

(6 pages)

Reg. No. :

Code No. : 6265

Sub. Code : PMBM 41

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Fourth Semester

Microbiology – core

FOOD MICROBIOLOGY

(For those who joined in July 2017 – 2022)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. What are the intrinsic factors for the microbial growth?
 - (a) pH
 - (b) oxidation-reduction potential
 - (c) moisture
 - (d) all of these

2. Water activity can act as
(a) intrinsic factor (b) extrinsic factor
(c) processing factor (d) all of these
3. Spreading pathogens from one surface to another is called _____.
(a) Cross contamination
(b) Sulphuring
(c) Food preservation
(d) Autoclaving
4. An example of physical contaminant is _____.
(a) pesticides (b) glass
(c) solvents (d) paints
5. A harmful parasite found in raw fish is _____.
(a) *Anisakis* (b) *Listeria*
(c) *Brucella* (d) none of these
6. _____ is a food borne bacterial pathogen causing gastrointestinal illness.
(a) *Bacillus cereus*
(b) *Aspergillus* sp.
(c) *Fusarium* sp.
(d) *Alternata* sp.

7. The danger zone range of temperature in food handling is _____.
- (a) 80-120°F (b) 50-100°F
(c) 40-140°F (d) none of these
8. The preservation of food by rapid freezing followed by dehydration under vacuum is _____.
- (a) Lyophilisation
(b) Cold dehydration
(c) Cryopreservation
(d) Sterilization
9. For which of the following FDA is not at all responsible?
- (a) Foods
(b) Radiation-emitting devices
(c) Cosmetics
(d) Vehicles
10. What do the Paediatric Rule states?
- (a) No drug should be tested on children
(b) No separate drug for children
(c) Include usage of paediatric use of a product
(d) Advertise the paediatric usage

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) What is the role of fungi in food materials?

Or

- (b) Write short notes on concept and scope of food microbiology.

12. (a) Brief about milk contamination and preservation.

Or

- (b) Define preservation and write a principles of food preservation.

13. (a) Depict the significance of Salmonella in foods.

Or

- (b) Discuss about fungal toxins.

14. (a) Discuss about cheese.

Or

- (b) What is genetically engineered foods? And give a two examples.

15. (a) Write about SCP.

Or

(b) Comment on :

(i) HACCP

(ii) ISO

(iii) AGMARK.

SECTION C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Write about factors influencing microbial growth in food.

Or

(b) What are the types of bacteria in food?

17. (a) Write about cereals and vegetable products contamination, spoilage and preservation.

Or

(b) What is canning? And why are we adding food additives to food?

18. (a) Write about food borne infection and write about a three bacterial food pathogens.

Or

- (b) Document the toxic roles of Vibrio and Listeria in foods.

19. (a) Write a essay about fermented beverages.

Or

- (b) Write about bread, cheese and viniger.

20. (a) Mention any three foods produced using Microbes with their significance.

Or

- (b) Highlight the food quality regulatory agencies in India.
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Reg. No. :

Code No. : 6266

Sub. Code : PMBM 42

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Fourth Semester

Microbiology – Core

FERMENTATION AND INDUSTRIAL
MICROBIOLOGY

(For those who joined in July 2017–2020 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Screening of microorganisms include
 - (a) Done in one or few steps
 - (b) Allow discarding of many valueless microbes
 - (c) Easy detection of the small percentage of useful microorganisms
 - (d) All of the above

2. Antibiotic producing microorganisms can be detected by the method
- (a) Incorporation of CaCO_3 in the agar medium
 - (b) Crowded plate method
 - (c) Wilking agar plate
 - (d) (b) and (c)
3. Mechanical agitation is required only in _____.
- (a) Packed bed
 - (b) Airlift reactor
 - (c) Stirred tank
 - (d) Bubble column
4. In which of the following bioreactor's the particles are not immersed in liquid?
- (a) Air lift reactor
 - (b) Stirred vessel
 - (c) Packed - bed
 - (d) Trickle - bed

5. Which of the following is not a product of fermentation?
- (a) Lactate
 - (b) Oxygen
 - (c) Carbondioxide
 - (d) Ethanol
6. The exponential phase may be described by the equation.
- (a) $\frac{dx}{dt} = \mu x$
 - (b) $\frac{dt}{dx} = \mu$
 - (c) $\frac{dx}{dt} = \mu t$
 - (d) $\frac{dx^2}{dt^2} = \mu$
7. Chromatography is based on the
- (a) different rate of movement of the solute in the column
 - (b) Separation of one solute from other constituent by being captured on the adsorbent
 - (c) different rate of movement of the solvent in the column
 - (d) any of the above

8. Which of the following is an up stream process
- (a) Screening
 - (b) Sterilization of media
 - (c) Product recovery
 - (d) Inoculum preparation
9. The simplest aminoacid is
- (a) Glycine
 - (b) Alanine
 - (c) Asparagine
 - (d) Tyrosine
10. Which among the following is not polymeric
- (a) Carbohydrates
 - (b) Nucleic acid
 - (c) Proteins
 - (d) Lipids

PART B — (5 × 5= 25 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write about the Raw material used in industrial fermentation.

Or

- (b) Write about the concept of Industrial microbiology.

12. (a) Discuss about the Inoculum development.

Or

- (b) Explain microbial growth kinetics stages.

13. (a) Describe the role of computer in process control in fermentation.

Or

- (b) Discuss about fluidized bed reactor with diagram.

14. (a) Write about the different types of filtration used in down stream processing.

