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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Microbial Diversity and Taxonomy (2316101)**

Day & Date: Friday, 10-05-2024  
Time: 03:00 PM To 05:30 PM

Max. Marks: 60

- Instructions:** 1) All question are compulsory.  
2) Figure to right indicates full marks.  
3) Draw neat labelled diagrams wherever necessary.

**Q.1 A) Rewrite the sentences by selecting correct alternatives given below. 08**

- 1) \_\_\_\_\_ is father of microbial evolution.
 

a) Pasteur	b) Lederberg
c) Tatum	d) Leeuwenhoek
- 2) Lowest taxonomic unit is \_\_\_\_\_.
 

a) family	b) order
c) species	d) phylum
- 3) Haeckel classified the organisms in to \_\_\_\_\_ kingdom.
 

a) two	b) one
c) six	d) five
- 4) DNA of Mitochondria and chloroplasts is similar to DNA of \_\_\_\_\_.
 

a) fungi	b) algae
c) bacteria	d) protozoa
- 5) Blue green algae belongs to \_\_\_\_\_.
 

a) animalia	b) prokaryotes
c) bryophytes	d) fungi
- 6) \_\_\_\_\_ is used as green manure.
 

a) protozoa	b) bacteria
c) yeast	d) nostoc
- 7) \_\_\_\_\_ found in extreme saline conditions.
 

a) Yeast	b) BGA
c) Mycoplasma	d) Halobacterium
- 8) 16SrRNA is present in \_\_\_\_\_.
 

a) ribosome	b) mesosome
c) carboxysome	d) glyoxysome

**B) True or False. 04**

- 1) Yeast is filamentous fungus.
- 2) Archaeobacteria are old living entities.
- 3) Mycorrhiza is association between fungi and algal.
- 4) Methanogens are extremophiles.

- Q.2 Answer the following. (Any Six) 12**
- a) Biosphere
  - b) Which organelles are endosymbionts & Why?
  - c) Species
  - d) Vernacular names
  - e) Acidophilus
  - f) Taxonomy
  - g) soda lakes & desert
  - h) Hyperthermophiles
- Q.3 Answer the following. (Any Three) 12**
- a) General characteristics and importance algae
  - b) Halophiles and Barophiles
  - c) Rules of Nomenclature
  - d) Significance of 16SrRNA in bacterial classification
- Q.4 Answer the following. (Any two) 12**
- a) Biochemical characteristics used in classification
  - b) Define thermophiles, Write in detail on commercial aspects of thermophiles
  - c) General properties of protozoa and outline classification of protozoa
- Q.5 Answer the following. (Any two) 12**
- a) General characteristics of Yeast and fungi
  - b) Whittaker's five kingdom classification
  - c) General characteristics of Lichen and Mycorrhiza



- Q.2 Answer the following (Any Six) 12**
- a) What is Lysogenic cycle?
  - b) What is full form of SARS?
  - c) What is Hemagglutination?
  - d) Define temperate phages.
  - e) Define plague.
  - f) How Nipah virus transmitted?
  - g) What are the satellite viruses?
  - h) What is prophage?
- Q.3 Answer the following. (Any Three) 12**
- a) Write on viroids and prions.
  - b) Describe cultivation of viruses by using cell culture.
  - c) Describe purification of viruses by Enzymatic and serological methods.
  - d) Describe in short one step growth curve.
- Q.4 Answer the following. (Any Two) 12**
- a) Describe in detail morphology and ultra structure of viruses.
  - b) Describe in detail Ebola virus infection.
  - c) Describe in detail Pathogenesis of Animal viruses.
- Q.5 Answer the following. (Any Two) 12**
- a) Describe in detail Lysogenic cycle of bacteriophages.
  - b) Describe in brief various assays of viruses.
  - c) Describe in detail classification and nomenclature of animal and plant viruses.

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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Diagnostic Microbiology (2316107)**

Day & Date: Wednesday, 15-05-2024  
Time: 03:00 PM To 05:30 PM

Max. Marks: 60

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

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

**08**

- 1) In a direct fluorescent antibody test, which of the following would we most likely be looking for using a fluorescently-labeled mAb?
  - a) bacteria in a patient sample
  - b) bacteria isolated from a patient and grown on agar plates
  - c) antiserum from a patient smeared onto a glass slide
  - d) antiserum from a patient that had bound to antigen-coated beads
- 2) What is the ideal time period limit for the transportation of the specimen to the laboratory after the collection method?
  - a) 2 minutes
  - b) 30 minutes
  - c) 1 hour
  - d) 2 hours
- 3) \_\_\_\_ bacilli are identified on the basis of acid-fast staining.
  - a) Salmonella
  - b) E. coli
  - c) Tubercle
  - d) Neisseria
- 4) Phenyl alanine deamination test is the characteristic test for identification of genus \_\_\_\_\_.
  - a) Salmonella
  - b) Proteus
  - c) Klebsiella
  - d) Pseudomonas
- 5) Koplik spot formation is the specific symptom in \_\_\_\_ disease.
  - a) Streptococcus
  - b) Salmonella
  - c) Rubella
  - d) Rubeola
- 6) \_\_\_\_ like components added in the enriched media support the growth of fastidious organisms.
  - a) pH indicator
  - b) salt
  - c) Bile salt
  - d) Blood
- 7) Herpes simplex is seen in \_\_\_\_\_.
  - a) < 10 years of age
  - b) 12-15 years of age
  - c) 25-30 years of age
  - d) 55-60 years of age
- 8) In a BSL 2 laboratory, what type of protective clothing is typically required for laboratory personnel?
  - a) Lab coat and gloves
  - b) Lab coat, gloves and safety goggles
  - c) Lab coat, gloves, safety goggles and a face mask.
  - d) Lab coat, gloves, safety goggles and face shield

- B) Write True/False.** **04**
- 1) In complement fixation test hemolysis indicates positive test. **True/False**
  - 2) Balantidiasis is the bacterial infection. **True/False**
  - 3) PCR technique is used for diagnosis of many diseases. **True/False**
  - 4) *Helicobacter pylori* produces powerful urease enzyme. **True/False**
- Q.2 Answer the following. (Any Six)** **12**
- a) Define biosafety cabinet.
  - b) What is microbiome?
  - c) Use of incineration.
  - d) Causative agent of Ascariasis and its morphology.
  - e) BSL -2
  - f) Define amboceptor and its use.
  - g) Components of Complement fixation test.
  - h) Principle of autoclave.
- Q.3 Answer the following. (Any Three)** **12**
- a) Describe complement fixation test and its applications.
  - b) Use of protective clothing.
  - c) Write a note on *Helicobacter pylori* infection.
  - d) Write a note on RFLP.
- Q.4 Answer the following. (Any Two)** **12**
- a) Pathogenesis, symptoms and lab diagnosis of infections caused by *Ascaris lumbricoides*.
  - b) PCR technique and its application in diagnosis.
  - c) ELISA test and Complement fixation test.
- Q.5 Answer the following. (Any Two)** **12**
- a) Write a note on methods collection and transport of clinical samples.
  - b) Pathogenesis, symptoms and lab diagnosis of infections caused by Rubella virus.
  - c) Serological methods for diagnosis of diseases with example.

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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Techniques in Microbiology I (2316108)**

Day & Date: Wednesday, 15-05-2024  
Time: 03:00 PM To 05:30 PM

Max. Marks: 60

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

**Q.1 A) Rewrite the following sentences by selecting correct answers from given alternatives. 08**

- 1) Stoke's Law is principle of \_\_\_\_\_.  
a) Colorimeter                      b) P<sup>H</sup> meter  
c) centrifuge                        d) AAS
- 2) Efficiency of HEPA filter is \_\_\_\_\_%.  
a) 70.72                                b) 50.50  
c) 80.88                                d) 99.97
- 3) \_\_\_\_\_ is Radioactive.  
a) Tritium                                b) H<sub>2</sub>S  
c) Vimentin                              d) Aluminum
- 4) Ninhydrin solution is used as \_\_\_\_\_ in paper chromatography.  
a) Solid phase                        b) Locating agent  
c) Mobile phase                        d) Adsorbant
- 5) Electron microscope is an invention that uses the beams of \_\_\_\_\_.  
a) Light rays                            b) U.V. rays  
c) Electrons                              d) Infra-red
- 6) Nanomembranes have a pore size of \_\_\_\_\_ nm.  
a) 1-10                                    b) 100-150  
c) 400-500                                d) 250-300
- 7) In ORD spectroscopy \_\_\_\_\_ light is used.  
a) Infrared                              b) Plane polarized  
c) Visible                                 d) Ultra-violet
- 8) For the separation of DNA \_\_\_\_\_ is used.  
a) Colorimeter                        b) p<sup>H</sup> meter  
c) Microscope                         d) Electrophoresis

**B) Write true/false. 04**

- 1) Electromagnetic lenses are used in Electro Microscope.
- 2) Gieger Muller counter is used for counting of optical density.
- 3) Electrophoresis is developed by Hershy.
- 4) Ethidium bromide is used as Fluorescent dye in Electrophoresis.

