SLR-HA-1

Set No.	

Set P

M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022
(MICROBIOLOGY) (University Campus)
Cytology and Taxonomy of Microorganisms

Day & Date: Monday, 13-02-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and. 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) The algae which are found in highly saline water condition are called as _____.
   a) Epizoic algae b) Parasitic algae
   c) Epiphytic algae d) Halophytic algae

2) The branch of biology which deals with the study of lichen is called as _____ and the one who studies is known as _____.
   a) Lichenology, Lichenologist
   b) Lichenologist, Lichenology
   c) Phycology, phycologist
   d) Mycology, Mycologist

3) The fungal component of lichen is called as _____.
   a) Mycobiont b) Phycobiont
   c) Ascolichen d) Both a & b

4) The word mycorrhiza was coined by the German scientist _____.
   a) A.G. Tansley b) A.B. Frank
   c) Haeckel d) Theophrastus

5) The results of numerical taxonomic analysis are often summarize with a treelike diagram which is called as _____.
   a) Dendrogram b) Cladogram
   c) Phenogram d) Phylogenetic tree

6) In Binomial nomenclature second name represents _____.
   a) Species b) Class
   c) Family d) Genus

7) During the _____ phase microorganisms are growing & dividing at the maximal rate.
   a) Lag b) Exponential
   c) Stationary d) Both b & c

8) _____ infects wide variety of birds & a number of mammals.
   a) *Chlamydia psittaci* b) *Chlamydia trachomatis*
   c) *Chlamydia pneumoniae* d) None of the above

9) The Jaccard's coefficient is calculated by which of the following formulae?
   a) (a+d)/(a+b+c+d) b) (a+b)/(a+b+c+d)
   c) (c+d)/(a+b+c+d) d) a/(a+b+c)

10) What type of colonies are formed by Mycoplasmas on the agar plate?
a) Coloured b) Fried egg
c) Colourless d) Lawn formation

B) Write true/false. **06**

1) In post-translational modification of proteins, glycosylation involves the addition of oligosaccharide groups to the polypeptide.
a) True b) False
2) Bergey's Manual of Systematic Bacteriology groups bacteria into species according to their phylogenetic relationship.
a) True b) False
3) Lichens growing on surface of leaves are called as corticolous lichen.
a) True b) False
4) During heterocyst formation in cyanobacteria both PS-I & PS-II are present.
a) True b) False
5) In reproduction of fungi the motile sporangiospores are called as aplanospores.
a) True b) False
6) A nonreplicating & infectious particle of *Chlamydia* are called as elementary body,
a) True b) False

Q.2 Answer the following **16**

a) Give the general characteristics of Mycoplasma.
b) Write a note on oncogenesis by DNA viruses.
c) Write a note on microalgae.
d) Write a note on structure of fungi.

Q.3 Answer the following

a) Explain in detail about transcription & post transcriptional changes of virus genomes. **10**
b) Describe in detail serological methods used for classification. **06**

Q.4 Answer the following

a) Describe in details general characteristics of lichen. **10**
b) Define Translation. Write a note on post translational modifications of proteins. **06**

Q.5 Answer the following

a) Give a detail account of general characteristics & classification of Actinomycetes. **10**
b) Write an essay on Bacterial flagella. **06**

Q.6 Answer the following

a) Describe the general characteristics & molecular architecture of Rickettsia. **10**
b) Explain in detail about morphology & ultrastructure of prions **06**

Q.7 Answer the following

a) Explain in detail all about lysogenic cycle & regulation of lysogenic cycle. **10**
b) Write a note on occurrence of algae based on habitat. **06**

SLR-HA-2

Seat No.	

Set P

M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov - 2022
MICROBIOLOGY (UNIVERSITY CAMPUS)
Microbial Genetics

Day & Date: Tuesday, 14-02-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory
2) Attempt any three questions from Q.No.3 to Q.No.7
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) In Hershey and Chase experiment _____ bacteriophage was used.
   a) Lambda b) T2
   c) M13 d) T4

2) Adenine paired with Thymine by _____ bond.
   a) Single b) Tetra
   c) Triple d) Double

3) Which type of super coiled DNA structure observed in bacteria?
   a) Plasmid b) Chromosomal DNA
   c) Nucleoid d) Nucleus

4) How will you estimate the amount of chromosomal DNA purified from *E.coli* cells?
   a) By observing absorbance at 290 nm
   b) By observing absorbance at 280 nm
   c) By observing absorbance at 270 nm
   d) By observing absorbance at 260 nm

5) If in a *Salmonella typhi* strain mutation in protease gene results in change in codon from GAA to GAG and both code for glutamate, which type of mutation will occur?
   a) Silent
   b) Point
   c) Missense
   d) Frameshift

6) Which type of *Salmonella typhimurium* strain used in Ames test?
   a) Autotrophic strain which does not require alanine for growth
   b) Auxotrophic mutant strain requires alanine for growth
   c) Prototrophic strain which does not require histidine for growth
   d) Auxotrophic mutant strain requires histidine for growth

7) What is the percentage of transposons present in human genome?
   a) 10% b) 4%
   c) 40% d) 60%

8) Which transposons cause target site duplication?
   a) Retroposons b) Insertion sequences
   c) Tn3 like elements d) Retrovirus like elements

9) Which plasmid present in *Agrobacterium tumefacient*?
   a) Tol plasmid b) Col plasmid
   c) R plasmid d) Ti plasmid

10) Which branch of genomics study histone modifications?
   a) Structural genomics b) Functional genomics
   c) Epigenomics d) Metagenomics

B) Write true/false **06**

1) Exons and Introns are present in Eukaryotic genes.
2) Human DNA is simple and circular.
3) Sodium chloride is used for density gradient centrifugation.
4) Ames test is used test mutagenicity of any chemical compound.
5) Transformation is done by bacteriophages.
6) Conjugation required F plasmid.