Or

- (b) Explain the major principle's of lyophilization.

15. (a) Explain the production of Organic acid in Industry by microorganisms.

Or

- (b) Discuss about Vitamin production using micro organisms.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Discuss about the primary and secondary screening.

Or

- (b) Write about the equipment, production media and air sterilization in industry.

17. (a) Discuss about scale up of fermentation.

Or

- (b) Write about the basic component's and functions of fermenter.

18. (a) Explain the different process control system in fermentor during fermentation.

Or

- (b) Write in detail about
(i) plug flow reactor
(ii) air driven column reactor's

19. (a) Explain in detail about different stages in down stream processing.

Or

- (b) What are the major advantages of Lyophilization for culture preservation.

20. (a) Write about principle, types and application of Immobilization.

Or

- (b) What are the steps involved in antibiotics production in industry?

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Reg. No. :

Code No. : 6267

Sub. Code : PMBM 43

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Fourth Semester

Microbiology — Core

BIOTECHNOLOGY

(For those who joined in July 2017–2020)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The DNA fragments have sticky ends due to
 - (a) Endonuclease
 - (b) Unpaired bases
 - (c) Calcium ions
 - (d) Free methylation

2. PCR technique was invented by
 - (a) Karry Mullis
 - (b) Boyer
 - (c) Sanger
 - (d) Cohn

3. Which of the following gene helps in identifying transformed cells?
(a) plasmid (b) selectable marker
(c) structural gene (d) vector
4. The DNA molecule used for integrating foreign gene for, cloning is called
(a) vector (b) carrier
(c) template (d) transformer
5. Which of the following does not affect the formation of hybrid DNA?
(a) Ionic strength (b) Pressure
(c) Temperature (d) Homologous DNA
6. Genomic library construction is concerned with _____
(a) Gene isolation (b) Protein production
(c) Antibiotics (d) Regeneration
7. The gene formed by the joining of DNA segments from two different sources are called as
(a) recombinant gene (b) joined gene
(c) both (a) and (b) (d) chimaeric gene

8. The DNA segment to be cloned is called
- (a) Gene segment (b) DNA fragment
(c) DNA insert (d) All of these
9. Which of the following gene have been introduced into the transgenic fish?
- (a) E.coli gene for B-galactosidase
(b) Human or rat gene for growth hormone
(c) Chicken gene of delta crystalline protein
(d) All of the above
10. DNA microinjection into the egg has been used to produce which of the following transgenic animals?
- (a) pigs (b) chicken
(c) mica (d) all of these

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Define ligase enzyme. and Explain the function of ligase enzyme.

Or

- (b) Explain the DNA sequencing by Maxma - Gilbert method.

12. (a) What is plasmid? Explain the properties and significance.

Or

(b) Discuss about cosmids.

13. (a) Write about the structural and functional analysis of recombinants in yeast.

Or

(b) What is immunological method? How does an immunoassay used for recombinant analysis?

14. (a) Write about Ti plasmid.

Or

(b) Explain the physical method of gene transfer in plants.

15. (a) Write about the methods of gene transfer mechanism in rDNA technology.

Or

(b) Write about transgenic goat.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Write in detail about southern blotting.

Or

- (b) Discuss in detail about types of restriction enzyme.

17. (a) Write about phage vector's used in recombinant technology.

Or

- (b) Explain the features of cloning vector and also explain derived bacterial plasmid vector's.

18. (a) How will you make the transgenic plants?

Or

- (b) Write in detail about the application of recombinant DNA technology.

19. (a) Discuss about cloning strategies in rDNA technology.

Or

- (b) Describe in detail about gene libraries.

20. (a) Explain about transgenic animals and discuss about transgenic mice.

Or

- (b) Discuss about transgenic fish.
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(6 pages)

Reg. No. :

Code No. : 6503

Sub. Code : ZMBM 11

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Microbiology – Core

GENERAL MICROBIOLOGY AND DIVERSITY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Agar-agar is obtained from Red algae used for the solidification of media was discovered by _____.
 - (a) Fenny Hesse
 - (b) Louss Pasteur
 - (c) Robert Koch
 - (d) Anton Von Leevonhock

2. Largest bacterium known presently _____.
- (a) *Thiomargarita magnifica*
 - (b) *Thiomargarita namibiensis*
 - (c) *Eupulofisum fishelsoni*
 - (d) *Sorangium cellulosum*
3. In fluorescence microscopy the samples absorbed light in particular wavelength and emits at _____.
- (a) Higher wavelength
 - (b) Lower wavelength
 - (c) Same wavelength
 - (d) None of the above
4. What is the types of the electron beam that are reflected from the sample by elastic scattering in scanning electron microscopy?
- (a) Transmitted electrons
 - (b) Secondary electrons
 - (c) Back-scattered electrons
 - (d) None
5. The radiation used for disinfecting enclosed areas such as entry ways, operation theaters and laboratories is _____.
- (a) Infra red rays
 - (b) Gamma rays
 - (c) Ultraviolet rays
 - (d) Cosmic rays

6. Sterilization by Autoclave kills the microorganisms by _____.
- (a) denaturation of protein
 - (b) coagulation of protein
 - (c) denaturation of amino acids
 - (d) denaturation of nucleic acid
7. _____ mushroom is called fool's cap.
- (a) Amanita Muscaria
 - (b) Amanita virosa
 - (c) Amanita Verna
 - (d) Amanita Phalloides
8. Fungi day is observed on _____.
- (a) October – 2
 - (b) December - 1
 - (c) November 14
 - (d) April – 1
9. Algae are abundant in places with enough _____.
- (a) CO₂ and organic matter
 - (b) Inorganic salt
 - (c) Moisture and Sunlight
 - (d) Humus

10. Chlorella, Chlamydomonas, Chlorococcum, Protosiphon and oedogonium are The most _____ algae found in soil.
- (a) Green (b) Pink
(c) Yellow (d) Brown

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe about Bergey's Manul of systemic bacteriology.