- Q.2 Answer the following.(Any Six) 12**
- a) Give two examples of nanoparticle synthesizing bacteria.
  - b) Give the principle of colorimeter.
  - c) Give the uses of p<sup>H</sup> meter.
  - d) Who developed Electron Microscope?
  - e) What is confocal fluorescence Microscopy?
  - f) Give the uses of Analytical centrifuge.
  - g) Give the principle of NMR.
  - h) What is application of Carbon nanotubes?
- Q.3 Answer the following.(Any Three) 12**
- a) Give the principle and applications of FRET Microscopy.
  - b) Give the principle working and applications of p<sup>H</sup> meter.
  - c) Describe in brief Autoradiography.
  - d) Give the different types of Nanoparticles.
- Q.4 Answer the following.(Any Two) 12**
- a) Describe in brief Agarose gel electrophoresis.
  - b) Give the principle, working and applications of Centrifuge.
  - c) Describe in brief Atomic absorption spectroscopy.
- Q.5 Answer the following.(Any Two) 12**
- a) Describe in brief principle, working and applications of Electron Microscope.
  - b) Give in detail application of Nanobiotechnology.
  - c) Describe in detail UV-visible spectrophotometer.



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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Research Methodology (2316103)**

Day & Date: Friday, 17-05-2024  
Time: 03:00 PM To 05:30 PM

Max. Marks: 60

**Instructions:** 1) All Questions are compulsory.  
2) Figure to right indicate full marks.

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

**08**

- 1) A research design should provide detailed information about \_\_\_\_\_.  
a) the study population                      b) data collection methods  
c) ethical issues                                d) All of the above
- 2) The first chapter of the report should be entitled \_\_\_\_\_.  
a) results    b) introduction  
c) conclusion                                        d) methodology
- 3) What is a cross-sectional design?  
a) A study of one particular section of society, e.g. the middle classes  
b) One that is devised when the researcher is in a bad mood  
c) The collection of data from more than one case at one moment in time  
d) A comparison of two or more variables over a long period of time
- 4) "Controlled Group" is a term used in \_\_\_\_\_.  
a) Survey research                                b) Historical research  
c) Experimental research                        d) Descriptive research
- 5) An abstract of the journal article doesn't contain \_\_\_\_\_.  
a) methodologies                                b) Result  
c) Objectives                                        d) Ethical consideration
- 6) Source of data collected and compiled by others is called \_\_\_\_\_.  
a) Primary    b) Secondary  
c) Primary & Secondary                        d) None of these
- 7) Which is the correct order of well-organized research paper?  
a) references-result—method—introduction—discussion  
b) references-result - introduction—discussion—method  
c) introduction—method—result—discussion- references  
d) method—result—discussion—references-. Introduction
- 8) In an experiment, the one variable that is changed is called the \_\_\_\_\_.  
a) Independent variable                        b) Controlled variable  
c) Dependent variable                         d) Experimental variable

**B) Write True /False.**

**04**

- 1) Applied research is used to find solutions to everyday problems.
- 2) For a successful research we need a research design.
- 3) The objective of quantitative research is not to develop and employ mathematical models, theories and/or hypotheses pertaining to phenomena.
- 4) Tentative answer to your research question is hypothesis.

- Q.2 Answer the following. (Any Six) 12**
- a) Define research.
  - b) What do you mean by basic research?
  - c) What are the advantages and disadvantages of correlational research?
  - d) What is the difference between citation and reference?
  - e) What is variable and which are the types of variables?
  - f) What should be written in acknowledgement section of research paper?
  - g) Write any four characteristics of good hypothesis.
  - h) What is Inductive method of research?
- Q.3 Answer the following. (Any Three) 12**
- a) Write a note on "Motivation of research".
  - b) Write a note on "steps of research design".
  - c) Write a note on "oral presentation".
  - d) Write a note on "plagiarism".
- Q.4 Answer the following. (Any Two) 12**
- a) Discuss on "Questionnaire as tool of data collection".
  - b) Discuss on "result" section of research paper.
  - c) Write in detail about "historical research".
- Q.5 Answer the following. (Any Two) 12**
- a) Discuss in detail about "hypothesis".
  - b) Write an essay on "Types of reports".
  - c) Write an essay on "Types of data".



**B) Write True or False.****06**

- 1) Vancomycin and Penicillin do not affect the mycoplasma.
- 2) The Rickettsias and Chlamydias are similar in all respects.
- 3) Initial body in the reproduction of Chlamydias is larger than the elementary body.
- 4) Earthy odour after first rain is due to soil actinomycetes.
- 5) Cyanobacteria are eukaryotic organisms.
- 6) Chitin major component in cell wall of algae.

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

- a) Write about Structure of Algae.
- b) Write short notes on PPLO.
- c) Write about cell division of bacteria.
- d) Write short notes on life cycle of Chlamydia.

**Q.3 Answer the following.****16**

- a) Write an essay biochemical characters used in classification and identification.
- b) Explain in detail the Principles of bacterial Nomenclature.

**Q.4 Answer the following.****16**

- a) Explain in detail Cell cycle and differentiation of bacteria.
- b) Write an essay on Classification of Fungi.

**Q.5 Answer the following.****16**

- a) Describe in detail surface properties of bacteria.
- b) Explain in detail bacterial Classification.

**Q.6 Answer the following.****16**

- a) Describe Classification of Rickettsia and chlamydia.
- b) Explain in detail General properties of Cyanobacteria.

**Q.7 Answer the following.****16**

- a) Explain in detail life cycle of Algae.
- b) Explain importance of morphological characters in classification and identification.

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: March/April - 2024**  
**MICROBIOLOGY**

**Microbial Chemistry and Enzymology (MSC23102)**

Day & Date: Monday, 13-05-2024  
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Q. Nos.1 and 2 are compulsory.  
 2) Attempt any Three questions from Q.No.3 to Q.No.7.  
 3) Figures to the right indicate full marks.

**Q.1 A) Rewrite the sentence choosing correct alternative. 10**

- 1) \_\_\_\_\_ serves as chief storage form of energy in cells.
  - a) Proteins
  - b) Lipids
  - c) Vitamins
  - d) Amino acids
- 2) Deficiency of vitamin c causes \_\_\_\_\_.
  - a) Scurvy
  - b) Beri-beri
  - c) Rickets
  - d) Xerophthalmia
- 3) \_\_\_\_\_ is a drug used in the treatment of alcoholism irreversibly inhibits the enzyme aldehyde dehydrogenase.
  - a) Disulfiram
  - b) DFP
  - c) Allopurinol
  - d) Fomepizole
- 4) Night blindness (nyctalopia) is one of the earliest symptoms of vitamin \_\_\_\_\_ deficiency.
  - a) A
  - b) B
  - c) C
  - d) D
- 5) Major mechanism of Fatty acid oxidations is \_\_\_\_\_.
  - a) Alpha
  - b) Omega
  - c) Beta
  - d) Delta
- 6) Cytochromes contain \_\_\_\_\_ as a prosthetic group.
  - a) Pyrrol
  - b) Phytol
  - c) Iron Porphyrin
  - d) FAD
- 7) The amino acids containing additional COOH group in the side chain are \_\_\_\_\_ amino acids.
  - a) Basic
  - b) Neutral
  - c) Acidic
  - d) Hemoglobin
- 8) \_\_\_\_\_ amino acid is commonly present in the active site of an enzyme.
  - a) Alanine
  - b) Serine
  - c) Methionine
  - d) Tryptophan
- 9) \_\_\_\_\_ is the key intermediate produced in aromatic hydrocarbon degradation.
  - a) Pyruvic acid
  - b) Catechol
  - c) Formic acid
  - d) Citric acid
- 10) \_\_\_\_\_ vitamin is required for synthesis of blood clotting factors.
  - a) Vit. A
  - b) Vit. B
  - c) Vit. K
  - d) Vit. E

- B) Fill in the blanks OR Write true/false. 06**
- 1) Proline is the imino acid found in protein structure. True/False
  - 2) Maltose is an example of monosaccharide. True/False
  - 3)  $\text{CH}_2\text{SH}$  is the R group of \_\_\_\_\_ amino acid.
  - 4) Vitamin B is fat soluble vitamin. True/False
  - 5) The enzyme having different regulatory and catalytic sites is called \_\_\_\_\_.
  - 6) Cytochromes are \_\_\_\_\_ in nature.
- Q.2 Answer the following. 16**
- a) Significance of the Michaelis Menten equation and  $K_m$  value.
  - b) Explain strain and distortion and proximity and orientation.
  - c) Write on Chlorophyll.
  - d) Explain Terpenes and Prostaglandins.
- Q.3 Answer the following. 16**
- a) Write a note on Chymotrypsin and lysozyme.
  - b) Write a note on Structure and functions of fat soluble vitamins.
- Q.4 Answer the following. 16**
- a) Explain various mechanisms of Drug metabolism.
  - b) What is kinetics, write on Briggs and Haldane modification.
- Q.5 Answer the following. 16**
- a) Describe classification of carbohydrates with structures.
  - b) Explain Multienzymes with examples.
- Q.6 Answer the following. 16**
- a) Write on degradation of aliphatic hydrocarbons by  $\beta$  oxidation with one example.
  - b) Explain chemical nature of proteins and explain structural features of protein.
- Q.7 Answer the following. 16**
- a) Give an account of types of fatty acids with examples.
  - b) Degradation of Aromatic hydrocarbons by gentisate pathway.