Q.2 Answer the following

1) Write a short note on buoyant density and UV absorption of DNA. **04**
2) Write a short note on DNA damaging agents. **04**
3) Write a short note on detection of transpositions. **04**
4) Write a short note on Cot curve. **04**

Q.3 Answer the following.

1) Explain in brief about Avery, MacLeod and McCarty experiment. **10**
2) Write the difference between prokaryotic and eukaryotic genome. **06**

Q.4 Answer the following.

1) Write in brief about types of mutations **10**
2) Write a short note on theta and rolling circle model of replication. **06**

Q.5 Answer the following.

1) Write in brief about transformation. **10**
2) Write a short note on purification of plasmids. **06**

Q.6 Answer the following.

1) Write in brief about tryptophan operon. **10**
2) Write a short note on post translational modifications. **06**

Q.7 Answer the following.

1) Write in brief about structure and life cycle Lambda bacteriophage. **10**
2) Write a short note on Structure M13 bacteriophage. **06**

SLR-HA-3

Set No.	

Set P

M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022
MICROBIOLOGY (CAMPUS)
Microbial Physiology and Metabolism

Day & Date: Wednesday, 15-02-2023 Max. Marks: 80
Time: 03:00 PM To 6:00 PM

Instructions: 1) Q. Nos. 1 and. 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

Q.1 A) Choose correct option. **10**

1) Detoxification of drug is carried out in _____.
   a) Pancreas b) Stomach
   c) Kidney d) Liver

2) The Pyruvate dehydrogenase complex requires coenzymes. Which of the following is correct coenzyme?
   a) Thiamine pyrophosphate
   b) Flavin retinoid nucleotide complex
   c) Coenzyme conjugates ScoA
   d) Biotin

3) The pyruvate dehydrogenase complex consists of three distinct enzymes. Which of the following enzyme is responsible to transfer group?
   a) Pyruvate dehydrogenase
   b) Dihydrolipoyl transacetylase
   c) Dihydrolipoyl dehydrogenase
   d) Pyruvate transacetylase

4) Addition of _____ its blocks electron transfer between cytochrome oxidase and O_2 inhibits both respiration and ATP synthesis.
   a) Cyanide (CN) b) Azide
   c) Vancomycin d) Ventrucidine

5) TCA cycle is more important to production more ATP. Where TCA cycle is carried out, choose correct answered?
   a) Cell cytoplasm b) Mitochondrial cytoplasm
   c) Peroxisome cytoplasm d) Lysosomal matrix

6) Some of the free energy released in the mitochondrial electron transport chain produces form ATP. How many ATPs can be formed from electron transport of FADH to oxygen?
   a) 1.5 b) 2
   c) 2.5 d) 1

7) If person suffers from methanol consumption, detoxification of methanol is possible in hospital by treating the patient with _____.
   a) Toxins b) Glucose supply
   c) Ethyl alcohol d) Antibiotic treatment

8) How many carbons of the purine ring are contributed by the folate one carbon pool during purine biosynthesis?
   a) 0 b) 2
   c) 1 d) 4

9) Which of the following Pump in humans act as multidrug transporter (MDR1) responsible for the striking resistance of certain tumors to some generally effective antitumor drugs?
   a) ABC b) Ca
   c) Cl-HCO_3 d) H-K

10) Which of the following is a correct statement for Na-K ATPas?
   a) 2 Na out and 3K in b) 3Na out and 2 K in
   c) 3K out and 2 Na in d) 2K out and 3 Na in

B) Choose appropriate options. **06**

1) Receptor mediated endocytosis from plasma membrane requires glycophorin coat proteins.
   a) True b) False
2) Lactate dehydrogenase is not a NAD+ requiring enzyme.
   a) True b) False
3) Glutamate is one of the amino acid to initiated in both purine and pyrimidine ring formation.
   a) True b) False
4) Fatty acid biosynthesis is processes occur in mitochondria.
   a) True b) False
5) Active transporter does not require any energy source.
   a) True b) False
6) In human stomach absorption of glucose transport in intestinal epithelial cells is carried out by Na-glucose symporter transporter.
   a) True b) False

Q.2 Answer the following **16**

a) Define diffusion and mention its types.
b) Write a note on PDH complex.
c) Write a note on fates of pyruvate.
d) Write a note on cell membrane.

Q.3 Answer the following

a) Explain in brief about TCA cycle and its ATP production in TCA. **10**
b) Write a note on mitochondria evolved from endosymbiotic bacteria. **06**

Q.4 Answer the following

a) Write a note on Glycolysis and explain both its aerobic and anaerobic mode of ATP formation. **10**
b) Write a note on glycerol 3-phosphate shuttle. **06**

Q.5 Answer the following

a) Write a note on Denovo pathway for nucleic acid biosynthesis. **10**
b) Explain in short role of cytochrome P450 oxidases. **06**

Q.6 Answer the following

a) Explain in brief cyclic and non-cyclic ETC. **10**
b) Write a note on Malate aspartate shuttle. **06**

Q.7 Answer the following

a) Explain in detail synthesis of saturated fatty acid. **10**
b) Define osmosis and explain its types. **06**

SLR-HA-4

Seat No.		Set	P

M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov - 2022
MICROBIOLOGY (CAMPUS)
Bioinstrumentation and Biotechniques

Day & Date: Thursday, 16-02-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. No. 1 & 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Draw neat labeled diagrams

Q.1 A) Choose correct option. (MCQ) **10**

1) To determine λ max for any solution, which of the following instrument used _____
   a) Colorimeter
   b) ELISA plate reader
   c) UV-Visible spectrophotometer
   d) pH-meter

2) pH-meter for _____
   a) Probability of H+ ions
   b) Prediction of H+ ions
   c) Potential of H+ ions
   d) Preference of H+ ions