Or

- (b) Illustrate DNA homology methods used for microorganism classification.

12. (a) List the major important microscopes used in microbiology laboratory? Cite the principle and applications of Bright field microscopy.

Or

- (b) Discuss about principle and staining procedure of a fungi.

13. (a) Compare moist heat sterilization and dry heat sterilization.

Or

- (b) Explain about the principle and applications of lyophilizer?

14. (a) Differentiate mold and yeast.

Or

(b) List the general character, morphology and reproduction of a fungi.

15. (a) Illustrate general character and Thallus structure of an algae.

Or

(b) State the general characters of a protozoa.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Recommend some techniques for determining microbial taxonomy and phylogeny.

Or

(b) Analyse evolution of microorganisms and microbiology.

17. (a) Discuss in detail about phase contrast microscopy.

Or

(b) Explain the principle and procedure for Gram's staining method.

18. (a) Explain in detail about the indicator microorganisms for sterilization process.

Or

(b) Record the important enriched media used in microbiology laboratory.

19. (a) Explain the general character, morphology, nutrition and metabolism of oomycetes.

Or

(b) Describe in detail about general characters and economic importance of Lichens.

20. (a) Tell about the general character, locomotion, nutrition and reproduction of *Entamoeba histolytica*.

Or

(b) Tabulate distribution, general characters, Thallus structure of BGA.

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Reg. No. :

Code No. : 6504

Sub. Code : ZMBM 12

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Microbiology – Core

BIOCHEMISTRY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Select the sugar which is closely associated with tooth decay
 - (a) Sucrose
 - (b) Lactose
 - (c) Maltose
 - (d) Glycogen

2. Which one of the following is acting as a virulence factor in bacteria?
- (a) Heparin (b) Hyaluronic acid
(c) Maltose (d) Glycogen
3. The 3D structure of proteins can be determined by
- (a) Spectroscopy
(b) X ray crystallography
(c) Nuclear Magnetic resonance
(d) Both (b) and (c)
4. Which of the following is not the function of proteins
- (a) Digestion
(b) Genetic information carrier
(c) Immunity
(d) Transport
5. Rancidity of lipids in lipid rich foodstuff is due to
- (a) Reduction of fatty acids
(b) Hydrogenation of unsaturated fatty acids
(c) Dehydrogenation of saturated fatty acids
(d) Oxidation of fatty acids

6. Select the derived lipids from the following
- (a) Terpenes
 - (b) Steroids
 - (c) Carotenoids
 - (d) All the above
7. DNA is found in
- (a) Nucleus
 - (b) Nucleus, mitochondria and ER
 - (c) Nucleus, mitochondria and Chloroplast
 - (d) Nucleus, mitochondria and RER
8. Identify the purine base of nucleic acids in the following
- (a) Cytosine
 - (b) Thymine
 - (c) Uracil
 - (d) Adenine
9. The normal Hg level is
- (a) 12-16 g /dL for healthy women
 - (b) 14-18 g /dL for healthy men
 - (c) Both are correct
 - (d) Both are wrong

10. A CSF analysis is used to measure different substances in your cerebrospinal fluid. It may include tests to diagnose:
- (a) Infectious diseases of the brain and spinal cord, including meningitis and encephalitis. CSF tests for infection look at white blood cells, bacteria, and other substances in the cerebrospinal fluid
 - (b) Autoimmune disorders, such as Guillain-Barré syndrome and multiple sclerosis (MS). CSF test for these disorders look for high levels of certain proteins in the cerebrospinal fluid
 - (c) Alzheimer's disease, the most common form of dementia, which includes memory loss, confusion, and changes in behavior
 - (d) All the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain the properties of glucose.

Or

- (b) Describe the properties of lactose.

12. (a) Write down the functions of lipids.

Or

(b) Sketch the biological importance of glycolipids.

13. (a) Evaluate the importance of nutritional enzymes.

Or

(b) List out the functions of proteins.

14. (a) Quota the reason for the stability and negative charge of DNA.

Or

(b) What do you know about unusual bases in tRNA?

15. (a) Write an account on hemolysis.

Or

(b) Report the routine tests done in urine.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Write an essay on the classification of carbohydrates and highlight its biological importance.

Or

- (b) Discuss in detail about Mucopolysaccharides.

17. (a) How do you design fattyacid classification?

Or

- (b) Write the features of phospholipids and steroids.

18. (a) Classify proteins and measure the biological functions of proteins.

Or

- (b) Summarise the mechanism of action of enzymes.

19. (a) Explain in detail about the contributions of Watson and Crick.

Or

- (b) Describe the protocol of chromosomal DNA isolation in detail.

20. (a) Write down the principle, applications and limitations of autoanalyser in clinical labs.