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**  
**Recent Trends in Virology (MSC23103)**

Day & Date: Wednesday, 15-05-2024  
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question 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 alternatives. (MCQ) 10**

- 1) Antigenic variation is most extensive in \_\_\_\_\_ viruses.
  - a) Measles
  - b) Mumps
  - c) Herpes
  - d) Influenza
- 2) In the reproductive "A" cycle the gene N product acts as \_\_\_\_\_.
  - a) Terminator
  - b) Anti-repressor
  - c) Repressor
  - d) Anti-terminator
- 3) Terminal protein of 55K is attached to the 5' end of the DNA of \_\_\_\_\_ virus.
  - a) Adeno
  - b) Polio
  - c) Pox
  - d) Influenza
- 4) In the Pock assay, viral dilution is inoculated onto the surface of \_\_\_\_\_.
  - a) Chorioallantoic membrane
  - b) Yolk sac
  - c) Allantoic cavity
  - d) Amniotic cavity
- 5) In lambda phage \_\_\_\_\_ operon makes the decision about lysis or lysogeny.
  - a) Right
  - b) Immunity
  - c) Maltose
  - d) Left
- 6) \_\_\_\_\_ has both RNA and DNA as its genome.
  - a) Raus sarcoma virus
  - b) HIV
  - c) Reo virus
  - d) Human cytomegalovirus
- 7) \_\_\_\_\_ virus can undergo antigenic shift.
  - a) Pox
  - b) Influenza
  - c) Rabies
  - d) Hepatitis
- 8) The name of order in ICTV system always ends with suffix \_\_\_\_\_.
  - a) Vira.
  - b) Virinae
  - c) Virales.
  - d) Viridae
- 9) The only virus which has double stranded RNA is \_\_\_\_\_.
  - a) Reovirus
  - b) Bunyavirus
  - c) Rhabdovirus
  - d) Calcivirus
- 10) A type of cell culture that can reproduce for an extended number of generations and is used to support viral replication is a \_\_\_\_\_.
  - a) Primary cell culture
  - b) Cell strain
  - c) Continuous cell line
  - d) Diploid fibroblast cell

- B) Write True or False.** **06**
- 1) Rabies virus is bullet shaped.
  - 2) Human body produces interferon as antiviral substance.
  - 3) In lambda phage A gene is responsible for the lysogenic state.
  - 4) The influenza virus has nucleus in 8 segments.
  - 5) Zika virus is dsDNA virus.
  - 6) Retroviruses are the only viruses that produce genome DNA by reverse transcription with mRNA as the template.
- Q.2 Answer the following.** **16**
- a) Antigenic shift and drift
  - b) Prophage
  - c) Cell transformation
  - d) Purification of viruses
- Q.3 Answer the following.** **16**
- a) Draw a labelled diagram of influenza virus and add a note on its antigenic variations.
  - b) Horizontal and vertical transmission in animal viruses.
- Q.4 Answer the following.** **16**
- a) Discuss briefly the physical and chemical methods used for assay of viruses.
  - b) Classification and nomenclature of animal viruses.
- Q.5 Answer the following.** **16**
- a) Write the details of SARS viral infection.
  - b) What are interferons? Describe their mode of action and its clinical use.
- Q.6 Answer the following.** **16**
- a) Describe in details Satellite viruses.
  - b) Explain the viral multiplication of bacteriophages – lytic cycle.
- Q.7 Answer the following.** **16**
- a) Write an account on cultivation of animal viruses using embryonated eggs and experimental animals.
  - b) Write a note on insect viruses (NPV).



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**M.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**

**Research Methodology and Scientific Writing (MSC23108)**

Day & Date: Friday, 17-05-2024

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

- Instructions:**
- 1) Question 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 the correct alternative from the options. 10**

- 1) What is a 'Hypothesis'?
  - a) It is a guess based on prediction
  - b) It is a guess based on law
  - c) It is a guess based on theoretical
  - d) It is a proposed assumption based on knowledge
- 2) Which type of presentation given by a Scientist in scientific conference?
  - a) Grant proposal
  - b) Oral presentation
  - c) Ph. D Thesis presentation
  - d) Practical
- 3) Which document submitted to college after the completion research project?
 

a) Thesis	b) Research paper
c) Project report	d) Review article
- 4) Which software is used to prepare bar graphs and line graphs in the result section of research paper?
 

a) Microsoft office Excel	b) Microsoft office word
c) Microsoft office Outlook	d) Microsoft office PowerPoint
- 5) The name of a book used for research should be included in which part of research paper?
 

a) Results	b) Introduction
c) Reference	d) Material and methods
- 6) Which search engine mostly used for literature survey?
 

a) UC	b) Google
c) Opera	d) Yahoo
- 7) What should be ideally short and specific in research paper?
 

a) Conclusion	b) Material and methods
c) Title	d) Results
- 8) Which is second part of research project layout?
 

a) Introduction	b) References
c) Results and discussion	d) Material and methods
- 9) Which software can be used to search plagiarism in research paper and reports?
 

a) Microsoft word	b) Paint
c) Turnitin	d) Photoshop

- 10) Which tense is used to describe results in research paper?
- a) Present
  - b) Past
  - c) Future
  - d) Continuous present

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

- 1) Poster presentation of research study can be done in scientific conferences by student.
- 2) Graphs and figures can be used to describe results in research paper.
- 3) PubMed database is used to search RNA sequence.
- 4) Corresponding author is generally at first position in the research paper.
- 5) Materials and Methods should be described in future tense in research paper.
- 6) Oral presentation can be done by using Microsoft PowerPoint software.

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

- a) Write a short note on choosing a mentor or guide.
- b) Write a short note on ideal Abstract of the research paper.
- c) Write a short note on audio-visual aids used in oral presentations.
- d) Write a short note Title of the research paper.

**Q.3 Answer the following.**

- a) Explain in brief about types of presentations.
- b) Write a short note on 'Concept', 'Hypothesis' and 'Law'.

**10****06****Q.4 Answer the following.**

- a) Write in brief about ideal IMRAD system of research paper writing.
- b) Write a short note ideal 'Conclusion' and 'Acknowledgment' of the research paper.

**10****06****Q.5 Answer the following.**

- a) Write in brief about use of search engines and databased for literature survey.
- b) Write a short note ideal 'Authorship' of the research paper.

**10****06****Q.6 Answer the following.**

- a) Write in brief layout of research project report.
- b) Write a short note on types research reports.

**10****06****Q.7 Answer the following.**

- a) Write in brief about general Author Guidelines of the scientific journal for research paper publications.
- b) Write a short note on Impact factor.

**10****06**

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**  
**Biophysics and Bioinstrumentation (MSC23109)**

Day & Date: Friday, 17-05-2024  
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question 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 the correct alternatives. (MCQ) 10**

- 1) Which of the following is an accurate method to determine the pH of an aqueous solution?
  - a) Litmus
  - b) Phenolphthalein
  - c) Phenol red
  - d) pH meter
- 2) In spectrophotometric experiments, the blank contains
  - a) Solute
  - b) Solvent
  - c) Light source
  - d) Absorption spectrum
- 3) In laminar airflow which type of filter is located?
  - a) Membrane filter
  - b) Seitz filter
  - c) HEPA filter
  - d) Vacuum filter
- 4) Which of the following is used as an electron microscope?
  - a) electron beams
  - b) magnetic fields
  - c) light waves
  - d) electron beams and magnetic fields
- 5) Which of the following isotopes is not a radioisotope?
  - a) Carbon-13
  - b) Carbon-14
  - c) Tritium
  - d) Sulphur-35
- 6) Which of the microscopes below is usually good for use on unstained specimens?
  - a) Phase-contrast
  - b) Fluorescence
  - c) Bright-field
  - d) Scanning electron
- 7) Chromatography is a physical method that is used to separate \_\_\_\_\_.
  - a) Simple mixtures
  - b) Complex mixtures
  - c) Viscous mixtures
  - d) Metals
- 8) Which of the following techniques would be most useful to identify as well as quantify the presence of a known impurity in a drug substance?
  - a) NMR
  - b) MS
  - c) IR
  - d) HPLC

- 9) Which of the following techniques is used to study the three-dimensional structure of a molecule?  
 a) Infra-red spectroscopy      b) Mass spectrometry  
 c) UV-visible spectroscopy      d) X-ray crystallography
- 10) If proteins are separated according to their electrophoretic mobility, then the type of electrophoresis is:  
 a) SDS PAGE      b) Affinity Electrophoresis  
 c) Electro focusing      d) Free-flow electrophoresis

**B) Write True or False.**

**06**

- 1) Ion exchange chromatography is based on electrostatic attraction.
- 2) The purpose of using bromophenol blue in the sample buffer is to monitor the electrophoretic run.
- 3) The pattern on the paper in paper chromatography is called a chromatogram.
- 4) The size of the molecule does not influence electrophoretic mobility.
- 5) In reverse-phase chromatography, the stationary phase is non-polar.
- 6) 25  $\mu\text{m}$ -2.5  $\mu\text{m}$  is the wavelength range corresponding to the UV-visible region.