3) 1Mole of any solutions contains _____.
   a) 1 mg in 100ml distilled water
   b) 1 grams in 1000ml distilled water
   c) Grams molecular weight of substance dissolved in 1000 ml of distilled water
   d) Grams normal weight in 1000ml distilled water

4) A solution of conjugate acid and its base is ____.
   a) Electrolyte b) Buffer
   c) 1N solution d) IM solution

5) NMR stands for _____.
   a) Non-magnetic resonance
   b) Non-molecular resonance
   c) Nuclear Magnetic resonance
   d) All of the above

6) SDS stands for _____.
   a) Sodium chloride b) Sodium dodocilsuphate
   c) salt of sulphate d) none of the above

7) For separation of purified fraction of protein which of the following is efficient _____.
   a) Southern blotting b) Northern blotting
   c) SDS-PAGE d) Native PAGE

8) Source of electron in electron microscope is ____.
   a) cathode tube b) Anode tube
   c) electron gun d) Proton pump

9) To analyse surface morphology, which of the following microscope is used _____.
   a) Compound microscope
   b) Steriomicroscope
   c) Scanning electron microscope
   d) light microscope

10) For gel chromatography which of the following chemical commonly used _____.
   a) Agarose b) Acrylamide
   c) Sephadex d) all of the above

Q.1 B) Fill in the blanks. **06**

1) A solution which resist change in pH called _____.
2) Chromatography means Chromas _____ and Graphy ___.
3) Live bacteria can visualize under _____ Microscopy.
4) The part of microscope which gathers light is _____.
5) Full form of EtBr _____.
6) Common protein denaturing agent is _____.

Q.2 Answer the following. **16**

a) Write short note on ocular.
b) Explain design of pH meter.
c) What is protein ladder?
d) Short note on electron gun

Q.3 A) Describe in details of transmission and scanning electron microscope. **08**
B) Give a detail account of ion exchange chromatography. **08**

Q.4 A) What is ORD/CD? Give its principal, working for biological sample analysis. **08**
B) Describe in details of Polyacrylamide gel electrophoresis. What is difference between native and SDS PAGE? **08**

Q.5 A) Describe the method of western blotting technique. **08**
B) Explain working construction and principal of atomic absorption spectroscopy.

Q.6 A) Give details of general microscopy with respect to working construction and principles. **08**
B) Enlist types of light microscope. Give their applications. **08**

Q.7 A) What is difference between conductometric and potentiometric titration? Derive an equation for Henderson Hasselbalch equation. **08**
B) Describe in detail about working, construction and principal of High-performance liquid Chromatography. **08**

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SLR-HA-6

Seat No.	

Set P

M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-2022
MICROBIOLOGY (CAMPUS)
Molecular Biology and Engineering

Day & Date: Monday, 20-02-2023 Max. Marks: 70
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory
2) Attempt any three questions from Q.No.3 to Q.No.7
3) Figure to right indicates full marks.

Q.1 A) Choose correct alternative. **10**

1) Which technique is used to detect specific DNA sequence?
   a) Eastern Blotting b) Western Blotting
   c) Southern Blotting d) Northern Blotting

2) Which enzyme is used in PCR?
   a) RNA polymerase b) Taq DNA polymerase
   c) Taq RNA polymerase d) DNA polymerase

3) In order to diagnose genetic disease, which technique will you use?
   a) RAPD b) RFLP
   c) AFLP d) PCR

4) What is the application of DNA finger printing technique?
   a) Mutation testing b) Paternity testing
   c) Serotype testing d) Genetic disease testing

5) What is the function of 'signal sequences' in protein?
   a) To activate the protein
   b) To fold the protein in specific structure
   c) To degrade the protein at specific sequence
   d) To transport protein at specific destination in cell

6) In which network, metabolites produced from principal nodes do not contribute to final product in pathway?
   a) Branched b) Non-Branched
   c) Dependent d) Independent

7) Which type of restriction endonuclease is mostly used in genetic engineering experiments?
   a) Type I b) Type II
   c) Type III d) Type IV

8) What is longform of Ti plasmid?
   a) Tumor including plasmid b) Tumor infecting plasmid
   c) Tumor inducing plasmid d) Tumor inserting plasmid

9) How will you carry out the blunt end ligation?
   a) by using Polynucleotide kinase
   b) by using Alkaline phosphatase
   c) by using E. coli DNA ligase
   d) by using T4 DNA ligase

10) What is the maximum cloning capacity of Lambda phage replacement vector EMBL4?

a) 14 kb b) 22 kb
c) 37 kb d) 51 kb

B) Write true/false **06**

1) Sodium chloride is used for chemical transformation of DNA into host cells.
2) DNA synthesis occurs in S phase of cell cycle.
3) Blue colonies are recombinant in Blue -White screening.
4) DNA is converted to RNA by reverse transcriptase enzyme.
5) Protein sequencing is generally called as N-terminal sequencing.
6) Proteins are identified by Northern blotting.

Q.2 Answer the following

1) Write a short note on RAPD. **04**
2) Write a short note on pBR322. **04**
3) Write a short note on T4 DNA ligase. **04**
4) Write a short note on Lipofection. **04**

Q.3 Answer the following.

1) Explain in brief about RT-PCR. **10**
2) Write a note on southern blotting technique. **06**

Q.4 Answer the following.

1) Write in detail about Cell cycle. **10**
2) Write a short note Oncogenes and protooncogenes. **06**

Q.5 Answer the following.

1) Write in brief about cellular storage and secretion of protein. **10**
2) Write a short note protein sequencing technique. **06**

Q.6 Answer the following.

1) Write in brief about Restriction endonucleases. **10**
2) Write a note on Insertion vectors, replacement vectors. **06**

Q.7 Answer the following.

