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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Microbial Diversity and Taxonomy (2316101)

Day & Date: Friday, 05-01-2024
Time: 03:00 PM To 05:30 PM

Max. Marks: 60

- Instructions:** 1) All questions are compulsory.
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. 08

- 1) Symbiotic association between algae and fungi is _____.
a) Mycorrhiza b) Mycobacterium
c) Mycoplasma d) Lichen
- 2) _____ gene derive the evolutionary relationship between taxonomic group
a) 23SrRNA b) 16SrRNA
c) 5SrRNA d) 18SrRNA
- 3) _____ found in extreme saline conditions.
a) Psychrophiles b) Mesophiles
c) Neutrophils d) halophiles
- 4) Archaeobacteria and nitrogen fixing bacteria are classified in _____ kingdom.
a) Animalia b) Plantae
c) Monera d) Fungi
- 5) Binomial nomenclature was given by _____.
a) Linnaeus b) Hugo
c) Johnson d) Huxely
- 6) % similarity (%S) of each strain to every other strain is calculated by _____.
a) Intuitive method b) Numerical taxonomy
c) Genetic relatedness d) DNA homology
- 7) Mitochondria and chloroplasts have their own DNA which is similar to the DNA of _____.
a) Protozoa b) Human
c) Bacteria d) Fungi
- 8) The period of years between _____ and _____ is referred to as the golden age of Microbiology.
a) 1300 and 1400 b) 1570 and 1680
c) 1230 and 1370 d) 1857 and 1913

B) Write True or False. 04

- 1) yeasts are Fungi.
- 2) Mycorrhiza is association between fungi and Proteus.
- 3) Methanogens do not produce oxygen.
- 4) Paramecium, penicillin and plasmodium belongs to the same kingdom.

- Q.2 Answer the following (Any six) 12**
- a) Mycorrhiza
 - b) Psychrophiles
 - c) Hyperthermophiles
 - d) Ternoenzymes
 - e) Genus
 - f) Endosymbiotic theory
 - g) Hydrosphere
- Q.3 Answer the following (Any three) 12**
- a) Characteristics of protozoa
 - b) High pressure habits
 - c) Hierarchical organization
 - d) Thermophilic Archaeobacteria
- Q.4 Answer the following (Any two) 12**
- a) Whittaker's five kingdom classification
 - b) Morphological characteristics used in taxonomy
 - c) General characteristics and classification fungi
- Q.5 Answer the following (Any two) 12**
- a) Haeckel's three kingdom classification
 - b) Biochemical characteristics used in taxonomy
 - c) Theoretical aspects of evolutionary analysis

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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Recent Trends in Virology (2316102)

Day & Date: Sunday, 07-01-2024
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 answer from given alternatives. 08

- 1) Bacteriophages are counted by _____ assay.

a) Colorimetric	b) Plaque
c) Enzymatic	d) Chemical
- 2) _____ is helical virus.

a) TMV	b) T ₄
c) Poxvirus	d) Herpes
- 3) _____ is antiviral protein produced after viral infection.

a) Histamine	b) Heparin
c) Insulin	d) Interferon
- 4) Viral genome are packaged in capsid made up of _____.

a) Lipids	b) Carbohydrates
c) Proteins	d) Calcium
- 5) Viruses which causes lysis of bacteria are known as _____ viruses.

a) Lytic	b) Lysogenic
c) Lysozymic	d) Latent
- 6) Viruses outside their host cells survives as _____.

a) Viri spore	b) Virions
c) Exospore	d) Endospore
- 7) Viral genome inserted in the bacterial DNA is termed as _____.

a) Plasmid	b) Capsid
c) Prophage	d) Prion
- 8) Chikungunya is caused by _____.

a) Mosquito	b) Rats
c) Mites	d) Aedes aegypti

B) Write True or False

04

- 1) Bacteriophages infects liver cells.
- 2) The family of Rhabdoviridae possesses ds DNA.
- 3) Tamiflu is used to cure Influenza.
- 4) TMV is plant virus.

- Q.2 Answer the following (any Six) 12**
- a) What are the temperate phages?
 - b) Who described one step growth curve?
 - c) Define prions.
 - d) What is Burst size?
 - e) Give two examples of antiviral drugs.
 - f) What is oncogene?
 - g) Define Lysogeny.
 - h) Who discovered virus?
- Q.3 Answer the following. (any Three) 12**
- a) Give the general characteristics of viruses.
 - b) Write note on Infectivity assays.
 - c) Write note on SARS
 - d) Write in brief cultivation viruses in Embryonated egg.
- Q.4 Answer the following. (any Two) 12**
- a) Describe in detail Lytic cycle.
 - b) Describe in detail classification and nomenclature of Animal viruses.
 - c) Describe in detail corona virus.
- Q.5 Answer the following. (any Two) 12**
- a) Describe in brief control of viral infections.
 - b) Describe in detail pathogenesis of plant viruses.
 - c) Describe in brief various methods used for purification of viruses.

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M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY

Diagnostic Microbiology (2316107)

Day & Date: Tuesday, 09-01-2024
 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 sentences choosing correct alternative.

08

- 1) Rubella virus refers to the _____ infection
 - a) German measles
 - b) Chicken pox
 - c) Measles
 - d) Small pox
- 2) Direct fluorescent antibody test is safer method for diagnosis of _____.
 - a) Syphilis
 - b) tuberculosis
 - c) Rubella
 - d) Leprosy
- 3) 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
- 4) Koplik spot formation is the specific symptom in _____ disease.
 - a) Streptococcus
 - b) Salmonella
 - c) Rubella
 - d) Rubeola
- 5) _____ like components added in the enriched media support the growth of fastidious organisms.
 - a) pH indicator
 - b) salt
 - c) Bile salt
 - d) Blood
- 6) Following methods of diagnosis utilize labelled antibody except _____.
 - a) ELISA
 - b) Haemagglutination inhibition
 - c) Radioimmunoassay
 - d) immunofluorescence
- 7) In herpes, primary lesion is _____.
 - a) ulcer
 - b) Papule
 - c) Vesicle
 - d) none of the above
- 8) What is the ideal temperature range for transporting and storing most clinical specimens before they reach the laboratory?
 - a) Body temperature (37°C)
 - b) Freezing (-20°C)
 - c) Refrigerated (2-8°C)
 - d) Room temperature (20-25°C)

B) Answer the questions true/false **04**

- 1) Hands should be washed before and after working in a biological safety cabinet -
 - a) True
 - b) False
- 2) Taq polymerase enzyme is used in PCR technique.
 - a) True
 - b) False
- 3) Full form of RFLP is Restriction Fragment Length Polymorphism.
 - a) True
 - b) False
- 4) In complement fixation test hemolysis indicates positive test.
 - a) True
 - b) False

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

- a) Explain BSL 1
- b) Structure of Rubella virus
- c) Define biohazardous waste
- d) Herpes Zooster virus
- e) Define CSF and collection of CSF.
- f) Define biosafety cabinet
- g) What is microbiome?
- h) Use of incineration

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

- a) ELISA test
- b) Life cycle of *Balantidium coli*
- c) Immunofluorescence test
- d) RFLP

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

- a) Hemagglutination and Hemagglutination inhibition Test.
- b) PCR technique and its application in diagnosis
- c) Life cycle of *Ascaris lumbricoides*

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

- a) Pathogenesis and symptoms of *Helicobacter pylori*
- b) Note on Rubeola virus infection
- c) Write a note on collection of clinical samples methods of transport of clinical samples.

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**M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Techniques in Microbiology - I (2316108)

Day & Date: Tuesday, 09-01-2024
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 answer from given alternatives. 08

- 1) Gieger muller counter is used to detect _____.
a) Charge b) pH
c) Mass d) Radiation
- 2) In Laminar air flow _____ filter is used.
a) HEPA b) Membrane
c) Seitz d) Whatsman
- 3) Centrifugation based on _____ law.
a) Stains b) Stoke's
c) Newton's d) Ohm's
- 4) _____ type pH meter is simplest of pH meters.
a) Null-detector b) Direct reading
c) Digital d) Modern
- 5) The resolving power of TEM is derived from _____.
a) Specimen b) Weight
c) Electrons d) Ocular system
- 6) _____ is used locating agent in paper chromatography.
a) HCl b) Alcohol
c) Safranin d) Ninhydrin
- 7) _____ Metal is used with nanoparticles for antibiotic delivery.
a) Gold b) Silver
c) Zinc d) Titanium
- 8) _____ is principle in NMR spectroscopy.
a) Diffraction b) Refraction
c) Absorption d) Emmision

B) Write True/False 04

- 1) E. Ruska developed Electron Microscope.
- 2) Nanoparticles are not synthesized by microorganisms.
- 3) The electrodes used in pH measurement have very high internal resistance.
- 4) Electrophoresis is not used for separation of DNA.