**Q.2 Answer the following.**

**16**

- a) Discuss the Laminar airflow.
- b) Write a note on the pH meter.
- c) Write the principle of chromatography and enlist all types of chromatography.
- d) Discuss the Ramachandran plot.

**Q.3 Answer the following.**

- a) Describe the principle and instrumentation of UV - visible spectrophotometry. **08**
- b) Explain the principle and instrumentation of fluorescence and atomic absorption spectroscopy. **08**

**Q.4 Answer the following.**

- a) Explain the protein structure determination by X-ray diffraction. **08**
- b) Discuss the tertiary and quaternary structure of proteins. **08**

**Q.5 Answer the following.**

- a) Describe the electrochemical cells and potentiometry. **08**
- b) Explain the principle and instrumentation of CD spectroscopy. **08**

**Q.6 Answer the following.**

- a) Describe the Radio-isotopic techniques and methods of detection. **08**
- b) Explain the principle and working of a phase contrast microscope. **08**

**Q.7 Answer the following.**

- a) Describe the electrophoretic technique. **08**
- b) Discuss experimental methods for the determination of the sizes of proteins. **08**

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**M.Sc. (Semester - II) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Majormandatory course I Pharmaceutical Microbiology (2316201)**

Day &amp; Date: Thursday, 09-05-2024

Max. Marks: 60

Time: 11:00 AM To 01:30 PM

- Instructions:** 1) All questions are compulsory.  
2) Figure to right indicate full marks.

**Q.1 A) Rewrite the following sentences by selecting correct answer from given alternatives. 08**

- 1) \_\_\_\_\_ radiation uses longer wavelength and lower energy for sterilization.
  - a) Non ionizing
  - b) X ray
  - c) Gamma
  - d) Ionizing
- 2) \_\_\_\_\_ inhibits nucleic acid synthesis.
  - a) Norfloxacin
  - b) Chloramphenicol
  - c) Penicillin
  - d) Ampicillin
- 3) The 50s ribosomal subunit is target for \_\_\_\_\_ antibiotics.
  - a) Macrolide
  - b) Chloramphenicol
  - c) Bactericidal
  - d) Antifungal
- 4) \_\_\_\_\_ concerned with change in temperature required to kill specific number of microbes.
  - a) L value
  - b) D value
  - c) B value
  - d) Z value
- 5) Who published the Indian pharmacopeia?
  - a) Food and Drug Administration
  - b) FSSAI
  - c) Ministry of defence
  - d) Indian Pharmacopeia Commission
- 6) A lipid bilayer structure that encloses an internal aqueous volume.
  - a) Liposome
  - b) Solid lipid nanoparticle
  - c) Nanoparticle
  - d) Noisome
- 7) An advantage of Novel Drug Delivery Systems is \_\_\_\_\_.
  - a) it causes fluctuation of blood levels
  - b) it cannot be target specific
  - c) it increases toxicity of the drug
  - d) it reduces side effects of the drug
- 8) Who controls the essential drug price in India?
  - a) BIS (Bureau of Indian Standard)
  - b) FSSAI (Food Safety and Standards Authority of India)
  - c) BEL (Bharat Electronics Limited)
  - d) NPPA (National Pharmaceutical Pricing Authority)

**B) Fill in the blanks or write true or false** **04**

- 1) USP in pharmaceutical stands for \_\_\_\_\_.
- 2) Penicillin acts inhibits synthesis of \_\_\_\_\_.
- 3) The biological indicator in sterilization is \_\_\_\_\_.
- 4) The full form of FSSAI is \_\_\_\_\_.

**Q.2 Answer the following (Any Six)** **12**

- a) What are the advantages of synthetic peptide vaccine?
- b) What is the purpose of validation of pharmaceutical products?
- c) Give the long forms of ISO and ISI.
- d) Write the use of liposomes in pharmaceuticals.
- e) What are antifungal agents?
- f) Which biological indicators are used to test sterilization?
- g) Give the examples chemical disinfectants and preservatives.
- h) What do you mean by gene therapy?

**Q.3 Answer the following.** **12**

- a) Write the role of advanced technology in R and D in pharmaceuticals.
- b) Write differences between quality assurance and quality control.
- c) Write a note on characteristics of antibacterial agents.

**Q.4 Answer the following. (Any Two)** **12**

- a) Write a note on DNA vaccines.
- b) Discuss in detail about biosensors.
- c) Describe in brief about drug delivery system in gene therapy.

**Q.5 Answer the following. (Any Two)** **12**

- a) Discuss in detail about sterilization control and sterility testing in pharmaceutical industry.
- b) Discuss in detail about biosafety cabinets in microbiology laboratory.
- c) Describe in detail about antibiotics affecting cell wall synthesis.

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**M.Sc. (Semester - II) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Majormandatory course Microbial Biochemistry (2316202)**

Day & Date: Saturday, 11-05-2024

Max. Marks: 60

Time: 11:00 AM To 01:30 PM

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

**Q.1 A) Rewrite the sentences by selecting correct alternatives given below. 08**

- 1) \_\_\_\_\_ is nonprotein chemical substance or metallic ion that is required for enzyme activation.
 

a) Cofactor	b) Cosubstrate
c) Coworker	d) Copartner
- 2) Enzymes that are involved in the feed back inhibition are known as \_\_\_\_\_ enzyme.
 

a) Apo	b) Co
c) Holo	d) Allosteric
- 3) Cobalamin is another name of vitamin \_\_\_\_\_.
 

a) K	b) A
c) B12	d) C
- 4) Fischer proposed \_\_\_\_\_ hypothesis of enzyme action.
 

a) Induced fit	b) Lock and key
c) Clonal selection	d) Allosteric
- 5) \_\_\_\_\_ are the substances reduces the rate of enzyme catalyzed reactions.
 

a) Substrates	b) Inhibitors
c) Enzymes	d) Products
- 6) Enzymes are chemically made up of \_\_\_\_\_.
 

a) Carbohydrates	b) Lipids
c) Polysaccharides	d) Proteins
- 7) \_\_\_\_\_ is an example of acidic amino acid.
 

a) Glutamic acid	b) Arginine
c) Lysine	d) Histidine
- 8) Cholesterol is an example of \_\_\_\_\_.
 

a) Glycolipid	b) Lipoprotein
c) Phospholipid	d) Carbolipid

**B) Write True or False.**

**04**

- 1) Steroides are injurious to human health.
- 2) Starch is polymer of glucose.
- 3) Chymotrypsin is saccharolytic enzyme.
- 4) Leghemoglobin is found in human blood

- Q.2 Answer the following (Any six) 12**
- a) Give the example of Aromatic amino acid.
  - b) Give the examples of water soluble vitamins.
  - c) What is active site of enzyme?
  - d) Give the significance of  $V_{max}$ .
  - e) Define coenzyme.
  - f) What is function of Isomerase.
  - g) Define Beta oxidation.
  - h) What is function of peroxidase enzyme.
- Q.3 Write short notes. (Any three) 12**
- a) Ramchadram plot
  - b) Bacterial pigments
  - c) Irreversible inhibition
  - d) Cofactors
- Q.4 Answer the following (Any two) 12**
- a) Describe in detail kinetics of Multisubstrate reactions.
  - b) Give the types and structures of lipids.
  - c) Describe in detail oxidation of aromatic hydrocarbons.
- Q.5 Answer the following (Any two) 12**
- a) Write an essay on Osmosis.
  - b) Give in detail Enzyme catalytic mechanisms.
  - c) Describe in detail Nomenclature and structure or carbohydrates.