1) Write in brief about direct screening and Blue-White screening method. **10**
2) Write a short note chemical transformation of DNA in to bacterial host. **06**

SLR-HA-7

Seat No.	

Set P

M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov - 2022
(MICROBIOLOGY) (CAMPUS)
Immunology and Immunotechnology

Day & Date: Tuesday, 21-02-2023 Max. Marks: 80
Time: 11:00 AM T0 02:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory
2) Attempt any three questions from Q.No.3 to Q.No.7
3) Figure to right indicate full marks.

Q.1 Choose correct alternative. **16**

1) In bone marrow their originate numbers of lymphocytes like RBCs, WBCs. Which of the following cell responsible for developing of lymphocytes?
   a) Stem cells b) Myeloma cells
   c) Progenitor cells d) Plasma cells

2) Which of the following disease caused by production of antibodies against adrenal glands? Choose correct disease for antibodies against adrenal glands?
   a) Rheumatoid arthritis b) Inflammatory bowel disease
   c) Graves' disease d) Addison's disease

3) The terminal sequence of complement activation involves C5b, C6, C7, C8, and C9, which interact sequentially to form a macromolecular structure called the _____.
   a) Membrane-attack complex (MAC)
   b) Factor D complex
   c) Hassall's corpuscles complex
   d) Lipid membrane complex

4) Class II MHC genes encode glycoproteins expressed on the surface of nearly all _____.
   a) Lymphocytes b) Nucleated cells
   c) Non- Nucleated cells d) Tissue cells

5) Hybridoma technology is used in production of monoclonal antibodies. It is possible only when two cells are fuse. Which of the following cells are responsible for formation monoclonal antibodies?
   a) T cells and B cell fusion b) B cell and myeloma cells
   c) T cell and myeloma cells d) Myeloma and T cells

6) In lab small amount of sample can be detected. Which technique is preferred to detect small amount of sample?
   a) Radio Immuno Assay (RIA)
   b) ELISA
   c) Immunofluorescence technique
   d) FACS

7) Degradation of pathogen is carried with help of complement pathway. Direct activation of C3b without antigen-antibody interaction association with factor D, B. Which of the following pathway is directly activating C3b?
   a) The alternative pathway b) Classical pathway
   c) The lectin pathway d) All of the above

8) Digeorge's syndrome is observed in patient because of _____.
   a) T cell mutation thymus b) B cell mutation in bone marrow
   c) Mutation in lymphoid cell d) Mutation in spleen cell

9) Monoclonal antibodies are used for diagnosis and treatment against pathogens. Production of monoclonal antibodies require hybrid cell. Which organ would you prefer for production of monoclonal antibodies in mice?
   a) Liver b) Kidney
   c) Spleen d) Liver cell line

10) If antigen is loading along with tapasin takes place inside the RER. Suppose mutation was observed in TAP protein. Choose appropriate option due to mutation in TAP?
   a) Loading of peptide is possible along with MHC II
   b) Loading of peptide is possible along with MHC I
   c) Loading of peptide is not possible along with MHC I
   d) Loading of peptide is not possible along with MHC II

11) Utilization of Horse radish peroxidase enzyme for detection of antigen antibody reaction. Which of the following test is used this enzyme for confirmation of antigen?
   a) Immunodiffusion Assays b) Neuraminidase
   c) ELISA d) RIA

12) Which of the following technique is very effective, less time consuming and at a time so many samples can be detected by _____.
   a) Agglutination b) CFT
   c) Neutralization d) ELISA

13) Which of the following compounds is NOT found in tears?
   a) Lysozyme b) Lactoferrin
   c) IgA d) IgE

14) Muscle cells take up the DNA and the encoded protein antigen is expressed. Use of DNA vaccines are raised in case of Covid19. Which type of immune response is generated by DNA vaccine?
   a) Cell mediated
   b) B cell mediated
   c) Both humoral and cell mediated
   d) None of the above

15) If macrophages are involved in oxygen dependent mechanism. Mainly nitric oxide synthetase involved in degradation of bacteria. What is the role of NOS (nitric oxide synthetase)?
   a) Oxidizes L-Arginine to yield L-Citrulline
   b) Oxidizes L-Citrulline to yield L-Arginine
   c) Oxidizes both L-Citrulline and L-Arginine
   d) None of the above

16) An autoimmune disease is arising in our body due to _____.
   a) Generation of Cytokines
   b) Destruction of RBCs
   c) Metabolism of Lymphocytes
   d) Formation of self-antibodies

Q.2 Answer the following **16**

1) Explain Characteristics of Adaptive immunity.
2) Write a note on Type I diabetes.
3) Write a note on antibody-independent pathway.
4) Write a note on Sandwich ELISA.

Q.3 Answer the following.

1) Explain in brief mechanism about T-Cell Maturation in the Thymus. **10**
2) Write a note on Fas-associated Apoptosis via NK cell. **06**

Q.4 Answer the following.

1) Define the term hypersensitivity and explain its type. **10**
2) Write a short note on Classical pathway. **06**

Q.5 Answer the following.

1) Define the term autoimmunity and explain mechanism of Pernicious anemia. **10**
2) Write a short note exogenous pathway. **06**

Q.6 Answer the following.

1) Write a note on principle method and applications of Flow cytometry. **10**
2) Write a note on Mannose binding lectin pathway. **06**

Q.7 Answer the following.

1) Explain in detail mechanism of Antigen-Presenting Cells in MHC class I molecule. **10**
2) Write a note on Perforin granazyme pathway for apoptosis. **06**

SLR-HA-8

Seat No.	

Set P

M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov - 2022
MICROBIOLOGY (CAMPUS)
Medical Microbiology - I (Bacteriology and Parasitology)

Day & Date: Wednesday, 22-02-2023 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory
2) Attempt any three questions from Q.No.3 to Q.No.7
3) Figure to right indicate full marks.