Or

- (b) What do you know about the routinely performed biochemical tests? and highlight their significance and reference values.
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(6 pages)

Reg. No. :

Code No. : 6505

Sub. Code : ZMBM 13

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Microbiology – Core

PHYSIOLOGY AND METABOLISM

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Slime layer is useful for

- (a) Attachment
- (b) Biofilm formation
- (c) To resist desiccation
- (d) All

2. Regarding Gas vesicles, choose the correct statement (s)
- (a) Few to 100 /cell
 - (b) Spindle shaped structure
 - (c) Visual under light and electron microscope
 - (d) All
3. Siderophores are associated with _____ transport
- (a) Glucose
 - (b) Amino acids
 - (c) Iron
 - (d) DPA
4. To produce more ATP, the difference in redox potential between the primary donor and the final electron acceptor should be _____
- (a) More
 - (b) Low
 - (c) Moderate
 - (d) Marginally low
5. Final electron acceptor in anaerobes is / are
- (a) Nitrate
 - (b) Sulphate
 - (c) Both
 - (d) Oxygen

6. Bioluminescence is useful for
- (a) Sexual attraction
 - (b) Threatening enemies
 - (c) Hunting prey
 - (d) All
7. Heterocyst is produced by
- (a) Cyanobacteria
 - (b) Fungi
 - (c) Arachebacteria
 - (d) Actinomycetes
8. Cofactor in Nitrogenase enzyme is
- (a) Fe-Nickel (b) Fe-Molybdenum
 - (c) Fe-Aluminium (d) Fe-Cadmium
9. Barophils are fond of
- (a) Sugar (b) Pressure
 - (c) Salt (d) Light
10. Helmstetter-Cummings technique is associated with _____ culture
- (a) Synchronous (b) Auxenic
 - (c) Mixed (d) Pure

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Explain the properties of F pili.

Or

- (b) Describe the features of nucleoid.

12. (a) Write a note on Group translocation.

Or

- (b) Sketch the features of chemiosmosis theory.

13. (a) Compose the steps in alcohol production.

Or

- (b) Comment on bioluminescence.

14. (a) Quota the features of halobacterial photosynthesis.

Or

- (b) What do you know about *nif* gene?

15. (a) Highlight the events in fed batch culture technique.

Or

- (b) Add a note on spore genes.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Indicate the events associated with murein synthesis with neat diagrams.

Or

- (b) Discuss in detail about archaebacterial cell wall.

17. (a) Describe events in glycolysis and Kerb's cycle along with their biological significance.

Or

- (b) Write an essay on the structure and functions of ETS.

18. (a) Explain in detail about the diverse types of final electron acceptors used in anaerobes.

Or

- (b) How to microbes produce methane? Explain in detail.

19. (a) Mention the properties of bacteriochlorophyll with necessary diagrams.

Or

- (b) Describe the features of nitrogenase and heterocyst.

20. (a) Write a clear note on the process of continuous culture.

Or

- (b) Display the diverse factors affecting microbial distribution and give a special focus on biological factors.
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(6 pages)

Reg. No. :

Code No. : 6506

Sub. Code : ZMBE 11

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

First Semester

Microbiology

Elective – BIOCHEMICAL TECHNIQUES AND
INSTRUMENTATION

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. What is the wavelength range for UV spectrum of light?
(a) 400 nm – 700 nm (b) 700 nm to 10 nm
(c) 1000 to 1100 nm (d) 10 nm to 400 nm

2. The intensity of an adsorption band is always
- (a) Atomic population
 - (b) Molecular population of the initial state
 - (c) Molecular population of the final state
 - (d) Temperature
3. Which of the following centrifugation is used to separate certain organelles from whole cell?
- (a) rate-zonal centrifugation
 - (b) normal centrifugation
 - (c) differential centrifugation
 - (d) isopycnic centrifugation
4. Which of the following is used as a media for density gradient?
- (a) Agarose
 - (b) Ficoll
 - (c) Luria broth
 - (d) Propylene glycol
5. Chromatography is a physical method that is used to separate and analyze _____ mixtures
- (a) simple
 - (b) complex
 - (c) viscous
 - (d) metal

6. Which of the following cannot be used as an adsorbent in column adsorption chromatography?
- (a) Magnesium-oxide
 - (b) Silica gel
 - (c) Activated alumina
 - (d) Potassium permanganate
7. Which technique separates charged particles using electric field?
- (a) Hydrolysis
 - (b) Electrophoresis
 - (c) Protein synthesis
 - (d) Protein denaturing
8. What does the electrophoresis apparatus consist of _____.
- (a) Gel, buffer chamber and fire pack
 - (b) Buffer chamber and electrophoresis unit
 - (c) Electrophoresis unit and gel separator
 - (d) Power pack and electrophoresis unit
9. Which of the following is not a type of radiation detectors?
- (a) Geiger Muller Counter
 - (b) Proportional Counter
 - (c) Semi conductor detector
 - (d) Flame emission detector

10. When nuclear radiations pass through, gas ionization is produced this is the principle of which of the following detectors?
- (a) proportional counter
 - (b) flow counter
 - (c) Geiger muller counter
 - (d) Scintillation counter

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe titration curve and measurement of PH value.

Or

- (b) Write the principles and applications of colorimetry.

12. (a) Explain the principles of centrifugation.

Or

- (b) Discuss centrifugation techniques with examples.

13. (a) State the principles and applications of gas chromatography.

Or

- (b) Focus on affinity chromatography.

14. (a) Collect some informations about radiolabelling.

Or

- (b) Explain the basic principles of electrophoresis.

15. (a) Tell the principles and structural components of X ray spectroscopy.

Or

- (b) List the types of Raman spectroscopy. Add note on its applications.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe the principle and applications of ultraviolet spectrophotometer.