Q.2 Answer the following (Any Six)

- a) What is use of Biosafety cabinet?
- b) What is Rf value?
- c) What is principal of colorimeter?
- d) What are applications of Electron Microscope.
- e) Define nanoparticles.
- f) What is application of fluorescence correlation spectroscopy?
- g) What is use of Ur-visible spectrophotometer?

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

- a) Describe in detail pH meter.
- b) Describe in detail thin layer chromatography.
- c) Describe different types of nanoparticles and their applications.
- d) Write on confocal fluorescence microscopy.

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

- a) Describe in brief Atomic absorption spectroscopy.
- b) Describe in detail colorimeter.
- c) Describe various types of centrifuges.

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

- a) Describe in detail Electron Microscope.
- b) Describe in detail Agarose gel electrophoresis.
- c) Describe in detail applications of Nanobiotechnology.

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M.Sc. (Semester - I) (New) (NEP CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY
Research Methodology (2316103)

Day & Date: Thursday, 11-01-2024
 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. (MCQ)**08**

- 1) What is a research design?
 - a) A plan for data analysis
 - b) A method for data collection
 - c) A statistical technique
 - d) A framework for conducting research
- 2) Boolean operators used in conducting literature searches include _____.
 - a) OR & AND
 - b) only OR
 - c) OR, AND, NOT
 - d) only NOT
- 3) _____ section of research paper has tables & graphical presentation.
 - a) Introduction
 - b) Result
 - c) Methods
 - d) Discussion
- 4) _____ is NOT a type of research data.
 - a) Primary data
 - b) Secondary data
 - c) Tertiary data
 - d) Meta data
- 5) Questionnaire is a _____.
 - a) Research method
 - b) Measurement technique
 - c) Tool for data collection
 - d) Data analysis technique
- 6) Which section of research article describe "Problem statement"?
 - a) introduction
 - b) methods
 - c) discussion
 - d) results
- 7) Inductive logic proceeds from: _____.
 - a) General to General
 - b) Particular to General
 - c) General to Particular
 - d) Particular to Particular
- 8) Which of the following is not a "Graphic representation"?
 - a) Pie Chart
 - b) Bar Chart
 - c) Table
 - d) Histogram

B) Write True /False.**04**

- 1) Results are primarily in the past tense.
- 2) For writing review article, it sufficient to refer to two or three papers.
- 3) The null hypothesis states that there is no relationship between the two things.
- 4) A specific source used in your text is called reference.

- Q.2 Answer the following. (Any Six) 12**
- a) Define research.
 - b) What is citation?
 - c) What is data?
 - d) What is the long form of IMRaD?
 - e) Which are different ways of scientific communications?
 - f) What should be written in acknowledgement section of research paper?
 - g) Write any four characteristics of good research.
 - h) What is correlational research?
- Q.3 Answer the following. (Any Three) 12**
- a) Write a note on “Motivation of research”.
 - b) What is Inductive and deductive reasoning.
 - c) What are the differences in qualitative and quantitative research?
 - d) Write a note on “Review article”.
- Q.4 Answer the following. (Any Two) 12**
- a) Discuss on “Types of data”.
 - b) Discuss on “Material and Methods” section of research paper.
 - c) Write in detail about “descriptive research”.
- Q.5 Answer the following. (Any Two) 12**
- a) Discuss in detail about “hypothesis”.
 - b) Write an essay on “plagiarism”.
 - c) Write an essay on “research design”.

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Cytology and Taxonomy of Microorganisms (MSC23101)

Day & Date: Friday, 05-01-2024
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 indicates full marks.

Q.1 A) Choose the correct alternatives. 10

- 1) Rocky Mountain Spotted fever is caused by _____.
a) *Rickettsia prowazekii* b) *Coxiella burnetii*
c) *Rickettsiae rickettsii* d) *Rickettsiae typhi*
- 2) _____ of the following is the standard resource for identifying bacteria.
a) Systema Naturae
b) Bergey's Manual of Determinative Bacteriology
c) Woese and Fox's phylogenetic tree
d) Haeckel's General Morphology of Organisms
- 3) _____ proposed the phylogenetic tree for living things.
a) Carlo Urbani b) Louis Pasteur
c) Robert Koch d) Carl Woese
- 4) In algae _____ is formed in pyrenoids.
a) oil b) glucose
c) starch d) silica
- 5) Scientific name of common mushroom is _____.
a) *Albugo* b) *Agaricusbisporus*
c) *Stolonifer* d) *Muccidae*
- 6) Fragmentation of filamentous cyanobacteria generates small filaments called _____ that help in reproduction.
a) Trichomes b) Hormogonia
c) Hetercysts d) Akinetes
- 7) _____ is the only bacterial genus where sterols are present in the cell membrane.
a) *Escherichia* b) *Mycoplasma*
c) *Chlamydia* d) *Vibrio*
- 8) The correct order of taxonomic groups from higher to lower rank is as _____.
a) Kingdom-Order-Class-Family
b) Order-Class-Division-Family-Genus-Species
c) Kingdom-Order-Division-Family-Class-Genus-Species
d) Kingdom-Division-Class-Order-Family-Genus-Species
- 9) _____ microorganism(s) among the following perform photosynthesis by utilizing light.
a) Cyanobacteria b) Fungi
c) Viruses d) Fungi and Viruses

- 10) Bacterial fimbriae present on the outer cell surface are used for ____.
- a) cellular activity
 - b) sexual reproduction
 - c) cell wall synthesis
 - d) adherence to surfaces

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

- 1) All fungi are multi-cellular.
- 2) The main constituent of a Gram positive cell wall is Peptidoglycan.
- 3) Bacterial cells have a large surface to volume ratio.
- 4) Bacteria divide by Mitosis.
- 5) Algae are autotrophic.
- 6) Lichen symbiotic association between algae and fungi.

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

- a) Write about bacterial adhesion.
- b) Write short notes on actinomycosis.
- c) Write about spore formed by fungi.
- d) Write short notes Pigments in algae.

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

- a) Write an essay on bacterial classification.
- b) Explain in detail the Numerical taxonomy

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

- a) Write an essay on Actinomyces.
- b) Write an essay on Classification of Lichen.

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

- a) Describe in detail External appendages of bacteria.
- b) Explain in detail General principles of bacterial Nomenclature.

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

- a) Describe in the detail life cycle and transmission of Mycoplasma.
- b) Explain in detail General properties of Rickettsia.

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

- a) Write an essay on Bergey's Manual.
- b) Explain in detail General properties and Types of Cyanobacteria.

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Microbial Chemistry and Enzymology (MSC23102)

Day & Date: Sunday, 07-01-2024
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) Choose correct alternative. 10

- 1) Apoenzyme is a _____.
 - a) Protein
 - b) Carbohydrate
 - c) Vitamin
 - d) Amino acid
- 2) _____ are isomers.
 - a) Glucose and glucose
 - b) Glucose and heptose
 - c) Glucose and fructosed
 - d) Glucose and maltose
- 3) Oligosaccharides contain _____ monosaccharide units.
 - a) 5 to 20
 - b) 2 to 9
 - c) more than 9
 - d) 10 to 100
- 4) _____ is sulfur containing amino acid.
 - a) Arginine
 - b) Aspartic acid
 - c) Cysteine
 - d) Glutamic acid
- 5) Lock and Key model is also known as _____.
 - a) Template model
 - b) Induced fit model
 - c) Khosland's Model
 - d) Enzyme-substrate interaction
- 6) _____ is not a co-enzyme.
 - a) NAD
 - b) NADP
 - c) FAD
 - d) Mn⁺⁺
- 7) The molecule which acts directly on an enzyme to lower its catalytic rate is _____.
 - a) Repressor
 - b) Inhibitorc
 - c) Modulatord
 - d) Regulator
- 8) The catalytic efficiency of two distinct enzymes can be compared by _____.
 - a) K_m
 - b) Product formation
 - c) Size of the enzymes
 - d) pH of optimum value
- 9) Glycolysis can occur in _____.
 - a) aerobic cells
 - b) anaerobic cells
 - c) both aerobic and anaerobic cells
 - d) neither aerobic and anaerobic cells
- 10) _____ is aromatic amino acid.
 - a) Lysine
 - b) Glutamine
 - c) Cysteine
 - d) Phenylalanine

- B) Write true/false.** **06**
- 1) Sugars are classified as ketose and aldose.
 - 2) Amino acids are joined by peptide bond.
 - 3) Michaelis-Menten constant is equal to substrate concentration.
 - 4) Pyruvate dehydrogenase is multienzyme complex.
 - 5) All enzymes are thermophilic.
 - 6) Cofactors are organic in nature.
- Q.2 Answer the following.** **16**
- a) Reducing sugars
 - b) Define kinetics
 - c) Define Co factors and coenzyme
 - d) Define monosaccharide
- Q.3 Answer the following.** **16**
- a) Explain Amino acids- structural features and Chemical reactions.
 - b) Describe significance of reversible and irreversible inhibition.
- Q.4 Answer the following.** **16**
- a) Drug metabolism
 - b) Write in details of microbial hormones and their significance.
- Q.5 Answer the following.** **16**
- a) Acid and base catalysis
 - b) Classification of amino acids
- Q.6 Answer the following.** **16**
- a) Covalent catalysis.
 - b) Modification of M-M equation.
- Q.7 Answer the following.** **16**
- a) Chemistry of Porphyrins & their significance.
 - b) Write in detail on cytochromes.