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**M.Sc. (Semester - II) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Major elective course Bioinformatics and biostatistics (2316207)**

Day & Date: Tuesday, 14-05-2024  
Time: 11:00 AM To 01:30 PM

Max. Marks: 60

**Instructions:** 1) All Questions are compulsory.  
2) Figure to right indicate full marks.

**Q.1 A) Rewrite the sentences choosing correct alternative. 08**

- 1) Which of the following is the first biological database?
  - a) Genbank
  - b) DDBJ
  - c) Atlas of protein sequence and Structure
  - d) OMIM
- 2) The most frequently occurring value in the data set is called \_\_\_\_\_.
  - a) Spread
  - b) Mode
  - c) Skewness
  - d) Median
- 3) CLUSTAL W is used for \_\_\_\_\_ alignment.
  - a) Pairwise
  - b) Multiple
  - c) Pairwise and Multiple
  - d) Local
- 4) Sequence \_\_\_\_\_ reflects the evolutionary relationship between sequences.
  - a) Homology
  - b) Similarity
  - c) Identity
  - d) All of these
- 5) The number of occurrences of a data value is called \_\_\_\_\_.
  - a) the class limits
  - b) the frequency
  - c) the cumulative frequency
  - d) the relative frequency
- 6) The PubMed provides information of \_\_\_\_\_ database.
  - a) Nucleotide
  - b) Protein
  - c) Genome
  - d) Literature
- 7) Which of the following is a protein structure database?
  - a) Genbank
  - b) Swiss-Prot
  - c) DDBJ
  - d) PDB
- 8) A measure of the strength of the linear relationship that exists between two variables is called \_\_\_\_\_.
  - a) Slope
  - b) Intercept
  - c) Correlation coefficient
  - d) Regression equation

**B) Fill in the blanks OR Write true/false. 04**

- 1) An instructor recorded the following quiz scores (out of a possible 10 points) for the 12 students present: 7, 4, 4, 7, 2, 9, 10, 6, 7, 3, 8, 5. The mode for this set of scores is \_\_\_\_\_.
- 2) The average of a series of numerical values is the sum of the values divided by their number. (True/False)
- 3) List any two protein databases.
- 4) The middle value of an ordered array of numbers is the Median. (True/False)

**Q.2 Answer the following. (Any Six)****12**

- a) Define Phylogeny.
- b) Give the merits and demerits of primary data.
- c) Define genomics with suitable example.
- d) Continuous Variable and Continuous Data.
- e) Enlist the primary databases for protein and nucleic acid.
- f) What are the different methods of sampling?
- g) Calculate the median for given data:  
8, 12, 7, 5, 6, 10, 14, 16, 13, 12, 11, 7, 9, 15, 13, 10, 13, 9, 6, 8, 9
- h) What are the sources for secondary data.

**Q.3 Answer the following. (Any Three)****12**

- a) Explain the interpretation and properties of Karl's Pearson coefficient of correlation.
- b) What is measures central tendency? What are the good characteristics of measures of central tendency?
- c) Search engines used in bioinformatic.
- d) RASMOL.

**Q.4 Answer the following. (Any Two)****12**

- a) Enlist the nucleic acid databases and write the information on GenBank.
- b) Write a note of diagrammatic representation of data.
- c) What is homology? Describe tools needed to determine homology.

**Q.5 Answer the following. (Any Two)****12**

- a) What is microarray? Give its type and applications.
- b) Give in detail the Prediction of the 3D structure of proteins and its applications.
- c) Discuss the methods for construction of histogram, frequency curve, ogive curve.

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**M.Sc. (Semester - II) (New) (NEP CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Major elective course Physiology and metabolism (2316208)**

Day & Date: Tuesday, 14-05-2024  
Time: 11:00 AM To 01:30 PM

Max. Marks: 60

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

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

- 1) Sodium ions are usually more concentrated \_\_\_\_\_ of the cell and potassium ions are usually more concentrated \_\_\_\_\_ of the cell.
  - a) Inside, Outside
  - b) Outside, Outside
  - c) Outside, Inside
  - d) Inside, Inside
- 2) \_\_\_\_\_ method does not require any carrier or channel for transport of substances.
  - a) Active transport
  - b) Facilitated diffusion
  - c) Group translocation
  - d) Simple diffusion
- 3) \_\_\_\_\_ Complex is also known as cytochrome c oxidase.
  - a) Complex-IV
  - b) Complex-III
  - c) Complex-II
  - d) Complex-I
- 4) \_\_\_\_\_ is a uncoupler which inhibit the ATP synthesis and generates heat in electron transport chain.
  - a) ATP synthase
  - b) Thermogenin
  - c) Cyanide
  - d) Cytochrome b
- 5) In salvage pathway thymidylate synthase enzyme is required for the synthesis of \_\_\_\_\_.
  - a) Cytosine
  - b) Uracil
  - c) Thymine
  - d) Adenine
- 6) In fatty acid synthesis \_\_\_\_\_ carrier molecule is responsible for moving acetyl and malonyl units between active site of enzyme.
  - a) Carnitine
  - b) Acyl carrier Protein
  - c) Coenzyme A
  - d) Glycerol phosphate
- 7) Microbes uses \_\_\_\_\_ pathway for the oxidation of aromatic hydrocarbons.
  - a) Glycolysis
  - b) Kreb
  - c) Beta ketoacidate
  - d) Pentose phosphate pathway
- 8) \_\_\_\_\_ pathway is used to synthesize the aromatic amino acids.
  - a) Shikimate
  - b) TCA
  - c) HMP
  - d) EMP

**B) Write True or False of following. 04**

- 1) Carrier proteins are involved in both passive and active transport.
- 2) The electron transport chain involves the pumping of protons across the mitochondrial inner membrane.
- 3) The Krebs cycle occurs in the cytoplasm of eukaryotic cells.
- 4) Glycolysis is an alternative to the beta-ketoadipate pathway for the oxidation of aromatic hydrocarbons.

**Q.2 Write short notes on any six of the following. 12**

- a) What is a symport?
- b) Define osmosis.
- c) Why the sodium-potassium transport mechanism is called a pump?
- d) Name the enzymes and the coenzymes involved in of PDH complex.
- e) What is the role of Cytochromes in ETC.
- f) What is Oxidative stress and its effects?
- g) Free radicals.
- h) What is passive transport?

**Q.3 Answer the following. 12**

- a) Discuss in detail Synthesis of Purine nucleotides from IMP.
- b) Describe in brief group translocation.
- c) Describe in detail mechanism of microbial drug detoxification.

**Q.4 Answer the following. (Any Two) 12**

- a) Describe in detail synthesis of amino acid from serine family.
- b) Discuss in brief components of mitochondrial electron transport chain.
- c) Discuss in brief degradation of aromatic hydrocarbons by  $\beta$  ketoadipate pathway.

**Q.5 Answer the following. (Any Two) 12**

- a) Describe in detail Krebs cycle and add a note on its energetics.
- b) Describe in detail Salvage pathways for Purine and Pyrimidine synthesis.
- c) Give an account on microbial hormones and add a note on its significance.

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**M.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**  
**Microbial Genetics (MSC23201)**

Day & Date: Thursday, 09-05-2024  
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Q.1 is compulsory. Solve any 4 from Q.2 to Q.7.  
 2) Draw neat labelled diagrams wherever necessary.  
 3) Figures to the right indicates full marks.

**Q.1 A) Rewrite the sentences by selecting correct alternatives given below 10**

- 1) \_\_\_\_\_ remove supercoiling in replicating DNA.  
 a) DNA Polymerase                      b) DNA ligase  
 c) Transcriptase                          d) Topoisomerase
- 2) EcoRI is \_\_\_\_\_.  
 a) restriction exonuclease              b) restriction endonuclease  
 c) DNA Polymerase                      d) RNA Polymerase
- 3) The process of transformation was discovered by \_\_\_\_\_.  
 a) Zimder and Lederberg                b) Griffith  
 c) Lederberg and Tatum                 d) Lederberg and Lederberg
- 4) \_\_\_\_\_ enzyme is used to join bits of DNA.  
 a) Helicase                                  b) Topoisomerase  
 c) Ligase                                      d) Endonuclease
- 5) \_\_\_\_\_ is bacteriophage.  
 a) Pox virus                                 b) Retrovirus  
 c) TMV                                        d) M13
- 6) \_\_\_\_\_ are structural genes in Lac operon.  
 a) zya    b) yza  
 c) azy                                         d) zay
- 7) \_\_\_\_\_ phage mediate generalized transduction.  
 a) lamda                                      b) T4  
 c) P1    d) P22
- 8) \_\_\_\_\_ is molecular scissor.  
 a) Helicase                                  b) Ligase  
 c) Exonuclease                              d) Restriction endonuclease
- 9) Watson and Crick double helix contains 10 nucleotides pre \_\_\_\_\_.  
 a) turn of helix                              b) strand  
 c) DNA                                        d) none of these
- 10) Extra chromosomal, circular and dsDNA molecule is \_\_\_\_\_.  
 a) phage                                        b) transposon  
 c) plasmid                                     d) small chromosome

- B) Write True or False.** **06**
- 1) DNA uptake doesn't require any energy.
  - 2) AUG is initiation codon.
  - 3) Bacterial DNA is double stranded and linear.
  - 4) Conjugation plasmid exhibit antibiotic resistance.
  - 5) Phagemid vectors are combination of plasmid and lamda phage.
  - 6) Oka-zaki fragments are joined by Polymerase.
- Q.2 Answer the following** **16**
- a) SOS repair
  - b) Antisense RNA and it's significance
  - c) Types of plasmids
  - d) Universality of genetic code
- Q.3 Answer the following.** **16**
- a) Avery and Macleod experiment.
  - b) Write in detail about bacterial transformation.
- Q.4 Answer the following.** **16**
- a) Describe Watson and Crick model.
  - b) Role of mutation in evolution and antibiotic resistance.
- Q.5 Answer the following.** **16**
- a) Plasmid nomenclature, classification and general properties.
  - b) Induction of mutation in Neurospora and yeast.
- Q.6 Answer the following.** **16**
- a) DNA Fingerprinting
  - b) Structure and life cycle of M13 phage
- Q.7 Answer the following.** **16**
- a) Structure and replication in Fi x174
  - b) Transcription in prokaryotes

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**M.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Microbial Ecology and Diversity (MSC23202)**

Day & Date: Saturday, 11-05-2024  
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- 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 the correct alternative. 10**