Or

- (b) Record the principle, components and applications of infrared spectroscopy.

17. (a) List the types of centrifugal rotors and add notes on its applications.

Or

- (b) Discuss about the types of analytical centrifugation.

18. (a) Explain the general principle and application of thin layer chromatography.

Or

- (b) Describe general principles and application of gel filtration chromatography.

19. (a) Recommend a few staining method for the analysis of bands in electrophoresis process.

Or

- (b) Define autoradiography and its principle.

20. (a) State the importance of NMR spectroscopy and how does it work.

Or

- (b) Evaluate and measuring radioactivity content of a specific environment.

(6 pages)

Reg. No. :

Code No. : 6507

Sub. Code : ZMBM 21

M.Sc.(CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Microbiology – Core

MOLECULAR BIOLOGY AND GENETICS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the best answer :

1. Genetic information flows from _____
 - (a) DNA to DNA
 - (b) DNA to RNA
 - (c) RNA to cellular protein
 - (d) DNA to cellular protein

2. Chimeric DNA _____
- (a) is found in bacteriophages
 - (b) contain unrelated genes
 - (c) has no restriction sites
 - (d) is palindromic
3. Sigma factor is component of _____
- (a) DNA ligase (b) DNA polymerase
 - (c) RNA polymerase (d) Endonuclease
4. mRNA is synthesis from DNA is termed as _____
- (a) Transcription (b) Transformation
 - (c) Translation (d) Replication
5. The method of post transcriptional gene silencing is particularly useful in _____
- (a) Plants (b) Animals
 - (c) Insect (d) Micro organism

6. The operon that encodes the enzymes in E.coli is an example of _____
- (a) how enzymes works in cell
 - (b) how gene control exists in cell
 - (c) how proteins are converted into energy compounds in cell
 - (d) how eukaryotic organism are evolved from prokaryotic organism
7. DNA transfer from one bacterium to another through phages is termed as _____
- (a) transduction (b) Induction
 - (c) Transfection (d) Infection
8. For transformation, micro particles coated with DNA to be bombarded with gene gun are made up of
- (a) Silicon or platinum (b) Gold or tungsten
 - (c) Silver or platinum (d) Platinum or zinc
9. The central block of the composite transposable element consists of a gene for
- (a) Transposase (b) Antibiotic resistance
 - (c) Integrase (d) Lactamase

10. _____ are repetitive DNA fragments which are inserted into chromosomes after they had been reverse transcribed from any RNA molecule.

- (a) Transfection (b) Retroposon
(c) Replicator (d) Enzyme

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) What is plasmids? Write short notes on types of plasmids.

Or

(b) Why was Griffith's experiment important? Explain the experiment done by Griffith.

12. (a) Write a short note on RNA splicing, capping and poly adenylation.

Or

(b) Explain the functions of RNA polymerase in detail.

13. (a) Discuss in detail about trp operon. And list out the genes of trp operon.

Or

- (b) Describe post-transcriptional gene silencing.

14. (a) Explain about Triparental mating

Or

- (b) Discuss about the specialized transduction in detail.

15. (a) Write short notes on transposons of E.coli.

Or

- (b) Discuss detail about Retroposon.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) How are errors corrected during DNA Replication? Explain.

Or

- (b) Explain rolling circle replication in detail.

17. (a) What are the steps involved in transcription? Explain them.

Or

(b) Describe in details about genetic code and its features.

18. (a) Write a short note on antisense RNA. And explain the epigenetic regulation of antisense RNA.

Or

(b) Write a short note on promoters, terminators and attenuators.

19. (a) Write a detailed note on conjugation with neat diagram.

Or

(b) What is general transduction? Explain the steps involved with a neat diagram.

20. (a) Give detailed account on insertion sequence.

Or

(b) What are the transposons occurring in yeast? Explain.

(6 pages)

Reg. No. :

Code No. : 6508

Sub. Code : ZMBM 22

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Microbiology — Core

IMMUNOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following immunity is obtained during a lifetime?
 - (a) Acquired immunity
 - (b) Active immunity
 - (c) Passive immunity
 - (d) None of the above

2. Which of the following immune cells/molecules are most effective at destroying intracellular pathogens?
- (a) T helper cells (b) Antibodies
(c) Complement (d) T cytolytic cells
3. The lymphocytes which are differentiated in the thymus gland are called
- (a) Plasma cells (b) T cells
(c) B cells (d) Monocytes
4. T cells originate from stem cells located in the _____.
- (a) Liver
(b) Bone marrow
(c) Thyroid gland
(d) Gastrointestinal tract
5. The most suitable method of rapid chemical diagnosis of bacterial, mycoplasma and viral diseases is
- (a) Double immunodiffusion
(b) Immuno electrophoresis
(c) Two-dimensional electrophoresis
(d) Counter immuno electrophoresis

6. In order to separate the antibodies in an antibody's mixture, the laboratory technologist may use a procedure called _____.
- (a) Transfusion
 - (b) Compliment fixation
 - (c) Electrophoresis
 - (d) Gene amplification
7. _____ is the first immuno deficiency diseases to have been recognized
- (a) Digeorge syndrome
 - (b) x linked agammaglobulinemia
 - (c) PMP deficiency
 - (d) Transcobalamin II deficiency
8. Analysis of protein antigen by
- (a) Southern blot
 - (b) Western blot
 - (c) Northern blot
 - (d) None of the above
9. Which of the following immunoglobulin is present normally in plasma at the highest concentration?
- (a) 1gA
 - (b) 1GD
 - (c) 1gE
 - (d) 1gG

10. The specificity of an antibody is due to
- (a) Its valance
 - (b) The heavy chains
 - (c) The Fc portion of the molecule
 - (d) The variable portion of the nearly and light chain.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Give a brief account on Blymphocytes.
- Or
- (b) Write a short note on phagocytosis.
12. (a) Explain the classical pathway of complement.
- Or
- (b) Write a short note on Haptens.
13. (a) Explain briefly about ourchterlony double immuno diffusion technique.
- Or
- (b) What is agglutination? Describe the type of ABO and Rh blood grouping.