Q.1 Choose correct alternative. **16**

1) Which of the following would be a sign of an infection?
   a) Muscle ache b) Headache
   c) Fever d) Myocardial infraction

2) Cocci-shaped bacteria usually grow in pairs are from _____ species.
   a) *Klebsiella* b) *Neisseria*
   c) *Pseudomonas* d) *Clostridium*

3) Some microbe scan survives as obligate intracellular pathogens. Name that group.
   a) *Salmonella* b) *Mycobacterium*
   c) *Rickettsia* d) *Vibrio*

4) Select the microscopic technique that provides three-dimensional images of a bacterial cell.
   a) Transmission Electron Microscopy
   b) Scanning Electron Microscopy
   c) Dark-field microscopy
   d) Fluorescent microscopy

5) Which of the following set is of bacterial diseases?
   a) Malaria, poliomyelitis, mumps
   b) Mumps, cholera, typhoid
   c) Plague, Leprosy, Diphtheria
   d) Measles, Tuberculosis, Tetanus

6) Identify the disease which is confirmed by Widal test for the susceptibility of the organism.
   a) Typhoid b) Cholera
   c) Malaria d) Tuberculosis

7) Which of these substances is exposed on the outer surface of a gram-negative bacterium?
   a) Braun lipoprotein
   b) O-antigen of lipopolysaccharide (LPS)
   c) Polysaccharide portion of lipoteichoic acid (LTA)
   d) Electron transport system components

8) Select the correct order during the steps of pathogenesis.
   a) invasion, infection, adhesion, exposure
   b) adhesion, exposure, infection, invasion
   c) exposure, adhesion, invasion, infection
   d) disease, infection, exposure, invasion

9) Which of the following would be a virulence factor of a pathogen?
   a) A surface protein allowing the pathogen to bind to host cells
   b) A secondary host, the pathogen can infect
   c) A surface protein, the host immune system recognizes
   d) The ability to form a provirus

10) Diagnosis of 'Diphtheria' is confirmed by which one of the following expressions?
   a) Microscopic appearance of organisms stained with methylene blue
   b) Isolation of typical organisms from materials such as blood, showing invasiveness
   c) Detection of β phage plaques in cultures of suspicious isolates
   d) Demonstration of toxin production by a suspicious isolate

11) Which characteristic below identifies *N.meningitis* but not *N.gonorrhoeae*?
   a) Ferments glucose
   b) Contains a polysaccharide capsule
   c) Is oxidase-positive
   d) No effective vaccines are available

12) One of the following is true of *Haemophilus influenza* which one is that?
   a) Invasive infections are most commonly associated with encapsulated strains
   b) Most invasive infections occur in infants during the neonatal period
   c) Most human infections are acquired from domestic pets
   d) The organism can be readily cultured on sheep blood agar in an environment of elevated CO_2

13) A distinguishing feature of human mycoplasma species is that these can...
   a) Stain well with Giemsa, but not by Gram stain
   b) Contain no bacterial pepidoglycan
   c) Not become immunogenic because these mimic host cell membrane components
   d) Not be cultivated *in vitro*

14) Which of the following bacteria is rarely associated with urinary tract infections?
   a) *E.coli*
   b) *Enterobacter* spp
   c) *Proteus* spp
   d) *Shigella* spp

15) Select the name of Gram-negative rod bacteria which is not a blood-borne pathogen.
   a) *Shigella* spp
   b) *Escherichia coli*
   c) *Klebsiella pneumonia*
   d) *Pseudomonas aeruginosa*

16) Throat swab culture is not useful to diagnose _____
   a) Streptococcal sore throat
   b) Diphtheria
   c) Thrush
   d) Pneumonia

Q.2 Answer the following **16**

1) Write a note on different routes of infections.
2) Write a note on food poisoning caused by *S. aureus*.
3) Write a note on *T.Saginata*.
4) Explain Morphology and Lab diagnosis of *Entamoeba histolytica*.

Q.3 Answer the following.

1) Explain in brief about etiological agent, life cycle, lab diagnosis of *W. Bancrofti* **10**
2) Write a note on skin disease caused by Staphylococcal bacteria **06**

Q.4 Answer the following.

1) Explain in brief about identification of bacteria by using following methods like gram staining, different types of media, biochemical, Serological test and antibiotic assays technique. **10**
2) Write a short note on recent diagnostic methods for *M. Tuberculosis*. **06**

Q.5 Answer the following.

1) Explain in detail about Morphology, symptoms, life cycle, lab diagnosis and treatment of *Giardia lamlia*. **10**
2) Write a short on E.Coli detection by using MPN method. **06**

Q.6 Answer the following.

1) Write in brief about *Entamoeba histolytica* with respect to etiological agent, mode of transmission, symptoms, life cycle of parasite, laboratory diagnosis, prophylaxis, treatment. **10**
2) Write a short note on symptoms, diagnosis and treatment of Malarial infection. **06**

Q.7 Answer the following.

1) Write in brief about *Helicobacter pyelori* with respect structure, transmission, laboratory diagnosis, prophylaxis and treatment. **10**
2) Write a short note on mode of symptoms, diagnosis and treatment of *Cryptosporidium parvum*. **06**

SLR-HA-10

Seat No.	