- 1)  $Fe_3O_4$  particles are present in \_\_\_\_\_ bacteria.
  - a) acidophilic
  - b) magnetotactic
  - c) alkaliphilic
  - d) xerophiles
- 2) Bioluminescence is the result of mutualistic association between \_\_\_\_\_.
  - a) bacteria and fungi
  - b) luminescent bacteria & marine invertebrates
  - c) animal and viruses
  - d) algae and fungi
- 3) \_\_\_\_\_ is modern approach for bacterial taxonomy.
  - a) Biochemical properties
  - b) Staining properties
  - c) Genetic properties
  - d) Morphology
- 4) \_\_\_\_\_ pigment is present in cyanobacteria.
  - a) Chlorophyll
  - b) Phycobilliproteins
  - c) Carotenoids
  - d) Chlorophyll B
- 5) \_\_\_\_\_ organisms are responsible for biodeterioration of stones.
  - a) Phototrophic
  - b) Chemolithic
  - c) Endolithic
  - d) Lichens
- 6) \_\_\_\_\_ association helps to improve phosphorus nutrition of plants.
  - a) Rhizosphere
  - b) Mycorrhizae
  - c) Rootnodulation
  - d) Bioluminescence
- 7) \_\_\_\_\_ of the following acts as chemical reductant in bacterial photosynthesis.
  - a) Oxygen
  - b)  $CO_2$
  - c) Ammonia
  - d) Hydrogen sulphide
- 8) \_\_\_\_\_ detect and identify all proteins produced by a complex environmental microbial community.
  - a) Genomics
  - b) Metaproteomics
  - c) Metagenomics
  - d) proteomics
- 9) The study of microbial relationships with other organisms and with their non-living environment is \_\_\_\_\_.
  - a) Microbial Ecology
  - b) Microbial Genetics
  - c) Microbial Physiology
  - d) Microbial Metabolism

10) \_\_\_\_\_ are the free living aerobic non photosynthetic nitrogen fixing bacteria.

- a) Rhizobium
- b) Azotobacter
- c) Anaebena
- d) Frankia

**B) Fill in the blanks/ State True or False.**

**06**

- 1) In Lichen, the fungal partner is called as mycobiont. True/False
- 2) \_\_\_\_\_ organism produces Taq polymerase enzyme used in PCR.
- 3) The organisms degrading pesticides are called \_\_\_\_\_ bacteria.
- 4) Peptidoglycan is present in the cell wall of halophiles. True/False.
- 5) \_\_\_\_\_ component is responsible for emission of light.
- 6) For identification of bacteria 16s rRNA sequencing is used. True/False

**Q.2 Answer the following.**

**16**

- a) Explain with examples halophiles.
- b) Define microbial diversity and describe types of microbial diversity.
- c) Write a note on Proteogenomics.
- d) Explain Bioluminescence with example.

**Q.3 Answer the following.**

**16**

- a) Write a note on culture independent methods of studying microbial diversity with special reference to metagenomics.
- b) Write a note on Magnetotactic bacteria.

**Q.4 Answer the following.**

**16**

- a) General characters of purple and green sulphur bacteria.
- b) Describe concept of biodeterioration and biodeterioration of various materials.

**Q.5 Answer the following.**

**16**

- a) Give an account of microbial interactions with examples.
- b) Give an account of N<sub>2</sub> fixing bacteria.

**Q.6 Answer the following.**

**16**

- a) Microbes in toxic environment.
- b) Describe methanogenic Archeobacteria and general characteristics.

**Q.7 Answer the following.**

**16**

- a) General characters of Cyanobacteria.
- b) Explain molecular Methods to study microbial diversity.



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**M.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**

**Microbial Physiology and Metabolism (MSC23206)**

Day &amp; Date: Tuesday, 14-05-2024

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 A) Choose correct alternative and write sentence again 10**

- 1) Most CO<sub>2</sub> from catabolism of glucose is released during the \_\_\_\_\_.  
a) Krebs's cycle                      b) Glycolysis  
c) Lactate fermentation              d) Oxidative phosphorylation
- 2) \_\_\_\_\_ is the first intermediate with a complete purine ring.  
a) Formate                              b) Aspartate  
c) Glycine                                d) Inosinate
- 3) The negative potential across the plasma membrane is maintained by \_\_\_\_\_.  
a) Active transport                      b) Passive transport  
c) Simple diffusion                      d) Osmosis
- 4) \_\_\_\_\_ are produced by bacteria to communicate their increased population density.  
a) Glycolipids                              b) Teichoic acid  
c) Pheromones                            d) Ergosterols
- 5) The drug biotransformation is \_\_\_\_\_ process.  
a) Detoxification                        b) Toxification  
c) Diffusion                                d) Osmosis
- 6) Biosynthetic pathway of \_\_\_\_\_ amino acid is similar to purine biosynthesis.  
a) Proline                                  b) Histidine  
c) Leucine                                  d) Tryptophan
- 7) A Fatty acid that is not synthesized in human body is \_\_\_\_\_ acid.  
a) Oleic                                      b) Palmitic  
c) Linoleic                                  d) Stearic
- 8) The intrinsic proteins present in cell membrane mainly functions as \_\_\_\_\_.  
a) Carriers                                  b) Enzymes  
c) Hormones                                d) Channels
- 9) In the process of Plasmolysis \_\_\_\_\_ occurs.  
a) Inhibition                                b) Exosmosis  
c) Endosmosis                              d) Diffusion
- 10) \_\_\_\_\_ oxidation is major mechanism of fatty acid oxidation.  
a) Beta                                        b) Alfa  
c) Omega                                      d) Delta

- B) State True or False.** **06**
- 1) Active transport is energy independent.
  - 2) Thiamine vitamin is necessary for TCA cycle.
  - 3) Pyruvate is precursor for alanine synthesis.
  - 4) Chemiosmotic hypothesis was postulated by Peter Mitchell.
  - 5) Carbohydrate is the biosynthetic source of all steroid hormones.
  - 6) Phycobilin's are light capturing substances present in Cyanobacteria.
- Q.2 Write Short Notes.** **16**
- a) Carrier proteins
  - b) Facilitated diffusion
  - c) Theories of ATP formation
  - d) Valerate pathway
- Q.3 Answer the following.** **16**
- a) Describe in detail process of drug metabolism.
  - b) Describe in detail Bacterial ETC.
- Q.4 Answer the following.** **16**
- a) Discuss in brief permeation systems in E.coli.
  - b) Describe in detail oxidation of hydrocarbons by beta ketoacid pathway.
- Q.5 Answer the following.** **16**
- a) Describe in detail Citric Acid cycle.
  - b) Describe the pathway for synthesis of aromatic amino acids.
- Q.6 Answer the following.** **16**
- a) Describe in detail Active transport.
  - b) Describe in detail photophosphorylation.
- Q.7 Answer the following.** **16**
- a) Write in detail on Microbial hormones and their significance.
  - b) Discuss in brief biosynthesis of purines and pyrimidines.

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**M.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**  
**Medical Microbiology (MSC23207)**

Day & Date: Tuesday, 14-05-2024  
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- 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) Which enzyme produced by some bacteria degrades the intercellular cement between adjacent cells in connective tissue?
  - a) Coagulase
  - b) Catalase
  - c) Nucleases
  - d) hyaluronidase
- 2) In \_\_\_\_\_ epidemiology, data that describe the occurrence of the disease are collected by various methods from all relevant sources. The data are then collated by time, place, and person.
  - a) Analytic
  - b) descriptive
  - c) Experimental
  - d) none of these
- 3) Which among the following is a largest nematode, or roundworm, that parasitizes the human gastrointestinal tract?
  - a) Taenia saginata
  - b) Ecchinococcus granulosus
  - c) Ascaris lumbricodes
  - d) Wucheraria bancrofti
- 4) \_\_\_\_\_viruses are spread to people through the bite of an infected Aedes species (Ae. aegypti or Ae. albopictus) mosquito.
  - a) Dengue
  - b) Hepatitis B
  - c) Japanese encephalitis
  - d) Rubella
- 5) \_\_\_\_\_bacteria without cell wall cause of community-acquired walking or a typical pneumonia.
  - a) Streptococcus pneumonia
  - b) SARS-CoV-2
  - c) Influenza
  - d) Mycoplasma pneumonia
- 6) \_\_\_\_\_ produces aflatoxin which is both a toxin and a carcinogen and which can potentially contaminate foods such as nuts.
  - a) Cryptococcus neoformans
  - b) Mycoplasma pneumonia
  - c) Candida albicans
  - d) Aspergillus flavus
- 7) \_\_\_\_\_is an immunological assay based on enzyme activity commonly used to measure antibodies, antigens, proteins and glycoproteins in biological samples.
  - a) ELISA
  - b) Widal
  - c) Radioimmunoassay
  - d) Complement fixation



- Q.4 Answer the following.**
- a) Write on epidemiological methods - descriptive, analytical and experimental epidemiology and measurement of infection rate. **08**
  - b) Write on Mycoplasma and cryptococcal infections infection with respect to structure, pathogenesis, transmission, laboratory diagnosis, prevention and control. **08**
- Q.5 Answer the following.**
- a) Describe pathogenesis of fungi, role of extracellular products in fungal infections. **08**
  - b) Write on Rapid methods of identification of pathogenic microorganisms - RIA and Western Blot. **08**
- Q.6 Answer the following.**
- a) Describe Enzymes in medical diagnosis and therapy. **08**
  - b) Write on Collection, transportation and preliminary processing of clinical specimen. **08**
- Q.7 Answer the following.**
- a) Explain Mechanism of action of different chemotherapeutic agents. **08**
  - b) Explain Animal Tissue Culture - types, formulations of media, methodology and applications. **08**

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**M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**

**Molecular Biology and Genetic Engineering (MSC023301)**

Day & Date: Friday, 10-05-2024

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) Figures to the right indicates full marks.