14. (a) Explain immuno suppression process.

Or

(b) What are the different categories of transplants?

15. (a) List out the application the monoclonal antibody.

Or

(b) What is adjuvant? Explain its types.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Give a detailed account on innate immunity.

Or

(b) Write about the structure and functions of thymus.

17. (a) Write a short note on allotypes, isotypes and idiotypes in detail.

Or

(b) Write an essay on major Histocompatibility complex.

18. (a) Write an essay on immuno electrophoresis.

Or

(b) Explain the principle, procedure and application of radio immuno assay.

19. (a) Describe the detail about the mechanism of tolerance.

Or

(b) Elaborate notes on immune deficiency diseases.

20. (a) Give an account of monoclonal antibody production.

Or

(b) What is vaccination? Give a brief note on types of vaccine.

(6 pages)

Reg. No. :

Code No. : 6509

Sub. Code : ZMBM 23

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Microbiology - Core

VIROLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Virus contains _____ as nucleic acid
 - (a) Only RNA
 - (b) Only DNA
 - (c) Either DNA or RNA
 - (d) Both DNA and RNA

2. _____ is intracellular obligate parasite
- (a) Bacteria (b) Virus
(c) Fungi (d) Algae
3. _____ is filamentous phage
- (a) T4 phage (b) Lambda phage
(c) M13 phage (d) MU phage
4. The prophage can be separated from bacterial chromosome and entre the lytic cycle is called
- (a) Induction (b) Excision
(c) Insertion (d) Separation
5. Which of the following plant virus has DNA in it?
- (a) Tobacco mosaic virus
(b) Potato mosaic virus
(c) Tomato mosaic virus
(d) Cauliflower mosaic virus
6. Plant viruses may be cultivated in
- (a) Tissue culture
(b) Whole plant
(c) Culture of separated cell
(d) All of these

7. Which of the following oncogenic viruses was first detected?
- (a) Rous sarcoma virus
 - (b) Epstein -Barr virus
 - (c) Herpes simplex virus type - 2
 - (d) Human T-cell leukemia virus
8. Which of the following is the largest virus?
- (a) Herpes virus
 - (b) Arbo virus
 - (c) Mumps virus
 - (d) Pox virus
9. Viroid's have
- (a) D.S - DNA enclosed by protein
 - (b) S.S - DNA not enclosed by protein
 - (c) S.S - RNA not enclosed by protein
 - (d) D.S – RNA enclosed by protein
10. Measles vaccine is administered
- (a) Intravenously
 - (b) Intramuscularly
 - (c) Intradermally
 - (d) Subcutaneously

PART B — (5 × 5 =25 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write short notes on nomenclature of viruses.

Or

- (b) Narrate the evolution of virus in detail.

12. (a) Write short notes on replication of T4 phage.

Or

- (b) Write down the information of Mu phage.

13. (a) Explain in detail about structure and molecular mechanism of vector-mediated cauliflower mosaic virus transmission.

Or

- (b) Write a short note on the common viral diseases of tomato and explain its pathogenicity and symptoms.

14. (a) Explain briefly about replication of adenovirus.

Or

- (b) Narrate the pathogenicity and physical nature of paramyxovirus.

15. (a) What is vaccines? Explain the different types of live attenuated vaccines.

Or

- (b) Write a short note on virusoids and give some examples for virusoids.

PART C — (5 × 8 = 40 marks)

Answer ALL the questions, choose either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Give a detailed account on classification of viruses based on nucleic acid and mRNA synthesis.

Or

- (b) Discuss about the taxonomy of virus in detail.

17. (a) Describe the general characteristics and replication of phage M13.

Or

- (b) Discuss the structural organization and life cycle of Lambda phages.

18. (a) Write an essay on viral disease of sugarcane.

Or

- (b) Write in detail about morphology and replication of Tobacco mosaic virus.

19. (a) Discuss in detail about life cycle and pathogenicity of measles virus.

Or

- (b) Explain detail about the Tumor viruses of human.

20. (a) Give detailed account on viroid's and prions. And give some examples for diseases caused by viroids.