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No.**M.Sc. (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY****Recent Trends in Virology (MSC23103)**Day & Date: Tuesday, 09-01-2024
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) Antiviral substance produced in human body is _____.
a) Antibody b) Antigen
c) Interferon d) Immunogen
- 2) _____ classification of viruses is based on the method of viral mRNA synthesis.
a) LHT b) Baltimore
c) Holmes d) ICTV
- 3) In pock assay, viral dilution is inoculated onto the surface of _____.
a) Allantoic cavity
b) Amniotic cavity
c) Chorioallantoic membrane
d) Yolk sac
- 4) The capsid of picornaviruses is made up of _____ capsomers.
a) 8 b) 10
c) 32 d) None of the above
- 5) _____ belongs to Orthomyxoviridae family.
a) Herpes virus b) Adeno virus
c) Influenza Virus d) Picorna Virus
- 6) The example of dsRNA plant virus is _____.
a) Coronavirus b) Nepovirus
c) Wound tumorvirus d) Bromovirus
- 7) Influenza virus multiply in _____.
a) Nucleus b) Mitochondria
c) Ribosome d) Cytoplasm
- 8) In prions proteins are coded by _____.
a) PRR b) Prp
c) Pre d) Pro
- 9) Lipid bilayer membrane of poxviruses is originated from _____ host cell.
a) Endoplasmic reticulum b) Golgi apparatus
c) Nuclear membrane d) Plasma membrane
- 10) Breast cancer in mice is discovered by _____.
a) Bittner virus b) Poxvirus
c) Adenovirus d) Rous sarcoma virus

B) Write True or False Of the following. 06

- 1) The incubation period of hepatitis type A virus is 15 to 45 days.
- 2) The phage OX -174 genome penetrates the host cell with the help of pilot protein which is product of A gene.
- 3) Viruses multiple inside and outside cells.
- 4) Hershey crystallized the TMV first time.
- 5) The ability of an animal virus to infect a cell depends primarily on, presence of receptor sites on the cell membrane.
- 6) Viruses having RNA genome are always single stranded.

Q.2 Answer the following. 16

- a) Pathogenesis of TMV.
- b) Purification of viruses by precipitation
- c) Pathogenesis of picorna virus
- d) ELISA

Q.3 Answer the following. 16

- a) Explain the role of DNA viruses in oncogenesis.
- b) Write in detail about EBOLA viral infection.

Q.4 Answer the following. 16

- a) Satellite viruses and their role in plant virus replication.
- b) Explain in detail control of viral infections with vaccines and antiviral drugs.

Q.5 Answer the following. 16

- a) Give details of lytic cycle of bacteriophages.
- b) Explain the multiplication of RNA animal viruses.

Q.6 Answer the following. 16

- a) Cultivation of viruses using embryonated eggs.
- b) Virus classification scheme of ICTV.

Q.7 Answer the following. 16

- a) Write an account on Zika Virus.
- b) Give details of SARS virus infection.

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**M.Sc. (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Research Methodology and Scientific Writing (MSC23108)

Day & Date: Thursday, 11-01-2024

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 rewrite the sentence. 10

- 1) Which is a statement or set of statements based on repeated experiments or observation?
 - a) Theory
 - b) Hypothesis
 - c) Concept
 - d) Scientific Law
- 2) Which type of presentation given by student in scientific conference?
 - a) Grant proposal
 - b) Poster presentation
 - c) Ph. D Thesis presentation
 - d) Project report
- 3) Which type of document can be submitted to a research journal for publication of research?
 - a) Conference report
 - b) Project report
 - c) Research paper
 - d) Review article
- 4) The background of research study should be included in which part?
 - a) Results
 - b) Introduction
 - c) Reference
 - d) Material and methods
- 5) The chemicals and procedures used for research study should be included in which part of research paper?
 - a) Results
 - b) Introduction
 - c) Reference
 - d) Material and methods
- 6) Which database can be used for literature survey?
 - a) NBCI
 - b) NCBI
 - c) NICB
 - d) NCBS
- 7) What should be used for literature survey of any research topic?
 - a) Conclusion
 - b) Material and methods
 - c) Keywords
 - d) Results
- 8) Which is last part of research project layout?
 - a) Material and methods
 - b) Introduction
 - c) Results and discussion
 - d) References
- 9) Which should be avoided in research paper and reports?
 - a) Tables
 - b) Graphs
 - c) Plagiarism
 - d) Figures
- 10) Which tense is used to describe methods in research paper?
 - a) Present
 - b) Past
 - c) Future
 - d) Continuous present

- B) Write True/false** **06**
- 1) Oral presentation of research study can be done in scientific conferences by scientist.
 - 2) Tables can be used to describe results in research paper.
 - 3) PubMed database is used to search DNA sequence.
 - 4) Plagiarism is allowed in research papers, project reports and Ph.D thesis.
 - 5) Results should be described in future tense in research paper.
 - 6) Curriculum vitae is submitted for job application.
- Q.2 Answer the following.** **16**
- a) Write a short note on maintaining a Lab notebook.
 - b) Write a short note on ideal Title of the research paper.
 - c) Write a short note on Acknowledgements section of the research paper.
 - d) Write a short note on ideal authorship format of the research paper.
- Q.3 Answer the following.**
- a) Explain in brief about oral, poster and written presentations. **10**
 - b) Write a note on audio-visual aids used for presentations. **06**
- Q.4 Answer the following.**
- a) Write in brief about ideal 'Material and Methods' and 'Results and Discussion' of the research paper. **10**
 - b) Write a short note on reference section of the research paper. **06**
- Q.5 Answer the following.**
- a) Write in brief about Literature survey. **10**
 - b) Write a short note on Impact factor. **06**
- Q.6 Answer the following.**
- a) Write in brief layout of research project report. **10**
 - b) Write a short note on ideal abstract of the research paper. **06**
- Q.7 Answer the following.**
- a) Write in brief about tenses used in various sections of research paper. **10**
 - b) Write a short note on Curriculum vitae. **06**

Seat No.	
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M.Sc. (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY
Biophysics and Bioinstrumentation (MSC23109)

Day & Date: Thursday, 11-01-2024
 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) In which type of chromatography, the stationary phase is held in a narrow tube and the mobile phase is forced through it under pressure?
 - a) Column chromatography
 - b) Planar chromatography
 - c) Liquid chromatography
 - d) Gas chromatography
- 2) In isoelectric focusing, proteins are separated based on them _____.
 - a) the relative content of positively charged residue only
 - b) the relative content of negatively charged residue only
 - c) size
 - d) the relative content of positively and negatively charged residue
- 3) Which of the following is used as a carrier gas in gas chromatography?
 - a) Carbon dioxide
 - b) Oxygen
 - c) Helium
 - d) Methane
- 4) Does a buffer solution comprise which of the following?
 - a) A weak acid in the solution
 - b) A strong acid in the solution
 - c) A weak base in the solution
 - d) A weak acid and its conjugate base in solution
- 5) Which of the microscopes below is usually good for use on unstained specimens?
 - a) Phase-contrast
 - b) Fluorescence
 - c) Bright-field
 - d) Scanning electron
- 6) Chromatography is a physical method that is used to separate _____.
 - a) Simple mixtures
 - b) Complex mixtures
 - c) Viscous mixtures
 - d) Metals
- 7) In an electrolytic cell, metal passes into ions at _____.
 - a) Cathode
 - b) Anode
 - c) Salt bridge
 - d) No oxidation or reduction
- 8) What is the role of the slit in UV-visible spectroscopy?
 - a) Monochromatic radiation to polychromatic radiation
 - b) Polychromatic radiation to monochromatic radiation
 - c) A and B
 - d) None of this

- 9) Which among these is not a way of non-specific elution?
a) Solvent change
b) pH change
c) Reversible denaturation
d) Competition for suitable complementary protein
- 10) Does the particle sedimentation velocity increase?
a) increasing viscosity
b) decreasing difference in density between the two phases
c) increasing diameter
d) All of the above

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

- 1) Phenol red is an accurate method to determine the pH of an aqueous solution.
- 2) In spectrophotometric experiments, the blank contains Solvent.
- 3) In laminar airflow HEPA filter is located.
- 4) Light waves are used as an electron microscope.
- 5) X-ray crystallography technique is used to study the three-dimensional structure of a molecule.
- 6) If proteins are separated according to their electrophoretic mobility, then the type of electrophoresis is SDS PAGE.