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

- 1) \_\_\_\_\_ DNA molecules are sometimes called chimeric DNA.
  - a) cDNA
  - b) Recombinant
  - c) Both a & b
  - d) None
- 2) Southern blotting technique used to separate \_\_\_\_\_.
  - a) DNA
  - b) RNA
  - c) protein
  - d) None
- 3) Protein-protein hybridization results in \_\_\_\_\_.
  - a) Southern blotting
  - b) Northern blotting
  - c) Western blotting
  - d) None of these
- 4) The first step in PCR is \_\_\_\_\_.
  - a) denaturation
  - b) annealing
  - c) polymerization
  - d) cooling
- 5) cDNA is complementary to \_\_\_\_\_.
  - a) DNA
  - b) mRNA
  - c) rRNA
  - d) tRNA
- 6) The restriction enzyme which is used widely in molecular cloning experiments are \_\_\_\_\_.
  - a) Type I
  - b) Type II
  - c) Type III
  - d) All of the above
- 7) The RNA molecule that contain thymine is \_\_\_\_\_.
  - a) tRNA
  - b) mRNA
  - c) rRNA
  - d) All of the above
- 8) \_\_\_\_\_ is initiation codon.
  - a) AUG
  - b) UAA
  - c) AAA
  - d) AAU
- 9) \_\_\_\_\_ is not needed for DNA transcription.
  - a) Ribosomes
  - b) Nucleotides
  - c) DNA
  - d) Enzymes
- 10) The end products of translation are \_\_\_\_\_.
  - a) fats
  - b) lipids
  - c) polypeptides
  - d) phospholipids

- B) Write True or False.** **06**
- 1) The enzymes that break hydrogen bonds and unwind DNA are helicases.
  - 2) DNA strands absorb less UV light when heated to a low temperature.
  - 3) Genetic engineering is the application of molecular genetics for practical purposes.
  - 4) Restriction enzymes make a straight cut through both strands of DNA.
  - 5) Restriction enzymes are used to cut DNA molecules into pieces.
  - 6) A ring of DNA in a bacterium is called a plasmid.
- Q.2 Answer the following.** **16**
- a) Write a short note on Fluorescence in situ hybridization (FISH).
  - b) Write short note on Genomic libraries.
  - c) Write in details on Transformation.
  - d) Applications of Genetic engineering
- Q.3 Answer the following.** **16**
- a) Constructions of recombinant DNA
  - b) Protein arrays & their applications
- Q.4 Answer the following.** **16**
- a) Describe Southern technique
  - b) DNA finger printing technique
- Q.5 Answer the following.** **16**
- a) Explain in details PCR.
  - b) Write in details on RFLP.
- Q.6 Answer the following.** **16**
- a) Write in details on RAPD.
  - b) Anticancer drugs and approaches
- Q.7 Answer the following.** **16**
- a) Legal aspects of Genetic engineering
  - b) Role of vector

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**M.Sc. (Semester - III) (New) (CBCS) Examination: March/April - 2024**  
**MICROBIOLOGY**

**Bioprocess Technology and Fermentation Technology (MSC023302)**

Day &amp; Date: Monday, 13-05-2024

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 the correct alternative. 10**

- 1) Alcoholic beverages contain \_\_\_\_\_.  
a) Methyl alcohol                      b) Ethyl alcohol  
c) Propyl alcohol                      d) A mixture of all the above
- 2) In which of the following fermenters the impellers are replaced by the constant flow of gas?  
a) Airlift fermenter                      b) Tower fermenter  
c) Hollow fiber                      d) Perfusion bioreactor
- 3) Which of the following method of sterilization does not affect spores?  
a) Drying                      b) Hot air oven  
c) Autoclave                      d) None of these
- 4) Which of the following procedure has a great application in strain improvement?  
a) rDNA Technology                      b) Conjugation  
c) Transformation                      d) Transduction
- 5) Which of the following is not a criterion to create media?  
a) It should be able to produce the maximum yield of product  
b) It should be able to produce the maximum concentration of product  
c) It should be easily sterilized  
d) It should permit the maximum rate of product formation, no matter how costly it is
- 6) Which of these statements is false regarding primary metabolites?  
a) They have identifiable functions  
b) They play a role in normal physiological processes  
c) Secondary metabolites are derived from primary metabolites  
d) Lipids are primary metabolites
- 7) Low dissolved oxygen concentrations lead to \_\_\_\_\_.  
a) low biomass yields  
b) high biomass yields  
c) no effect on biomass yields  
d) none of the above





**Q.7 Answer the following.**

**16**

- a) Describe the quality control test of the product by Pyrogenicity testing.
- b) Explain the product recovery and purification by Centrifugation and Filtration.

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**M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Immunology and Immunotechnology (MSC023306)**

Day & Date: Wednesday, 15-05-2024  
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- 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) All of the following are professional APC Except \_\_\_\_\_.
  - a) Mast cells
  - b) B cells
  - c) Macrophages
  - d) Dendritic cells
- 2) The antigen receptor on B cell is \_\_\_\_\_.
  - a) IgM
  - b) TCR
  - c) CD3
  - d) CD4
- 3) The sequence of class regions in MHC gene from centromere is \_\_\_\_\_.
  - a) Class I - Class II - Class III
  - b) Class II - Class III - Class I
  - c) Class I - Class III - Class II
  - d) Class III - Class I - Class II
- 4) During humoral immune response B cells differentiate into \_\_\_\_ cells.
  - a) plasma and memory
  - b) basophils and stem
  - c) stem and plasma
  - d) memory and helper
- 5) The graft rejection involves \_\_\_\_ cells.
  - a) Mast
  - b) basophils
  - c) cytotoxic cells
  - d) endothelial
- 6) Granzyme is secreted by \_\_\_\_ cells.
  - a) Mast
  - b) cytotoxic
  - c) B
  - d) macrophages
- 7) Tumor immune surveillance may be mediated by \_\_\_\_\_.
  - a) mast cells
  - b) neutrophils
  - c) Langerhans cells
  - d) NK cells
- 8) A fundamental difference between the antigen receptors on B cells (BCR) and on T cells (TCR) is their \_\_\_\_\_.
  - a) different requirements for antigen presentation.
  - b) function following antigen binding.
  - c) heterogeneity on each lymphocyte.
  - d) membrane location.
- 9) Components of innate immunity are \_\_\_\_\_.
  - a) T cells
  - b) Complement proteins
  - c) B cells
  - d) immunoglobulins
- 10) Pentameric immunoglobulin is \_\_\_\_\_.
  - a) IgG
  - b) IgM
  - c) IgD
  - d) IgE

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

- 1) Spleen is \_\_\_organ.
- 2) \_\_\_immunoglobulin is involved in allergic reaction.
- 3) MHC of human is present on chromosome\_\_\_\_\_.
- 4) When donor and recipient both are same individuals, graft is called\_\_\_\_\_.
- 5) Two types of light chains of immunoglobulin are\_\_\_\_\_.
- 6) Systemic lupus erythematosus is example of\_\_\_\_\_ disease.

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

- a) DNA vaccine
- b) ELISA
- c) Myasthenia Gravis
- d) TCR

**Q.3 Answer the following.****16**

- a) Write in detail about primary lymphoid organs.
- b) Lymphatic system.