Or

- (b) Make a brief note on cyanophages. And neatly sketch the structure of cyanophages.
-

(7 pages)

Reg. No. :

Code No. : 6510

Sub. Code : ZMBE 21

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Second Semester

Microbiology

Elective – BIODEGRADATION AND
BIOREMEDIATION

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. What is the drawback of biodegradable polymers?
 - (a) Fast oxidation
 - (b) Slow process-ability
 - (c) Brittleness
 - (d) Strength

2. Which of the following bacterium is called as the superbug that could clean up oil spills
 - (a) Bacillus subtilis
 - (b) Pseudomonas putida
 - (c) Pseudomonas denitrificans
 - (d) Bacillus denitrificans

3. Which of the following heavy metal is/are not absorbed by organisms?
 - (a) Cadmium
 - (b) Lead
 - (c) Both lead and cadmium
 - (d) None of the above

4. Microbial ecology is
 - (a) The study of practical uses of microbes in industry
 - (b) The study of microorganisms in the laboratory
 - (c) The study of microbes in their natural habitat
 - (d) The release of genetically recombined microbes

5. Which of the following is the most common bacteria used for bioleaching?
- (a) Spirillum
 - (b) Coccus
 - (c) Bacillus
 - (d) Streptococcus
6. *Chlorella* sp are widely used in the removal of
- (a) Organic wastes
 - (b) Hydrocarbons
 - (c) Heavy metals
 - (d) All of these
7. A process using microbes to convert toxic industrial wastes to less toxic or non-toxic compounds is
- (a) Precipitation
 - (b) Complement fixation
 - (c) Bioconversion
 - (d) Bioremediation

8. Which of the following needs archaea to degrade a contaminant?
- (a) Bio augmentation
 - (b) Accumulation
 - (c) Sterilization
 - (d) Pasteurization
9. Which of the following fungi is not known to degrade DDT insecticide?
- (a) *Aspergillus niger*
 - (b) *Mucor alternans*
 - (c) *Penicillium sp*
 - (d) *Bacillus cereus*
10. Which of the following is a commonly used earthworm species for the vermicomposting process?
- (a) *Eisenia fetida*
 - (b) *Perionyx excavatus*
 - (c) Both (a) and (b)
 - (d) None of the above

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Discuss the role of microbes in natural polymers.

Or

- (b) Explain the basic difference between aquatic and terrestrial ecosystem.

12. (a) Write notes on oil spill degradation by microorganisms.

Or

- (b) Briefly explain how paints are bio deteriorated.

13. (a) Explain how DDT becomes concentrated as it passes through a food chain.

Or

- (b) Explain the process of bio mining.

14. (a) Difference between insitu and exsitu bioremediation.

Or

- (b) Explain the case histories of bioremediation.

15. (a) Explain Herbicide and Pesticide degradation.

Or

(b) Explain activated sludge process.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Give a detail account on microbial degradation of lignin and hemicellulose.

Or

(b) Describe the heterotrophic microbial population in arid ecosystem.

17. (a) Explain the microbial degradation of metal and concrete.

Or

(b) Explain the sub-surface degradation.

18. (a) Explain the removal of heavy metals and radionucleoide from effluents.

Or

(b) Write detail notes on testing for biodegradability.

19. (a) Explain the use of bioreactors in bioremediation process.

Or

(b) Write a brief note on types of bioremediation.

20. (a) Explain the treatment of solid and liquid waste.

Or

(b) Write a brief note on vermicomposting.

(6 pages)

Reg. No. :

Code No. : 6511

Sub. Code : ZMBM 31

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022

Third Semester

Microbiology – Core

BIOINFORMATICS AND BIOSTATISTICS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following is an example of homology and similarity tool?
 - (a) BLAST
 - (b) RasMol
 - (c) EMBOSS
 - (d) PROSPECT

2. In which year did the SWISSPROT protein sequence database begin?
 - (a) 1988
 - (b) 1985
 - (c) 1986
 - (d) 1987
3. In laboratory work using computers and computer generated models generally offline is referred to as
 - (a) In silico
 - (b) Dry lab
 - (c) Wet lab
 - (d) All of the above
4. The procedure of aligning two sequences by searching for patterns that is in the same order in the sequences.
 - (a) Sequence alignment
 - (b) Pair wise alignment
 - (c) Multiple sequence alignment
 - (d) All of these
5. Sequence alignment helps scientists,
 - (a) To trace out evolutionary relationships
 - (b) to infer the functions of newly synthesized genes
 - (c) To predict new members of genes families
 - (d) All of these

6. Alignment method suitable for aligning closely related sequence is,
- (a) Multiple sequence
 - (b) Pair wise alignment
 - (c) Global alignment
 - (d) Local alignment
7. Fly base is a
- (a) Biodiversity database
 - (b) Model organism database
 - (c) Literature database
 - (d) Biomolecular database
8. The statistical approach which helps the investigator to decide whether the outcome of the study is a result of factors planned within design of the study or determined by chance is called,
- (a) Descriptive statistics
 - (b) Inferential statistics
 - (c) Normal distribution
 - (d) Standard deviation
9. A measure of central tendency influenced by extreme scores and skewed distribution is;
- (a) Mean
 - (b) Median
 - (c) Mode
 - (d) Range

10. A measure of central tendency in which is calculated by number arranging in numerical order is:
- (a) Standard deviation
 - (b) Range
 - (c) Median
 - (d) Mode

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain the computer age in biological world.
- Or
- (b) Define public biological databases, and add a note on available biological databases
12. (a) Define genomics and add a note on it's analysis

Or

- (b) What is phylogenetic alignment? add and a note on the types of alignment in bioinformatics

13. (a) Define proteomics, Illustrate the protein databank

Or

- (b) Give a brief account on protein modelling.

14. (a) List out the methods of collecting and presentation of data

Or

- (b) Distinguish the features of skewness and kurtosis

15. (a) Define inferential statistics, and add a note on its types with examples

Or

- (b) Differentiate correlation from regression

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the computational approaches in Biology

Or

- (b) What is an operating system, add note on the five different operating system?

17. (a) Write an essay about the BLAST and FASTA analysis.

Or

- (b) Explain the general principles of gene bank, add note on its need and importance.