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

- a) Discuss the Bio-safety cabinet.
- b) Write a note on the Colorimeter.
- c) Write the principle and instrumentation of the fluorescence microscope.
- d) Discuss the secondary structure of the protein.

Q.3 Answer the following.

- a) Describe the principle, working, and applications of Ion exchange chromatography.
- b) Discuss in detail agarose gel electrophoresis

08**08****Q.4 Answer the following.**

- a) Discuss the conformational properties of proteins.
- b) Explain in detail the Ramachandran plot with a diagrammatic representation.

08**08****Q.5 Answer the following.**

- a) Describe the tertiary and quaternary structure of proteins.
- b) Explain the principle and instrumentation of ORD spectroscopy.

08**08****Q.6 Answer the following.**

- a) Describe principles, instrumentation, and applications of atomic absorption spectroscopy.
- b) Explain the principle and working of a scanning electron microscope.

08**08****Q.7 Answer the following.**

- a) Explain the SDS PAGE technique for the separation of proteins.
- b) Discuss NMR spectroscopy for determination of structure of a molecule.

08**08**

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Set **P**

M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023

MICROBIOLOGY**Microbial Genetics (MSC23201)**

Day & Date: Monday, 18-12-2023

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

- Instructions:** 1) Q.-1 is compulsory. Solve any 4 from Q-2 to Q7.
 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) In _____ one or more bases are removed from the nucleotide chain.
 - a) Deletion
 - b) Insertion
 - c) Transition
 - d) Transversion
- 2) In Griffith experiment pneumococci strains used were _____.
 - a) noncapsulated and pathogenic
 - b) noncapsulated and nonpathogenic
 - c) capsulated and pathogenic
 - d) capsulated and nonpathogenic
- 3) _____ was identified as transforming principle.
 - a) Carbohydrate
 - b) Protein
 - c) DNA
 - d) RNA
- 4) In _____ phase of growth recipient cells takes up the donor DNA.
 - a) Lag
 - b) early log
 - c) late log
 - d) stationary
- 5) _____ molecules of DNA are transformed after each transformation.
 - a) One
 - b) Three
 - c) Ten
 - d) Many
- 6) Mutation arising from insertion or deletion of nucleotide is called _____ mutation.
 - a) frameshift
 - b) Silent
 - c) Nonsense
 - d) Natural
- 7) The process of recombination in prokaryotes takes place by _____.
 - a) Transformation
 - b) Transduction
 - c) conjugation
 - d) all of these
- 8) Semiconservative DNA replication was first demonstrated in _____.
 - a) *E coli*
 - b) *Pseudomonas*
 - c) *Drosophila*
 - d) *Drosera*
- 9) _____ is principle replication enzyme in prokaryotes.
 - a) Polymerase I
 - b) Polymerase II
 - c) Polymerase III
 - d) Endonuclease

- 10) In _____ the viral particles are transmitted through lysis of cell.
- a) lytic cycle
 - b) Lysogeny
 - c) replication
 - d) translation

B) Write True or False.

06

- 1) DNA replication is conservative.
- 2) Replacement of purine by pyrimidine is known as transversion
- 3) M13 phage is double stranded DNA vector.
- 4) Replication of plasmid depends on host cell.
- 5) Conjugation is discovered by Lederberg and Tatum.
- 6) Genetic code is doublet.

Q.2 Answer the following

16

- a) Ames test for toxicity testing
- b) Photoreactivation
- c) Silent features of T4 DNA replication
- d) Negative and positive superhelix

Q.3 Answer the following.

16

- a) Write in detail about the Griffith experiment
- b) Structure and replication in Φ x 174

Q.4 Answer the following.

16

- a) T4 phage DNA replication
- b) Translation in prokaryotes

Q.5 Answer the following.

16

- a) Define the genetic code and write on properties of genetic code
- b) Define transposons and explain in detail mechanism of transposition

Q.6 Answer the following.

16

- a) DNA damage and repair
- b) Write in detail about types of DNA

Q.7 Answer the following.

16

- a) Lac operon
- b) Hershey and Chase experiment

Seat No.	
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M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY
Microbial Ecology and Diversity (MSC23202)

Day & Date: Tuesday, 19-12-2023
 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) A Rewrite the following sentences by selecting correct answer from the given alternatives. 08

- 1) The organisms degrading pesticides are called _____ bacteria.

a) Acidophilic	b) Xerophilic
c) Xenobiotic	d) Endolithic
- 2) Biodiversity with high number of species is called as _____.

a) species poorness	b) species highness
c) species richness	d) species maximum
- 3) Rhodomicrobium is an example of _____.

a) Green sulphur bacteria	b) Purple non sulphur bacteria
c) Cyanobacteria	d) Green non sulphur bacteria
- 4) *Sulfolobus acidocaldarius* is an example of _____.

a) alkaliphile	b) halophile
c) acidophile	d) barophile
- 5) The functional and sequence-based analysis of the collective microbial genomes from an environmental sample is called as _____.

a) Genomics	b) Proteomics
c) Metagenomics	d) Genome
- 6) The ecological niche of an organism is its _____.

a) Foraging area	b) Territory
c) Habitat	d) Way of life
- 7) In Lichen, the fungal partner is called as _____.

a) Phycobiont	b) Photosymbiont
c) Mycobiont	d) All of above
- 8) _____ is the causative agent of Mad cow disease.

a) Rickettsia	b) Chlamydia
c) Prion	d) Archaeobacteria
- 9) _____ is the most stable ecosystem.

a) Mountain	b) Forest
c) Desert	d) Ocean
- 10) The ability of microorganisms to communicate and co-ordinate by the use of chemical signal molecules is called _____.

a) Quorum sensing	b) Phototaxis
c) Chemotaxis	d) Communication

B) Fill in the blanks OR Write true/false. 06

- 1) 'Bioluminescence is an example of beneficial association'.
state true/false
- 2) Taq polymerase enzyme used in PCR is produced by *Thermus aquaticus*.
state true/false
- 3) _____ diversity refers to the variety of species with in a region.
- 4) The community in equilibrium with environment is called _____ community.
- 5) *Pseudomonas putida* is not used for bioremediation. state true/false
- 6) Magnetosomes are responsible for _____.

Q.2 Answer the following 16

- a) Describe Acidophiles with examples.
- b) Oxygenic photosynthetic microbes- General characteristics of Cyanobacteria.
- c) Explain levels and types of microbial diversity.
- d) Write a note on 'Microorganisms in prospecting of oil'.

Q.3 Answer the following 16

- a) Explain Methanogenic Archaeobacteria.
- b) Anoxygenic photosynthetic microbes-General characteristic of purple and green sulphur bacteria.

Q.4 Answer the following 16

- a) Give an account of microbes in toxic environment.
- b) Give an account of N₂ fixing bacteria

Q.5 Answer the following 16

- a) Define extremophiles and describe in detail thermophiles and osmophiles with examples.
- b) Explain with examples beneficial microbial interactions.

Q.6 Answer the following 16

- a) Give an account of molecular based culture dependent methods for assessing microbial diversity
- b) Describe concept of biodeterioration. Explain biodeterioration of various materials.

16

Q.7 Answer the following

- a) Describe bioluminescent bacteria
- b) What is culture independent methods? Explain Metagenomics.

Seat No.	
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**M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Microbial Physiology and Metabolism (MSC23206)

Day & Date: Wednesday, 20-12-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Question 1 and 2 are compulsory.
2) Attempt any Three from Q.3 to Q.7
3) Figures to the right indicate full marks.