Set P

M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022
(MICROBIOLOGY)
Pharmaceutical Microbiology

Day & Date: Monday, 13-02-2023 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 and 2 are compulsory.
2) Attempt any three questions from Q.No.3 to Q.No.7.
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) Who is responsible for routine quality check of water used for manufacturing of pharma products?
   a) Research and Development Microbiologist
   b) Quality assurance executive Microbiologist
   c) Quality control executive Microbiologist
   d) Production Microbiologist

2) Which sterile pharmaceutical product is used for the long-term feeding of patients who are unconscious or unable to take food?
   a) Saline
   b) Tablets
   c) Injections
   d) Total parenteral nutrition

3) Which medium is used detect of *Salmonella* contamination in pharma product?
   a) Mannitol salt agar
   b) MacConkey agar
   c) Xylose lysine deoxycholate agar
   d) Cetrimide agar

4) How the viable microbial monitoring tested in cleanroom facility of pharma industry?
   a) By using vacuum cleaner
   b) By using anemometer
   c) By using active air sampler
   d) By using smoke generators

5) Why lean labs are used in pharma industry?
   a) To test employee's skill
   b) To test employee's knowledge
   c) To conduct mock trial
   d) To train new employees

6) What is the role of research executive microbiologist in pharmaceutical industries?
   a) To check the quality of the product
   b) To discover the new product
   c) To manufacture the product
   d) To assure quality of the product

7) How much CFU allowed for purified water in pharmaceutical industry?
   a) 1 CFU/100 ml b) 10 CFU/100 ml
   c) 100 CFU/100 ml d) 1000 CFU/100 ml

8) Which is the incubation temperature for bioburden determination for fungi?
   a) 40°C b) 25°C
   c) 15°C d) 37°C

9) Which government authority conduct audit of pharma industry in USA?
   a) UNFDA b) WHO
   c) Indian FDA d) US FDA

10) How the new equipment is validated for capability of special operation in pharma industry?
   a) By checking Operational qualification
   b) By checking Installation qualification
   c) By checking Design qualification
   d) By checking User requirement specification

B) Write true/false **06**

1) The autoclave is maintained at 121°C for 15 minutes for sterilization
2) Spore is a bacterial endotoxin which acts as a pyrogen.
3) Tetracycline is an example of antifungal drug.
4) Highly purified water used for preparation tablets.
5) MPN test used to test water sample in pharma industries.
6) Anemometer used to test air microorganisms in clean room facility.

Q.2 Answer the following **16**

a) Write a short note on role of QC and QA Microbiologist in pharma industries.
b) Write a short note on microbial contamination in pharmaceutical products.
c) Write a short note on steam sterilization.
d) Write a short note on biological indicator of sterilization.

Q.3 Answer the following.

a) Explain in brief about mechanism of action of Penicillin, Tetracycline and Chloramphenicol. **10**
b) Write a note on mechanism of action of ketoconazole, Nystatin. **06**

Q.4 Answer the following.

a) Write in brief about different types sterile pharmaceutical products. **10**
b) Write a short note on sterility assurance of pharmaceutical products. **06**

Q.5 Answer the following.

a) Write in brief about bioburden determination of pharmaceutical product. **10**
b) Write a short note on presumptive test of MPN. **06**

Q.6 Answer the following.

a) Write in brief about pharmaceutical microbiology laboratory design. **10**
b) Write a short note on Quality Control of pharma product during manufacture. **06**

Q.7 Answer the following.

a) Write in brief about cGMP in pharmaceutical industries. **10**
b) Write a short note on Pharmacopoeia. **06**

SLR-HA-11

Seat No.		Set	P

M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov - 2022
MICROBIOLOGY (UNIVERSITY CAMPUS)
Biostatistics and Bioinformatics

Day & Date: Tuesday, 14-02-2023 Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 & 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7.
3) Draw neat labeled diagrams

Q.1 A) Choose correct option. (MCQ) **10**

1) The average value of a given data is.
   a) standard deviation b) ANOVA
   c) Mean d) Mode

2) For accepting the data which of the following is/are necessary?
   a) It should be reproducible
   b) Having minimum ambiguity
   c) Based on certain experiments/study
   d) All of the above

3) Categorical data problems can be solved by ____.
   a) ANOVA b) Chi-square test
   c) Standard deviation d) All of the above

4) Collection of data abruptly is _____.
   a) continuous sampling b) random sampling
   c) census of India d) All of the above

5) Branch of mathematics which deals with biological data is ____.
   a) Bio statistics b) Mathematics
   c) Applied statistics d) None of above

6) Which of the following is example of Nucleotide repository?
   a) Gene Bank b) DDBJ
   c) EMBL d) All of the above

7) GB stands for ____.
   a) Gyro bites b) Gamma bites
   c) Giga bytes d) All of the above

8) ExPASy is developed by BIS, it is stands for _____.
   a) External protein analysis
   b) Expert protein analysis system
   c) Exterior of protein system
   d) None of the above

9) Generally protein coded in bioinformatics by single letter code, which is discovered.
   a) Margarete O Dayhoff b) Bruce Albert
   c) Max Plank d) Merry Curie

10) Bioinformatics is science which can provide ____.
   a) Computational knowledge to analyze biological information
   b) Study of universe
   c) Study of Abiotic components
   d) All of the above

B) Fill in the blanks. **06**

1) EBI is European _____ institute.
2) β - sheets and β - loops of protein represents _____ structure.
3) The average value from given data represents _____.
4) To visualize 3D Structure of protein _____ software is used BLAST is used to analyse _____ Sequence. (Two nucleotide)
5) Multiple Nucleotide Sequence analysed by _____Tool
6) Construction of analog for binding site of protein is _____.

Q.2 Write short notes. **16**

a) Swiss-Prot database
b) Gene Bank
c) Standard deviation
d) Karl Pearson coefficient

Q.3 A) Describe in detail protein information with reference to ExPASy. **16**
B) Give a detailed account of the primary nucleotide databases.

Q.4 A) What is PDB? Put focus over its significance. **16**
B) Explain how protein structure can be determined by using structural databases.

Q.5 A) Enlist and explain tools used for visualization protein structure. **16**
B) What is molecular docking? Highlight its significance.

Q.6 A) Define the following terms: **10**
   a) Statistics
   b) Biostatistics
   c) Mean
   d) Mode
   e) Standard deviation

B) Enlist different graphical methods for the representation of data. **06**

Q.7 A) Differentiate between the Binomial and Poisons distribution. **16**
B) Solve the problem?

