c) What is plant breeders right? Describe its advantages and disadvantages.

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Seat No.	

Set P

M.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019
Biotechnology
MEDICAL BIOTECHNOLOGY AND BIO-NANOTECHNOLOGY

Day & Date: Monday, 11-11-2019 Max. Marks: 70
Time: 03:00 PM To 05:30 PM

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

Q.1 Fill in the blanks by choosing correct alternative given below. **14**

1) *Clostridium tetani* produces _____.
   a) Exotoxin b) Cytotoxin
   c) Endotoxin d) Neurotoxin

2) Candidiasis is caused by _____.
   a) Bacteria b) Fungi
   c) Virus d) Protozoa

3) Malaria is an example of _____.
   a) Fungal b) Yeast
   c) Protozoal d) Algal

4) _____ is antifungal agent.
   a) Penicillin b) Streptomycin
   c) Nystatin d) Ampicillin

5) Compounds have property to produce antitoxins called _____.
   a) Toxins b) Toxoids
   c) Neurotoxins d) Exotoxins

6) ORS stands for _____.
   a) Oral rehydration solution b) Oral regeneration solution
   c) Organized restriction solution d) Oral redehydration solution

7) _____ antibiotic used for *Pseudomonas* infection.
   a) Penicillin b) Gentamicin
   c) Ampicillin d) Streptomycin

8) Fullerene or bucky ball is made up of _____ carbon atoms.
   a) 100 b) 20
   c) 75 d) 60

9) Nanoscience can be studied with the help of _____.
   a) quantum mechanics b) newtonian mechanics
   c) macro-dynamics d) Geophysics

10) The width of a typical DNA molecule is _____ nm.
   a) 1 b) 2
   c) 5 d) 10

11) _____ had invented the famous 'Geodesic' dome structure.
   a) Eric Drexler b) Buckminster Fuller
   c) Richard Smalley d) Faraday

12) _____ microscope is used study at atomic level.
   a) Compound b) Inverted
   c) scanning electron d) scanning tunneling

13) Microorganisms growing widely throughout the body called _____ infection.
   a) Localized b) Generalized
   c) Wide area d) Bacterial

14) The size of a virus is _____ nm.
   a) 2 b) 20
   c) 50 d) 2000

Q.2 A) Answer the following questions. (Any Four) **08**
1) Define Pandemic.
2) Enlist *Salmonella typhi* antigens.
3) Enlist normal microbial flora of human body.
4) What are syndromes?
5) What is Micelle?

B) Write Short Notes (Any Two) **06**
1) What is Nystatin? Add note on its function
2) Describe the epidemiology *E. coli*
3) Write note on Hydrothermal Method

Q.3 A) Answer the following questions. (Any Two) **08**
1) Write diagnostic methods for *Salmonella.*
2) Write note on different types of interferon and their clinical significance.
3) Write note on different types of nanopartilces.

B) Answer the following questions. (Any One) **06**
1) Write a detail account on gene therapy.
2) Write a detail account on polymyxins.

Q.4 A) Answer the following questions.(Any Two) **10**
1) Explain any two mechanical methods for nanoparticle synthesis.
2) Explain the molecular diagnosis of HIV.
3) Explain the use of nanoparticles in drug delivery.

B) Answer the following questions.(Any One) **04**
1) Laboratory diagnosis of common infective and parasitic disease.
2) Explain functionalization of nanoparticles for biological applications

Q.5 Answer the following questions. (Any Two) **14**
1) Write detail account on photodynamic inactivation.
2) Write note on infectious process of malaria.
3) Write note on drug resistance mechanism in bacteria.