**Q.4 Answer the following.****16**

- a) Innate immunity
- b) Mechanism of graft rejection

**Q.5 Answer the following.****16**

- a) Cytokines
- b) Immune response to viral infection

**Q.6 Answer the following.****16**

- a) HLA
- b) IgG

**Q.7 Answer the following.****16**

- a) Active immunization
- b) Flow cytometry





**Q.7 Answer the following.**

- a)** Describe in detail the fermentative production of streptokinase. Add a note its application. **08**
- b)** Describe in detail good manufacturing practices in the pharmaceuticals. **08**

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**M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**

**Food and Dairy Microbiology (MSC023402)**

Day & Date: Saturday, 11-05-2024  
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- 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 the correct alternative.**

10

- 1) The causative agent for mastitis diseases is \_\_\_\_\_.  
 a) *Shigella dysenteriae*                      b) *Penicillium*  
 c) *Mycobacterium*                              d) *Streptococcus agalactia*
- 2) Rennet is used in production of \_\_\_\_\_.  
 a) Yughurt    b) cheese  
 c) Dahi    d) kefir
- 3) Phosphatase enzyme present in milk is destroyed in \_\_\_\_\_ of the following processes.  
 a) sterilization                                      b) canning  
 c) dehydration                                      d) pasteurization
- 4) Food preservation involves \_\_\_\_\_.  
 a) increasing shelf life of food  
 b) ensuring safety for human consumption  
 c) both a and b  
 d) None of these
- 5) The time temperature relationship for LTH method of pasteurization is \_\_\_\_\_.  
 a) 62.8°C for 15 min                              b) 71.7°C for 15 sec  
 c) 71.7°C for 30 min                              d) 138°C for 1 sec
- 6) The production of blue discolouration in milk by is caused by \_\_\_\_\_.  
 a) *Pseudomonas synzyanea*                      b) *Pseudomonas synxantha*  
 c) *Pseudomonas aeruginosa*                      d) *Pseudomonas putida*
- 7) Chemical preservatives do not include \_\_\_\_\_.  
 a) organic acids                                      b) sulfites  
 c) alcohol    d) starch
- 8) \_\_\_\_\_ is the causative agent of Q fever.  
 a) *Lactobacillus*                                      b) *Coxiella burnetti*  
 c) *Lactobacillus bulgaricus*                      d) *Clostridium*
- 9) Sodium dinitro phenyl phosphate is the substrate used for \_\_\_\_\_ test.  
 a) MBRT    b) MPN  
 c) Phosphatase                                      d) SPC



- 10) \_\_\_\_\_ is the causative agent of Q fever.
- a) *Lactobacillus*
  - b) *Coxiella burnetti*
  - c) *Lactobacillus bulgaricus*
  - d) *Clostridium*

**B) Fill in the blanks OR Write True/False.****06**

- 1) Yoghurt is produced by the controlled fermentation of milk by two species of bacteria *Lactobacillus bulgaricus* and *Lactotococcus thermophilus*. (True/False)
- 2) The dominant sugar present in milk is \_\_\_\_\_.
- 3) Give two examples of the dyes used in dye reduction tests.
- 4) Which is pasteurization temperature for HTST?
- 5) Aflatoxicosis is caused by *Aspergillus flavus*. (True/False)
- 6) Rennet is used in production of \_\_\_\_\_.

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

- a) Define milk and composition of milk.
- b) Define Fermented food products. Explain in detail production of Idli.
- c) Write a note on principles of food preservation and food preservation by canning.
- d) Define food spoilage and explain spoilage of fish.

**Q.3 Answer the following.****16**

- a) Define fermented milk products and Explain manufacture of Swiss Cheese.
- b) What are the principles of food preservation? Explain food preservation by chemicals.

**Q.4 Answer the following.****16**

- a) What is FSSAI? Functions and Powers of FSSAI.
- b) Write in detail on food intoxications.

**Q.5 Answer the following.****16**

- a) Describe various sources of contamination of milk.
- b) Describe various methods of microbiological examination of milk.

**Q.6 Answer the following.****16**

- a) Describe various tests in chemical analysis of milk.
- b) Define pasteurization. Describe various methods of pasteurization.

**Q.7 Answer the following.****16**

- a) Describe important milk borne infections.
- b) Define fermented milk products types and production of Kefir, Kumiss.

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**M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024  
MICROBIOLOGY**

**Principles of Bioinstrumentation and Technique (MSC023403)**

Day &amp; Date: Tuesday, 14-05-2024

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

- Instructions:** 1) Question 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 and write the sentence again. 10**

- 1) \_\_\_\_\_ is used to getting a three-dimensional picture of the specimen.
  - a) Transmission electron microscope
  - b) Scanning electron microscope
  - c) Compound microscope
  - d) Simple microscope
- 2) Ion exchange resin is \_\_\_\_\_.
  - a) Linear
  - b) Low molecular weight
  - c) Organic polymer with porous structure
  - d) Soluble
- 3) \_\_\_\_\_ biopolymer is not a gel filtration media used in gel filtration.
 

a) Agarose gel	b) Polyacrylic amide gel
c) Sephadex	d) Silica
- 4) The rate zonal centrifugation based on separation of particles on the basis of \_\_\_\_\_.
 

a) Mass	b) Density
c) Solubility	d) Size
- 5) The wavelength range for UV spectrum of light is \_\_\_\_\_.
 

a) 400-800nm	b) 700-1000nm
c) 0.01-10nm	d) 10-400nm
- 6) In electrophoresis the speed of migration of ions depends upon \_\_\_\_\_.
  - a) Shape and size of molecule
  - b) Magnitude of charge and shape of molecule
  - c) Magnitude of charge, shape and mass of molecules
  - d) Magnitude of charge and mass of molecules
- 7) If proteins are separated according to their electrophoretic mobility, then the type of electrophoresis is \_\_\_\_\_.
  - a) SDS PAGE.
  - b) Affinity electrophoresis.
  - c) Electro focusing.
  - d) Free flow electrophoresis.
- 8) Western blotting techniques is used to separate \_\_\_\_\_ from the sample.
 

a) DNA	b) RNA
c) Protein	d) Lipid





- 10) What do you mean by 'Incubation period" during infection cycle of pathogens?
- Time between pathogen entry and recovery of the infected person
  - Time between pathogen entry and death of the infected person
  - Time between pathogen initial contact and development of signs and symptoms
  - Time between pathogen entry and development of signs and symptoms

**B) Write True or False.****06**

- Giardia lamblia* is a bacterium that cause diarrheal condition in humans.
- Entamoeba histolytica* is an anaerobic parasitic that cause amoebiasis in humans.
- Taenia saginata* a fungal species causes intestinal infection in humans.
- COVID-19 is caused by SARS-CoV-1.
- Polio virus has single stranded DNA as a genome.
- Some of the COVID-19 patient in second wave suffered from Mucormycosis in India.

**Q.2 Answer the following.**

- Explain in brief about factors in development of infection. **10**
- Write a note on reservoirs of infection. **06**

**Q.3 Answer the following.**

- Write a note on detection of *M. tuberculosis*, *Vibrio cholera* and *Leptospirios*. **10**
- Write a short note on ELISA. **06**

**Q.4 Answer the following.**

- Write in brief about peptic ulcer by *Helicobacter* with respect to etiological agent, mode of transmission, symptoms, epidemiology, laboratory diagnosis, prophylaxis and treatment. **10**
- Write a short note skin infection caused by *Staphylococcus*. **06**

**Q.5 Answer the following.**

- Write in brief about amoebiasis with respect to etiological agent, mode of transmission, symptoms, life cycle of parasite, laboratory diagnosis, prophylaxis, treatment. **10**
- Write a short note on mode of symptoms, diagnosis and treatment of *Taenia saginata* infection. **06**

**Q.6 Answer the following.**

- Write in brief about COVID-19 with respect structure of virus, clinical manifestations, transmission, laboratory diagnosis, prophylaxis, and treatment. **10**
- Write a short note on mode of symptoms, diagnosis and treatment of Mucormycosis. **06**

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**M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024**  
**MICROBIOLOGY**  
**Recombinant DNA Technology (MSC023410)**

Day & Date: Thursday, 16-05-2024  
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question 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.  
 4) Draw neat labeled diagrams wherever necessary.

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

- 1) BAL 31 Nuclease acts as \_\_\_\_\_.  
 a) an exonuclease, degrading double stranded DNA and RNA from both termini  
 b) an endonuclease, cleaving single stranded DNA and RNA  
 c) cutting nicks and gaps of DNA/RNA  
 d) All of these
- 2) \_\_\_\_\_ an enzyme that cleaves DNA into fragments at or near specific recognition sites within molecules known as restriction sites.  
 a) RNA polymerase                      b) DNA polymerase  
 c) restriction endonuclease          d) DNA ligase
- 3) At the University of California \_\_\_\_\_ cloning vectors are created.  
 a) pUC    b) pBR  
 c) pMB                                         d) pRB
- 4) Cosmids are plasmids that incorporate a segment of \_\_\_\_\_ DNA.  
 a) bacteriophage  $\sigma$                       b) bacteriophage  $\lambda$   
 c) bacteriophage  $\beta$                          d) bacteriophage  $\mu$
- 5) Liposome is made up of \_\_\_\_\_ and used in gene transfer techniques.  
 a) proteins                                    b) nucleic acids  
 c) Phospholipids                          d) carbohydrates
- 6) Screening of protein expression carried out using \_\_\_\_\_.  
 a) Phage display                          b) ELISA  
 c) Radio Immuno Assay                d) All of these
- 7) Polymerase used for PCR is extracted from \_\_\_\_\_.  
 a) *Thermus aquaticus*                      b) *Escherichia coli*  
 c) *Homo sapiens*                             d) *Saccharomyces cerevisiae*
- 8) The enzyme used in formation of cDNA from mRNA is \_\_\_\_\_.  
 a) helicase                                    b) reverse transcriptase  
 c) polymerase                                d) gyrase
- 9) The chain termination PCR is used for \_\_\_\_\_ DNA sequencing method.  
 a) Maxam-Gilbert                          b) Pasteur  
 c) Sanger                                        d) Edmans