In a cross between black and white coat color mice, individuals obtained in F2 generation are 787 black and 277 white coat color individuals. The expected ratio is 3:1, apply the chi-square test and comment weather data is accepted or not (P = 5%)

SLR-HA-12

Seat No.	

Set P

M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022
MICROBIOLOGY (CAMPUS)
Medical Microbiology – II (Viral and Fungal Diseases)

Day & Date: Wednesday, 15-02-2023 Max. Marks: 80
Time: 11:00 AM To 2:00 PM

Instructions: 1) Q. Nos. 1 and. 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

Q.1 A) Choose correct option. **10**

1) Which of the following statements are true about a virion?
   a) Lytic phage
   b) Lysogenic phage
   c) The viral capsid
   d) An infectious and fully formed viral particle

2) Which of the following viruses represent the largest nonenveloped viruses because they are the maximum size able to be transported through the endosome?
   a) Adenoviruses b) Retroviruses
   c) Influenza viruses d) Capripoxvirus

3) Corona virus enters through special receptor and multiplies inside the host cell to multiply and produce multiple copies of virus. Which of the following receptor are participating for host attachment?
   a) AEC2 b) TMPRSS2
   c) Salicyclic acid d) HA and NA

4) If person was suffering to any viral infection and serological sample is used in detection and confirmation of presence and absence of virus by using following technique, choose appropriate efficient technique for virus detection?
   a) Hemagglutination technique
   b) ELISA technique
   c) Ag-Ab test
   d) DNSA method

5) SARS-CoV-2 virus infection show different symptoms and some duration of time it will be recover. What is the incubation period of that virus in Human?
   a) 15 days b) 10 days
   c) 14 days d) 6 days

6) It is meaning "that which bends up" of the contorted posture of people affected with the severe joint pain and arthritic symptoms associated with this disease. Choose appropriate virus that is responsible to above infection?
   a) Influenza viruses b) Chikungunya
   c) HIV d) Hepatitis virus

7) It is more useful are rapid culture methods for identification of cytomegalovirus is _____ can provide a result in 24-48 hours.
   a) ELISA b) Kit Test
   c) DEAFF test d) PCR

8) In case of influenza genetic variations create different strain. Which of the following influenza strain infect only human being?
   a) H1N1, H2N2, H3N2 b) H1N3, H13N2, H5N13
   c) H13N9, H12N9, H5N13 d) H5N2, H12N3, H1N2

9) When there is a sudden, complete or major change, it is called as _____ it appears to result from genetic recombination of human with animal or avian virus, providing a major antigenic change.
   a) Antigenic shift b) Antigenic drift
   c) Antigenic variation d) Antigenic shift and drift

10) Which of the following residues of the viral envelope may act on the in mucus to produce liquefaction?
   a) Heamagglutinase b) Nuraminidase
   c) Nacetylgalactosidase d) Hyalurinidase

B) Write true or False **06**

1) The genetic constituent of viruses is DNA or RNA.
   a) True b) False
2) Herpes virus is the largest virus.
   a) True b) False
3) HIV is a Capripoxvirus.
   a) True b) False
4) HIV parasitizes macrophages cells.
   a) True b) False
5) The viral envelope is made up of proteins, glycoproteins, lipids and Proteins.
   a) True b) False
6) Transmission of Chikungunya Virus from person to person via Nipha virus.
   a) True b) False

Q.2 Answer the following **16**

a) Explain in short how gene reassortment involved in formation of different types of influenza virus.
b) Write a note on pathogenicity and diagnosis of Kaposi's Sarcoma.
c) Write a note on adenovirus as Vector in Gene therapy
d) Explain in short mode of action of HPV and its treatment.

Q.3 Answer the following

a) Write in detail on structure, genomic organization, pathogenesis and control of HIV virus. **10**
b) Write a note on mode of transfer and explain its diagnosis and treatment of Candida. **06**

Q.4 Answer the following

a) Explain in detail structure, genomic organization, pathogenesis and control of poliovirus. **10**
b) Write a note on mode of action precaution and treatment of Rotavirus. **06**

Q.5 Answer the following

a) Explain in brief antiviral drugs that are approved or under evaluation for the treatment of COVID-19. **10**

b) What is Japanese encephalitis? Explain its mode of transmission and treatment of JPV. **06**

Q.6 Answer the following

a) Explain in detail how does vaccine therapy works in COVID-19 and its types. **10**

b) Write a note on Chikungunya. **06**

Q.7 Answer the following

a) Explain in detail host immune response against Ebola viruses, Diagnosis and its treatment. **10**

b) Write a short note on Mucormycosis. **06**

SLR-HA-14

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022
(MICROBIOLOGY) (CAMPUS)
Research Methodology

Day & Date: Monday, 20-02-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory
2) Attempt any three questions from Q.No.3 to Q.No.7
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. **10**

1) What do you mean by search for knowledge through objective and systematic method of finding solution to a problem?
   a) New findings b) Invention
   c) Research d) Discovery

2) What is included in descriptive research?
   a) Logic b) Experiments
   c) Available information d) Survey

3) Which research approach generate data in numbers?
   a) Simulation approach b) Experimental approach
   c) Quantitative approach d) Qualitative approach

4) Which is included in research methods?
   a) Survey for research
   b) Techniques used to conduct research
   c) General methods used to conduct research in all fields
   d) Data collection for research

5) What do you mean by Scientific method?
   a) Methods of all virtually trained minds
   b) Methods of all physically trained minds
   c) Methods of all nonlogically trained minds
   d) Method of all logically trained minds

6) Which is the first step of research process?
   a) Preparation of the report or the thesis
   b) Development of working hypotheses
   c) Formulating the research problem
   d) Extensive literature survey

7) Which is the part of research design?
   a) Observational design b) Experimental design
   c) Logical design d) Data design

8) Which is the online primary source systematic literature search for biomedical research?
   a) Systematic reviews b) Journals
   c) Library d) Medline

9) Which is a measure of the citation frequency of the average article in a particular journal for a given year?
   a) Citation index b) Impact factor
   c) H-index d) i10-Index

10) Who development PubMed database for biomedical research?
   a) NHI b) WHO
   c) NCBI d) NCL

B) Write true/false **06**

1) Preparation of the rough draft is a part of research report writing.
2) Preliminary Pages are the last part of the research layout.
3) Summary is not a part of main text of the research layout.
4) Plagiarism of the data is one of the scientific misconducts.
5) SALAMI is one of the scientific misconducts.
6) IMALAS is not included in scientific misconducts.