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

- 1) Osmosis is a flow of solvent from region of _____ solute concentration.
 - a) Low to high
 - b) Low to low
 - c) High to high
 - d) High to low
- 2) _____ is not aromatic aminoacid.
 - a) Tyrosine
 - b) Leucine
 - c) Phenyl alanine
 - d) Tryptophan
- 3) _____ postulated the chemiosmotic hypothesis of ATP formation.
 - a) Michelis-Menten
 - b) Krebs
 - c) Peter Mitchell
 - d) Carls Lewin
- 4) TCA cycle is inhibited by _____ hormone.
 - a) Insulin
 - b) Glucagon
 - c) Thyroxin
 - d) Gibberellin
- 5) _____ transport is energy independent.
 - a) Primary active
 - b) Secondary active
 - c) Active
 - d) Passive
- 6) Conformational change in protein induced by _____.
 - a) Facilitated diffusion
 - b) Uniport
 - c) Antiport
 - d) Symport
- 7) The drug biotransformation is _____ process.
 - a) Diffusion
 - b) Osmosis
 - c) Detoxification
 - d) Toxicification
- 8) Like green plants _____ carry out on oxygenic photosynthesis.
 - a) Clostridia
 - b) Bacillus
 - c) E. coli
 - d) Cyanobacteria
- 9) _____ vitamin is necessary for TCA cycle.
 - a) Biotin
 - b) Thiamine
 - c) Vit E
 - d) Folic acid
- 10) Oxidative phosphorylation results in the formation of _____.
 - a) ATP + H₂O
 - b) ADP
 - c) GTP
 - d) NADH

B) True or false.**06**

- 1) Carrier proteins take part in active transport of ions.
- 2) The term osmosis was given by Nolloth.
- 3) Methionine is nonessential amino acid.
- 4) Acetone is required for conversion of Acetyl COA to Malonyl COA
- 5) Eight ATP molecules are generated after complete oxidation of Glucose molecule.
- 6) Beta oxidation is major mechanism of fatty acid oxidation.

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

- a) Simple Diffusion
- b) Structure of Mitochondria
- c) Theories of ATP formation
- d) Aromatics Hydrocarbons

Q.3 Answer the following**16**

- a) Describe in detail Active transport.
- b) Comment on Oxygen toxicity.

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

- a) Give the microbial hormones and their significance.
- b) Describe in detail oxidative phosphorylation.

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

- a) Describe in detail biosynthesis of amino acids.
- b) Describe in detail drug metabolism.

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

- a) Describe in detail citric acid cycle.
- b) Describe different permeation systems in E. coli.

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

- a) Describe in brief biosynthesis of purines and pyrimidines.
- b) Describe in brief oxidation of Aromatic hydrocarbons.

Seat No.	
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M.Sc. (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY
Medical Microbiology (MSC23207)

Day & Date: Wednesday, 20-12-2023
 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) _____ is an important antiphagocytic factor for some bacteria.
 - a) Cell wall
 - b) Flagella
 - c) Pilli
 - d) Capsule
- 2) Which toxin is powerful neurotoxin found in contaminated food?
 - a) Diphtheria toxin
 - b) Botulinum toxin
 - c) Tetanus toxin
 - d) Cholera toxin
- 3) _____ is the study of the determinants, occurrence, and distribution of health and disease in a defined population.
 - a) Epidemiology
 - b) Immunology
 - c) Toxicology
 - d) Biostatistics
- 4) Peptic ulcer is caused by _____.
 - a) *Staphylococcus aureus*
 - b) *Salmonella typhi*
 - c) *Pseudomonas aeruginosa*
 - d) *Helicobacter pylori*
- 5) Who is responsible for Lymphatic filariasis or elephantiasis infections which is one of the major vector-borne diseases in sub-Saharan Africa?
 - a) *Taenia saginata*
 - b) *Ecchinococcus granulosus*
 - c) *Ascaris lumbricoides*
 - d) *Wucheraria bancrofti*
- 6) _____ is the most common serious viral liver infection spread through blood, semen, or other body fluids.
 - a) Herpes
 - b) Hepatitis B
 - c) Japanese encephalitis
 - d) Dengue fever
- 7) Trichophyton, Microsporum and Epidermophyton species produce _____ disease.
 - a) Osteomyelitis
 - b) Periodontal
 - c) Pharyngitis
 - d) Skin and nail infections such as athlete's foot and ringworm
- 8) The analytical profile index or API is a classification based on biochemical tests, allowing fast identification of _____.
 - a) Chemical molecules
 - b) Microorganisms
 - c) Physical matter
 - d) Radiations
- 9) In which technique, radioactive antigen ("tracer") competes with a non-radioactive antigen for a fixed number of antibody or receptor binding sites.
 - a) ELISA
 - b) RIA
 - c) FAT
 - d) Western blot

- 10) _____ is antiviral drug.
- | | |
|-----------------|------------------|
| a) Oseltamivir | b) Penicillin |
| c) Tetracycline | d) Ciprofloxacin |

B) Fill in the blanks OR write true/false.

06

- 1) What is the chemical nature of endotoxins?

a) protein	b) polysaccharide
c) lipopolysaccharide	d) lipid
- 2) _____ is a viral infection that causes blisters on the genital and oral sores.

a) Herpes	b) Hepatitis
c) Japanese encephalitis	d) Dengue fever
- 3) In which technique the fluorescent dye can be tagged directly with primary antibody and used to detect viruses in sample?

a) ELISA	b) Widal
c) FAT	d) Complement fixation
- 4) Gama Glutamyl Transferase (GGT) level increases in _____.

a) pancreatic disorders	b) bone problem
c) Alcoholic hepatitis	d) diabetes
- 5) Protein synthesis inhibitor is _____.

a) Penicillin	b) Polymyxin
c) Tetracycline	d) ciprofloxacin
- 6) What is used to measure the frequency of occurrence of new instances of infection within a population during a specific time period?

a) Infection rate	b) Incubation time
c) Death rate	d) Infecting dose

Q.2 Answer the following.

16

- a) Write on Entry, establishment, spread of microorganism in body, tissue damage and antiphagocytic factors, mechanism of bacterial adhesion; colonization and invasion of mucous membranes.
- b) Describe Dental Caries and periodontal diseases and their infectious nature.
- c) Explain on Pathogenic fungi with examples.
- d) What are different techniques of Collection, transportation and preliminary processing of clinical specimens.

Q.3 Answer the following.

- a) Explain characteristics and mode of action of Diphtheria, Cholera, *Vibrio parahaemolyticus*, endotoxins of gram-negative bacteria. **08**
- b) Write on Hepatitis B infection with respect to structure, antigenic characters, pathogenesis, transmission, laboratory diagnosis, prevention and control. **08**

Q.4 Answer the following.

- a) Write on epidemiological methods - descriptive, analytical and experimental epidemiology and measurement of infection rate. **08**
- b) Write on *Leptospira icterohaemorrhagiae* infection with respect to structure, life cycle, pathogenesis, transmission, laboratory diagnosis, prevention and control. **08**

Q.5 Answer the following.

- a) Describe structural dimorphism and pathogenesis of fungi, role of extracellular products in fungal infections. **08**
- b) Write on Rapid methods of identification of pathogenic microorganisms - API and ELISA. **08**

Q.6 Answer the following.

- a) Describe Enzymes in medical diagnosis and therapy. **08**
- b) Write on RIA and Western Blot techniques. **08**

Q.7 Answer the following.

- a) Explain different chemotherapeutic agents for Bacteria, fungi, viruses and protozoa. **08**
- b) Explain Animal Tissue Culture - types, formulations of media, methodology and Applications. **08**

Seat No.	
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M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY

Molecular Biology and Genetic Engineering (MSC023301)

Day & Date: Friday, 05-01-2024

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) RNA is copied into complementary DNA (cDNA) by: _____.
a) Taq DNA polymerase b) RNA polymerase II
c) Reverse transcriptase d) Uracil-N-Glycosylase
- 2) DNA sequencing refers to the _____.
a) Technique used to determine the sugar sequence in a DNA Molecule
b) Technique used to determine the phosphate sequence in a DNA molecule
c) Technique used to determine the base sequence in a DNA molecule
d) All of these
- 3) Which of the following is a chemical nucleotide sequencing method?
a) Sanger method b) Maxam-Gilbert method
c) Edman's method d) Automated sequencing method
- 4) Which of the following statements is accurate for the PCR - polymerase chain reaction?
a) Automated PCR machines are called thermal cyders
b) A thermostable DNA polymerase is required
c) Millions to billions of desired DNA copies can be produced from microgram quantities of DNA
d) All of the above
- 5) What is the difference between a deoxyribonucleotide and a dideoxynucleotide?
a) A deoxynucleotide is missing a 3'-hydroxyl group on its sugar.
b) A dideoxynucleotide is missing a 3'- hydroxyl group on its sugar.
c) A dideoxynucleotide is missing a 5'-phosphate group.
d) A deoxynucleotide is missing a 5'-phosphate group.
- 6) Which technique was used to determine the double-helical structure of DNA?
a) electrophoresis b) chromatography
c) centrifugation d) X-ray crystallography
- 7) Microsatellite sequence is: _____.
a) Small satellite
b) Extrachromosomal DNA
c) Short sequence (2-5) repeats DNA
d) Looped-DNA

- 8) The construction of recombinant DNA involves _____.
 - a) cleaving DNA segments with ligase and rejoining them with endonuclease
 - b) cleaving and rejoining DNA segments with ligase alone
 - c) cleaving and rejoining DNA segments with endonuclease alone
 - d) cleaving DNA segments with endonuclease and rejoining them with ligase

- 9) Which of the following is necessary to make accurate copies of vector DNA?
 - a) RNA polymerase
 - b) DNA polymerase
 - c) DNA ligase
 - d) Endonucleases

- 10) What is the name of the site where foreign DNA can be inserted in the plasmid of Agrobacterium?
 - a) t-RNA
 - b) c DNA
 - c) T-DNA
 - d) B-DNA

B) Write true or false.

06

- 1) The division of cytoplasm is known as cytokinesis
- 2) Nuclear DNA replicates in the G 2 phase.
- 3) DNA helicase is required for repairing the phosphodiester backbone of DNA during molecular cloning
- 4) Oncogenes do not encode for DNA-dependent RNA polymerase
- 5) A person with a hereditary disease can be cured with the help of gene therapy.
- 6) Bacteria protect themselves from viruses by fragmenting viral DNA with an endonuclease.

Q.2 Answer the following.

16

- a) Discuss the Microsatellite repeats
- b) Write a note on the cDNA libraries.
- c) Write a note on DNA fingerprinting
- d) Discuss Real-time PCR

Q.3 Answer the following.

16

- a) Explain Protein arrays and their applications
- b) Discuss the types of tumor

Q.4 Answer the following.

16

- a) Explain in detail the western Blotting technique
- b) Describe the Oncogenes and protooncogenes

Q.5 Answer the following.

16

- a) Discuss DNA sequencing methods
- b) Describe in detail the Human genome project.

Q.6 Answer the following.

16

- a) Describe the Screening of recombinants by Colony hybridization
- b) Discuss in detail Gene therapy.

Q.7 Answer the following.

16

- a) Describe the construction and applications of Genomic libraries
- b) Explain the applications of Genetic engineering in Human health and Environmental pollution control.

Seat No.	
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Set P

M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY

Bioprocess Technology and Fermentation Technology (MSC023302)

Day & Date: Sunday, 07-01-2024

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) _____ is the recovery and purification of biochemical products which includes cell separation, filtration, product recovery, and, extraction of products.
 - a) Upstream Processing
 - b) Extraction processing
 - c) Downstream Processing
 - d) None of the above
- 2) Differential centrifugation relies on the differences in the _____ of biological particles of different sizes and densities.
 - a) density
 - b) Sedimentation rate
 - c) Size
 - d) Mass
- 3) Which of the following is responsible for the formation of foam?
 - a) Natural media
 - b) Synthetic media
 - c) Complex media
 - d) Defined media
- 4) Which of the following operation is not a solid-liquid separation process?
 - a) Filtration
 - b) Centrifugation
 - c) Flocculation
 - d) Adsorption
- 5) Soy meal, peptone, and tryptone are used as the source of:
 - a) Carbon source
 - b) Carbon and nitrogen source
 - c) Nitrogen source
 - d) Mineral source
- 6) Which one of these is correct about carcinogenic testing?
 - a) Testing substances can cause cell lysis
 - b) Testing substances can cause mutations as well as cancer in the animals
 - c) Testing substances can cause swelling to cells
 - d) None of the above
- 7) An open system in which the growth rate is maintained by the removal and addition of media at such a rate as to maintain a constant cell density is called a _____.
 - a) Manostat
 - b) Chemostat
 - c) Turbidostat
 - d) Culturostat

- 8) In the industrial production of streptomycin, the secondary metabolite or by-product is _____
- a) Vitamin -B 12 b) Vitamin-C
c) Vitamin -B6 d) Ethanol
- 9) What protects the intellectual property created by inventors?
- a) Copyright b) Geographical indications
c) Patents d) Registered designs
- 10) 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

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

- 1) Effluent treatment operation does not come under upstream processing.
- 2) Whisky is distilled from the fermented product of grains.
- 3) Sparger in stirred tank bioreactor helps in Proper gas distribution.
- 4) Chromatography is used to separate Complex mixture compounds.
- 5) Anaerobic respiration by yeast produces only CO₂.
- 6) Low dissolved oxygen concentrations lead to high biomass yields.

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

- a) Discuss the Sterilization of fermentation media
- b) Write a note on the GM foods
- c) Write a note on the whole broth processing
- d) Discuss Fermentation economics.

Q.3 Answer the following.

- a) Describe the use of biosensors for maintaining environmental parameters e.g., pressure, and pH. **08**
- b) What is fermentation media? and discuss the screening of media. **08**

Q.4 Answer the following.

- a) Explain the Product recovery and purification by Chromatography. **08**
- b) Describe the industrial production of Vitamin B12. **08**

Q.5 Answer the following.

- a) Explain the scale-up of the fermentation process. **08**
- b) Describe the production of Xanthan gum and dextran. **08**

Q.6 Answer the following.

- a) Describe the concept of Bioethics. **08**
- b) Describe the quality control test of the product by carcinogenicity testing. **08**

Q.7 Answer the following.

- a) What are the metabolites? and differentiate between the primary and secondary metabolites **08**
- b) Describe the concept of stock culture maintenance. **08**

Seat No.	
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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Immunology and Immunotechnology (MSC023306)

Day & Date: Tuesday, 09-01-2024
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) 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.
- 2) T-lymphocytes mature in _____.
 - a) thymus
 - b) bone marrow
 - c) spleen
 - d) lymph node
- 3) Tumor immune surveillance may be mediated by _____.
 - a) mast cells
 - b) neutrophils
 - c) Langerhans cells
 - d) NK cells
- 4) An oncogene is a gene that is associated with _____.
 - a) apoptosis
 - b) cancer
 - c) TCR and BCR signal transduction.
 - d) viruses
- 5) The unencapsulated lymphoid tissues is _____.
 - a) Thymus
 - b) Lymph node
 - c) Spleen
 - d) MALT
- 6) Most important cells involved in the destruction of virus-infected cells are _____.
 - a) B cells
 - b) macrophages
 - c) Cytotoxic T cells
 - d) T_H cell
- 7) Components of innate immunity are _____.
 - a) T cells
 - b) Complement proteins
 - c) B cells
 - d) immunoglobulins
- 8) The gene segments needed to encode the variable region of a k chain are _____.
 - a) one Jk plus one Dk
 - b) one Jk plus one Ck
 - c) one Vk plus one Dk
 - d) one Vk plus one Jk
- 9) The antibody heavy and light chains are connected through _____ bridges.
 - a) sugar chain
 - b) phospholipid
 - c) disulfide
 - d) amino acid

- 10) The human MHC is known as _____.
a) H2
b) HLA
c) Ia
d) Diversity gene

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

- 1) Vaccination is _____ immunity.
- 2) In agglutination reactions, the antigen is a _____.
- 3) During humoral immune response B cells differentiate into _____ cells.
- 4) All T lymphocytes have _____ as specific marker on its cell membrane.
- 5) Class I molecule is composed of _____ polypeptides.
- 6) In human, the genes that encode for the heavy chain of Ig is present on chromosome number _____.

Q.2 Answer the following **16**

- a) Write a note on spleen.
- b) Immunoglobulin G.
- c) TCR
- d) Multiple myeloma

Q.3 Answer the following **10**

- a) Discuss on "immune response to viral diseases" **10**
- b) Autoimmune hemolytic anemia. **06**

Q.4 Answer the following **08**

- a) Primary immunodeficiency disorders **08**
- b) Graft rejection. **08**

Q.5 Answer the following **08**

- a) Immunoglobulin gene structure **08**
- b) Secondary immunodeficiency disorders **08**

Q.6 Answer the following **08**

- a) MHC class II molecules **08**
- b) Immune response to in bacterial diseases **08**

Q.7 Answer the following **08**

- a) Recombinant vaccines **08**
- b) immunoelectrophoresis **08**

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M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY
Pharmaceutical Microbiology (MSC023401)

Day & Date: Monday, 18-12-2023
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question 1 and 2 are compulsory.
 2) Attempt any three questions from question number 3 to question number 7.
 3) Figures to right indicates full marks