Q.2 Answer the following

a) Write a short note on objective and motivation of research. **04**
b) Write a short note on descriptive vs. analytical research and applied Vs. fundamental research. **04**
c) Write a short note on selecting the research problem. **04**
d) Write a short note on primary and secondary resources of literature search. **04**

Q.3 Answer the following.

a) Explain in brief about research approaches and research significance. **10**
b) Write a note on Research and Scientific method. **06**

Q.4 Answer the following.

a) Write in brief about technique involved in defining a problem. **10**
b) Write a note on need for research design and features of a good design. **06**

Q.5 Answer the following.

a) Write in brief about impact factor and quality assessment. **10**
b) Write a short note on expanding and narrowing the search with free text search. **06**

Q.6 Answer the following.

a) Write in brief about different steps in writing research report. **10**
b) Write a short note on technical research report **06**

Q.7 Answer the following.

a) Write in brief about authorship issues with respect to scientific misconduct. **10**
b) Write a short note on fabrication of data and plagiarism. **06**

SLR-HA-15

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022
(MICROBIOLOGY) (CAMPUS)
Biosafety and Lab Management

Day & Date: Tuesday, 21-02-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q.Nos.1 and 2 are compulsory
2) Attempt any three questions from Q.No.3 to Q.No.7
3) Figure to right indicate full marks.

Q.1 Choose correct alternative. **16**

1) Which of the following statements about Personal Protective Equipment (PPE) is not correct?
a) PPE should be worn and stored only inside the laboratory
b) PPE should be chosen based upon the work being completed
c) Employees utilizing PPE should be properly trained
d) PPE should be worn and stored only inside the Cabinate

2) Which biosafety cabinet is most suitable for work in COVID -19 PCR Laboratory?
a) BSC-I b) BSC- III
c) BSC A2 d) Laminar hood

3) Which of the following is considered a biohazard?
a) Blood b) Urine
c) Stool d) All body fluids

4) Which organism is not considering a threat for bio-safety?
a) Bacillus anthracis b) Small pox virus
c) Bacillus subtilis d) Vibro cholera

5) Which PPE is mandatory while collecting nasopharyngeal sample for COVID- 19 PCR?
a) Gloves b) N95 mask
c) Face-shield d) All of above

6) Which of the most common sample collected for the diagnosis of COVID-19?
a) Sputum b) Urine
c) Nasopharyngeal swab d) Blood

7) Type of packing mandatory for transportation of COVID -19 is?
a) Single layer b) Triple layer
c) Double layer d) Non of above

8) Steps of proper waste management?
a) Waste minimization and segregation
b) Waste transportation
c) Waste collection
d) All of above

9) Biological indicator used for the QC of the autoclave?
- a) Bacillus anthracis
- b) Bacillus subtilis
- c) Geobacillus stearothermophilus
- d) All of above

10) Step by step written instruction to each procedure perform in the laboratory is called?
- a) Quality
- b) SOPs
- c) Reference material
- d) All of the above

11) SARS-CoV-2 comes under which risk group category?
- a) Risk group I
- b) Risk group IV
- c) Risk group II
- d) Risk group III

12) Which one of the following is a primary containment device?
- a) Centrifuge rotor
- b) Standard animal cage
- c) Clean air bench
- d) Gasketed centrifuge cups

13) Cryptococcus neoformans would be handled at which Risk Group?
- a) Risk Group 1
- b) Risk Group 2
- c) Risk Group 3
- d) None of the above

14) A Biosafety Level 3 facility should have which type of air pressurization?
- a) Neutral
- b) Positive
- c) Negative
- d) Atmospheric

15) Below is the list of laboratory rules except
- a) Wear lab coat, glove and cover shoes every time entering into lab
- b) Never do any experiment without instruction by laboratory instructor/technician
- c) Eating, drinking and smoking are prohibited inside the laboratory
- d) Student can made noise during discussion inside the laboratory

16) Where can you find safety signage in labs?
- a) On the wall
- b) Material Safety Data Sheet (MSDS)
- c) OSH and laboratory SOP folder
- d) All the above

Q.2 Answer the following **16**

1) Explain in short biosafety Level 3 and 4.
2) Write a note on facility design heightened control measures.
3) Write a note on regulation of the transport of infectious substances.
4) Explain in short infectious substances.

Q.3 Answer the following.

1) Explain in brief about specimen receipt and storage. **10**
2) Explain in short specimen transfer between buildings on the same site. **06**

Q.4 Answer the following.

1) Explain in brief about general rules regarding chemical incompatibilities. **10**
2) Write a note on Training programme. **06**

Q.5 Answer the following.

1) Write a note on Decontamination and waste management. **10**
2) Write a note on Electrical hazards. **06**

Q.6 Answer the following.

1) Write a note on Personal protective equipment in heightened control measures. **10**

2) Write a note on WHO laboratory biosafety guideline related to COVID-19. **06**

Q.7 Answer the following.

1) Write a note on Good microbiological practice and procedure. **10**

2) Write a short note on Biosecurity risk assessment. **06**