Q.1 A) Choose correct alternatives. 10

- 1) _____ antibiotic inhibit the growth of bacteria by blocking the binding of aminoacyl t-RNA to the A site of ribosome and halt protein synthesis
 - a) Penicillin
 - b) Tetracycline
 - c) Quinolones
 - d) Vancomycin
- 2) The _____ is a peptide antibiotic which inhibit the growth of bacteria by binding to lipid A of cytoplasmic membrane and disrupts membrane integrity.
 - a) Imidazole
 - b) Penicillin
 - c) Sulphonamides
 - d) polymyxin E
- 3) Resistance developed against aminoglycoside antibiotic is due to _____ mechanisms.
 - a) Production of β - lactamases
 - b) Structural modification of drug by enzymes
 - c) Increased influx
 - d) Decreased efflux
- 4) _____ enzyme used in the liquefying blood clots or pus in the chest cavity during the treatment of thromboembolic disorder.
 - a) β - lactamases
 - b) L- asparaginase
 - c) Streptodornase
 - d) Penicillinase
- 5) _____ used as biological indicator for moist heat sterilization process.
 - a) *B. stercophilus*
 - b) *B. subtilis*
 - c) *Cl. Perfringes*
 - d) *Cl. acetobutylicum*
- 6) Heat sensitive injections and ophthalmic preparation, air and other gases for the supply of aseptic areas is carried out by _____.
 - a) Ethylene oxide
 - b) Moist heat
 - c) Dry heat
 - d) Membrane filter
- 7) _____ virus used as vector that possess reverse transcriptase enzyme and introduce double stranded DNA into host chromosomes.
 - a) Catheter
 - b) Liposomes
 - c) Adenovirus
 - d) Retrovirus
- 8) _____ used as antimicrobial agent in the various ophthalmic products.
 - a) Polyhexamethylene biguanides
 - b) Chlorine
 - c) Formaldehyde
 - d) Phenol

- 9) _____ is a subunit vaccine consisting solely of surface protein which can elicit immune response without risk of infection.
- a) HBsAg b) Sabin
c) Salk d) MMR
- 10) Immobilized _____ as enzyme electrode used in the diagnosis of blood glucose analysis in clinical medicine.
- a) Hexokinase b) glucose oxidase
c) Amylases d) Oxygenase

B) Write True or False.

06

- Amphotericin B and nystatin is member of polyene antifungal antibiotics which inhibits cell membrane synthesis.
- Sulphonamides are the structural analogues of para-amino benzoic acid.
- Bacitracin is a polypeptide antibiotic which shows antiviral activity against both DNA and RNA virus.
- Fluoroquinolones inhibit the growth of bacteria by inhibiting DNA ligase enzyme and interferes in DNA replication.
- Neuraminidase is used in the removal of sialic acid residues from the outer surface of tumor cell and increase the immunogenicity.
- Ultra violet is a ionizing electromagnetic radiation which inhibit the growth of microorganism by damaging DNA and producing free radicals.

Q.2 Answer the following.

16

- Describe in detail mechanism of action of tetracycline.
- Write in short about the contamination of ophthalmic preparations such as eye drops and implants.
- Describe in detail application of microbial and immobilized enzyme in the pharmaceutical.
- Define subunit vaccine. Explain in brief new vaccine technology used for vaccine production.

Q.3 Answer the following.

- Describe in detail Mechanism of drug resistance in bacteria.
- What is an antifungal antibiotic? Discuss in detail mechanism of action of antifungal antibiotics.

08

08

Q.4 Answer the following.

- Write note on biosensors and enlist their applications in pharmaceutical industry.
- Write in short about mode of action and mechanism of resistance of sulphonamides antibiotic.

08

08

Q.5 Answer the following.

- Define aminoglycoside antibiotic. Describe in detail mode of action of antibiotic inhibiting protein synthesis.
- Define microbial spoilage. Discuss in detail types of microbial spoilage.

08

08

Q.6 Answer the following.

- Write in detail about mechanism of action of non antibiotic agent such as heavy metals, halogens and surface active agents.
- Describe in detail molecular principle of drug targeting

08

08

Q.7 Answer the following.

- a)** Describe in detail the fermentative production of streptodornase. Add a note on its application. **08**
- b)** Describe in detail good laboratory practices and quality control in the pharmaceuticals. **08**

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M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY

Food and Dairy Microbiology (MSC023402)

Day & Date: Tuesday, 19-12-2023
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 undesirable change in a food that makes it unsafe for human consumption is referred as _____.
 - a) Food decay
 - b) Food Spoilage
 - c) Food Loss
 - d) All of the above
- 2) Food preservation involves _____.
 - a) Increasing shelf life of food
 - b) Ensuring safety for human consumption
 - c) Increasing microbial growth
 - d) both a and b
- 3) Bacterial soft rot is caused by _____.
 - a) *Erwinia carotovora*
 - b) *Pseudomonas marginalisc*
 - c) Both a and b
 - d) Botrytis allii
- 4) In spoilage of fresh beef, whiskers are produced by _____.
 - a) Thamnidium
 - b) Mucor
 - c) Rhizopus
 - d) All of the above
- 5) The ratio of vapour pressure of solution to vapour pressure of solvent is called as _____.
 - a) Water pressure
 - b) Water activity
 - c) Available water
 - d) both b and c
- 6) _____ is natural inhibitory substance present in egg white.
 - a) Lactenins
 - b) Lysozyme
 - c) Benzoic acid
 - d) Albumin
- 7) Swelling of the can is caused primarily by _____.
 - a) Gas forming, anaerobic spore formers
 - b) Gas forming aerobic spore formers
 - c) Both a and b
 - d) None of these
- 8) The blue colour in milk is developed due to growth of _____.
 - a) *Pseudomonas synxantha*
 - b) *Pseudomonas syncanea*
 - c) *Streptococcus lactis*
 - d) *Flavobacterium sp.*
- 9) _____ is called as father of canning.
 - a) Louis Pasteur
 - b) John Tyndall
 - c) Nicolas Appert
 - d) Robert Koch

- 10) _____ is responsible for primary ripening of blue cheese.
- a) *Streptococcus lactis* b) *Streptococcus cremoris*
c) *Penicillium roqueforti* d) *Penicillium notatum*

B) Fill in the blanks**06**

- 1) For Idli Manufacturing _____ and _____ are used as raw material.
- 2) FSSAI stands for _____.
- 3) Rennet contains _____ and _____ two principal enzymes.
- 4) Oxidation-Reduction potential of a system is expressed by the symbol _____.
- 5) A type of spoilage in which anaerobic decomposition of protein leads to formation of off odour and formation of hydrogen sulphide. Mercaptans _____ etc. is called as _____
- 6) _____ starter culture is used for yogurt manufacturing.

Q.2 Answer the following**16**

- a) Write in short about microbial flavours used in food and dairy industry.
- b) Enlist the general principles underlying preservation of milk and write in short about pasteurisation.
- c) Write note on prevention and control of milk borne diseases
- d) Write in short about microbiology and manufacturing technology of curd.

Q.3 Answer the following**16**

- a) Define platform test and describe in detail about various platform tests used in dairy industry.
- b) Describe in detail about microbiology and production technology for Jilebi and Idli manufacturing.

Q.4 Answer the following**16**

- a) Describe in detail about role and importance of HACCP and FSSAI in food and dairy industry
- b) Describe in detail about manufacturing technology for Cheddar cheese.

Q.5 Answer the following**16**

- a) Describe in detail about food as substrate for microorganisms.
- b) Define milk and Describe in detail about various sources of contamination of milk.

Q.6 Answer the following**16**

- a) Write in detail about spoilage of meat and meat products.
- b) Write in detail about composition and nutritive value of milk.

Q.7 Answer the following**16**

- a) Enlist the various methods of food preservation and describe in detail about salting, canning and radiation.
- b) Describe in detail about the production technology and defects of yogurt.

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No.**M.Sc. (Semester-IV) (New) (CBCS) Examination: Oct/Nov-2023**
MICROBIOLOGY**Principles of Bioinstrumentation and Techniques (MSC023403)**Day & Date: Wednesday, 20-12-2023
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) The concept of pH was discovered by _____.
a) Wilson b) Jansen
c) Sorensen d) Henderson- Hasselbalch
- 2) The ability of a buffer solution to resist a change in pH on the addition of strong acid or alkali is expressed by its _____.
a) Buffer capacity
b) Concentration of H⁺ ions
c) Concentration of OH⁻ ions
d) Buffer
- 3) The pH electrode is an example of _____.
a) Oxygen electrode b) Optical electrode
c) Ion selective electrode d) none of these
- 4) In thin layer chromatography, the stationary phase is made of _____ and the mobile phase made of _____.
a) Liquid, Liquid b) Solid, Liquid
c) Liquid, Gas d) Solid, Gas
- 5) _____ technique is also known as colour writing.
a) NMR b) Mass spectroscopy
c) Chromatography d) Electrophoresis
- 6) _____ are the detectors commonly used in High Performance Liquid Chromatography.
a) Variable wavelength b) Fluorescence
c) Electrochemical d) All of the above
- 7) In centrifugation frictional coefficient depends on the _____ of the biological particle.
a) Size b) Shape
c) Speed of rotation d) All of the above
- 8) In density gradient centrifugation _____ material is commonly used for gradient preparation.
a) Caesium chloride b) Sodium bromide
c) Percoll d) All of the above

- 9) Agarose is a linear polysaccharide made up from basic repeating units of _____.
a) Galactose and 3,6 anhydrogalactose
b) Agarobiose
c) Galactose and Carboxy methyl cellulose
d) Both a and b
- 10) _____ type of microscope used for viewing unstained cells or tissue preparation.
a) Bright field
b) Phase contrast
c) Fluorescence
d) Compound microscope

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

- 1) Chromatography cannot be used to purify volatile substances. (True / False)
- 2) NMR spectroscopy with ^{13}C , ^{15}N , and ^{31}P isotopes is frequently used in biochemical studies. (True / False)
- 3) Fluorescence intensity emitted by a molecule is dependent on the lifetime of the excited state of that particular molecule (True / False)
- 4) _____ developed the first analytical centrifuge in late 1920.
- 5) In PAGE polymerisation of acrylamide is initiated by the addition of _____ and _____.
- 6) The process in which separated proteins are transferred from gel to nitrocellulose paper is called as _____.

Q.2 Answer the following 16

- a) Write in brief about the principle of phase contrast and light microscope.
- b) Write in short about the principle and application of ultracentrifugation.
- c) Write note on native gel electrophoresis and its applications.
- d) Define southern blotting and write in short about its principle.

Q.3 Answer the following.

- a) Describe in detail about the principle, working and applications of fluorescence spectroscopy. 08
- b) Define chromatography and describe in detail about the principle, working and applications of the affinity chromatography. 08

Q.4 Answer the following.

- a) Define electrophoresis and describe in detail about the principle, working and applications of the agarose gel electrophoresis. 08
- b) Write in short about various components of electron microscope and describe in detail about the scanning electron microscope and transmission electron microscope. 08

Q.5 Answer the following.

- a) Describe in detail about the principle, working and applications of the atomic absorption spectroscopy. 08
- b) Define centrifugation and describe in detail about the principle, working and applications of the density gradient centrifugation. 08

Q.6 Answer the following.

- a) Write in detail about the principle, working and applications of the gel filtration chromatography. 08
- b) Describe in detail about principle, working and applications of the western blotting. 08

Q.7 Answer the following.

- a)** What is NMR and describe in detail about the principle, working and applications of the NMR spectroscopy. **08**
- b)** Describe in detail about the principle, working and applications of the High Performance - Liquid Chromatography. **08**

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**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY**

Health care and Diagnostic Microbiology (MSC023409)

Day & Date: Thursday, 21-12-2023
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) Rewrite the following sentences by selecting correct answers from given alternatives. 10

- 1) _____ test is used for identification of S.aureus.
 - a) Amylase
 - b) Protease
 - c) Gelatinase
 - d) Coagulase
- 2) _____ infections are transferred from mother to infants.
 - a) Perinatal
 - b) Original
 - c) Nosocomial
 - d) Secondary
- 3) _____ contains largest microbial population.
 - a) Mouth
 - b) Small intestine
 - c) Oesophagus
 - d) Stomach
- 4) Period between entry of pathogen and appearance of symptoms of disease is called _____.
 - a) Period of illness
 - b) Period of recovery
 - c) Incubation period
 - d) Latent period
- 5) Histoplasmosis is _____ infection.
 - a) Lung
 - b) Tongue
 - c) Heart
 - d) Brain
- 6) Peptic ulcer is caused by _____.
 - a) Plasmodium
 - b) H.pylori
 - c) E.histolytica
 - d) N.gonorrhoeae
- 7) The _____ of an infectious agent is the habitat in which the pathogen normally lives, grows and multiplies.
 - a) Spread
 - b) Control
 - c) Reservoir
 - d) Eradication
- 8) Mantoux test is used for diagnosis of _____.
 - a) Malaria
 - b) COVID-19
 - c) Peptic ulcer
 - d) Tuberculosis
- 9) Malignant pustule is term for _____.
 - a) Anthrax ulcer
 - b) Leprosy
 - c) Peptic ulcer
 - d) Malarial parasites
- 10) Metachromatic granules are seen in _____.
 - a) WBC
 - b) Cory.diphtheriae
 - c) V.cholerae
 - d) B.anthraxis

- B) Write True or False.** **06**
- 1) Gonorrhoea is not sexually transmitting disease.
 - 2) Malaria is bacterial infection.
 - 3) Wuchereria bancrofti is filarial nematode.
 - 4) S.aureus produces cytolytic toxin.
 - 5) Epidemic typhus is louse-borne typhus.
 - 6) Immunodiagnosis is not based on antigen antibody reaction.
- Q.2 Write short notes on.** **16**
- a) Pathogenesis in Legionellosis
 - b) Treatment for Mucormycosis.
 - c) Clinical manifestations in SARS
 - d) Bacterial toxins
- Q.3 Answer the following.**
- a) Describe in detail Skin infections caused by Pseudomonas. **08**
 - b) Discuss in detail Histoplasmosis. **08**
- Q.4 Answer the following.**
- a) Write on Recent diagnostic methods for bacterial infections. **08**
 - b) Describe in detail diseases caused by Nematodes. **08**
- Q.5 Answer the following.**
- a) Discuss in detail Polio. **08**
 - b) Describe in detail various factors involved in development of infection. **08**
- Q.6 Answer the following.**
- a) Give the recent advances in diagnosis of protozoal infections. **08**
 - b) Describe in detail Epidemic and endemic typhus fever. **08**
- Q.7 Answer the following.**
- a) Discuss in detail living and non-living reservoirs of infections. **08**
 - b) Write an essay on Meningitis. **08**

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M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2023
MICROBIOLOGY

Recombinant DNA Technology (MSC023410)

Day & Date: Thursday, 21-12-2023
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 from the options. 10

- 1) The unpaired nucleotides produced by the action of restriction enzyme are referred to have _____.
 - a) Sticky ends
 - b) Single strand
 - c) Restriction fragments
 - d) Ligase joints
- 2) The first human hormone produced by rDNA technology is _____.
 - a) Thyroxine
 - b) Auxin
 - c) Oestrogen
 - d) Insulin
- 3) Genomic Library can be prepared by _____.
 - a) PCR technique
 - b) Shotgun experiment
 - c) Colony hybridization
 - d) Electrophoresis
- 4) The sites of DNA where restriction enzymes acts are generally _____.
 - a) Tandem repeats
 - b) CG rich region
 - c) Palindromic
 - d) AT rich region
- 5) A method used to insert DNA molecules into the cell by using short electrical impulses is known as _____.
 - a) Electroporation
 - b) Electrophoresis
 - c) Electroplating
 - d) Electroplanting
- 6) The technique of DNA fingerprinting involves _____.
 - a) ELISA
 - b) Southern Blotting
 - c) PAGE
 - d) Northern Blotting
- 7) _____ Enzyme is used in PCR technology.
 - a) RNA polymerase
 - b) DN A gyrase
 - c) Taq polymerase
 - d) Helicase
- 8) _____ discovered rDNA technology.
 - a) Hershey and Chase
 - b) Watson and Crick
 - c) Avery and MacLeod
 - d) S. Cohen & H. Boyer
- 9) The DNA molecule to which the gene of insert is integrated for cloning is called _____.
 - a) Vector
 - b) Clone
 - c) Carrier
 - d) Transformer
- 10) _____ developed PCR technique.
 - a) Sanger
 - b) Kary Mullis
 - c) Boyer
 - d) Cohen

- B) Give True or False.** **06**
- 1) Restriction Endonuclease is DNA fragment joining enzyme.
 - 2) Viruses are not used as vectors in rDNA technology.
 - 3) E.coli is generally used as cloning organism.
 - 4) rDNA technology is not used for production of vaccines.
 - 5) Ethidium bromide is used as visualising agent in Electrophoresis.
 - 6) Microarray system is also known as DNA chip.
- Q.2 Write short notes on.** **16**
- a) Genetically modified organisms.
 - b) Chromosome microdissection and micro cloning.
 - c) Restriction Endonucleases.
 - d) Fluorescence Activated cell sorter.
- Attempt any Three of the following.**
- Q.3** **08**
- a) What is electrophoresis? Discuss in detail PAGE.
 - b) Discuss in detail identification of clones containing recombinant vectors. **08**
- Q.4** **08**
- a) Write in detail on DNA sequencing.
 - b) Describe various common steps in core genetic engineering technique. **08**
- Q.5** **08**
- a) Write in detail on Western blotting and its applications.
 - b) Describe in detail plasmid vectors. **08**
- Q.6** **08**
- a) Write in detail principle, method advantages and applications PCR technique.
 - b) Describe in detail applications of rDNA technology in medical field. **08**
- Q.7** **08**
- a) Write an essay on Shuttle vectors.
 - b) Describe in detail process for isolation of gene of desired interest. **08**