18. (a) Describe the determination of secondary structure prediction.

Or

- (b) Write an essay about the protein modelling

19. (a) Describe the measures of central tendency with suitable example

Or

- (b) Explain the measures of dispersion with suitable example.

20. (a) Explain ANOVA with suitable example.

Or

- (b) Explain Chi-square test, add suitable example.

(8 pages)

Reg. No. :

Code No. : 6512

Sub. Code : ZMBM 32

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Third Semester

Microbiology – Core

MEDICAL AND PHARMACEUTICAL
MICROBIOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Each of the following organisms is an important cause of urinary tract infections, Except.
 - (a) *Klebsiella pneumoniae*
 - (b) *Escherichia coli*
 - (c) *Bacteriodes fragilis*
 - (d) *Proteus mirabilis*

2. All, except one, are the examples of protein present in the antigenic structure of *N. gonorrhoeae*.
- (a) Por proteins (b) Rmp proteins
(c) Opa proteins (d) IgM proteins
3. Which of the following Dermatophytes does not have the spore form characteristic called microconidia?
- (a) *Microsporum spp*
(b) *Epidermophyton spp*
(c) *Trichophyton spp*
(d) *Blastomyces spp*
4. The most common of the human infecting malarial parasite is?
- (a) *Plasmodium ovale*
(b) *Plasmodium vivax*
(c) *Plasmodium falciparum*
(d) *Plasmodium malariae*

5. What is the major mode of transmission of dengue fever?
- (a) Bite of male Culex mosquito
 - (b) Bite of female sand fly
 - (c) Bite of the female Aedes mosquito
 - (d) Bite of female Anopheles mosquito
6. Which of the following is an emerging infection with the greatest global impact?
- (a) H1N1 infection
 - (b) SARS covid 2
 - (c) Human papilloma virus infection
 - (d) Both (a) and (b)
7. The “Rideal walker coefficient is used to identify the strength of a
- (a) Antiseptic
 - (b) Antibiotic
 - (c) Antiviral
 - (d) All of the above

8. Halogens are known irritants, the only halogen used for "Disinfection" is _____
- (a) Iodine
 - (b) Chlorine
 - (c) Bromine
 - (d) Fluorine
9. Membrane filtration method can be used for sterility testing of _____
- (a) Ophthalmics
 - (b) Parenterals
 - (c) Antibiotics
 - (d) All of the above
10. The chairman of Indian Pharmacopoeial commission is _____
- (a) Chairman – Scientific body
 - (b) The drugs controller general
 - (c) Directorate general of health services
 - (d) The secretary, Ministry of health and family welfare.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write short note on
- (i) shigellosis
 - (ii) Gonococcus
- Or
- (b) Make a note on rotaviral diarrhea.
12. (a) Explain different pathological conditions caused by Dermatophytic fungi.
- Or
- (b) Portray the clinical manifestations of rabies.
13. (a) Record about the pathogenesis and diagnosis of Chikungunya.
- Or
- (b) Sketch a note on epidemiology and clinical conditions of Zika.
14. (a) What are the selection criteria followed to select disinfectants? Add note on disinfection Kinetics.
- Or
- (b) Comment the following :
- (i) Rabbit pyrogen test
 - (ii) Invitro pyrogen test

15. (a) Describe the sterility testing of parental products.

Or

- (b) What are the culture media used in sterility testing? Add note WHO sterility testing guidelines.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. (a) Describe the pathogenesis, clinical manifestations and diagnosis of tuberculosis.

Or

- (b) Discuss the etiologic agents, pathogenesis, clinical manifestations and laboratory diagnosis of urinary tract infections.

17. (a) Document the etiology, transmissions, pathogenesis, clinical manifestations and laboratory diagnosis of bacterial meningitis.

Or

- (b) Give short notes on the following

- (i) benign malaria
- (ii) malignant tertian malaria
- (iii) malaria vector control strategies

18. (a) Describe briefly about H1N1 influenza.

Or

(b) Write an essay on SARS – Covid 2 variants and mutations and Add note on impact of variants on diagnosis.

19. (a) Differentiate between disinfectants and antiseptics. How does it destroy the micro organisms. List out the types of disinfectants and antiseptics.

Or

(b) Explain the sterility and toxicity testing or pharmaceutical products.

20. (a) Explain the importance of the following

(i) BP

(ii) IP

(iii) EP

(iv) USP

Or

(b) Discuss about sterility testing of the following pharmaceutical products.

- (i) Surgical devices
 - (ii) Surgical dressings
 - (iii) Hemostats
 - (iv) Surgical ligatures and catgut
-

(6 pages)

Reg. No. :

Code No. : 6513

Sub. Code : ZMBM 33

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Third Semester

Microbiology — Core

ENVIRONMENTAL AND AGRICULTURAL
MICROBIOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following organisms are known to grow on the surfaces of freshly exposed rocks?
(a) Green algae (b) Diatoms
(c) Cyanobacteria (d) Yeast

2. In carbon cycle flow of energy is _____
(a) Bidirectional (b) Cyclic
(c) Linear (d) Irreversible

3. Which fungal diseases is not spreaded through air?
- (a) Blastomycosis (b) Cryptococcosis
(c) Aspergillosis (d) Candidiasis
4. Droplet nuclei size is _____
- (a) 0.01 – 0.1 um (b) 1-4 um
(c) 5-7 um (d) 0.1-1 um
5. Which of the following genus of bacteria is not found in fresh water?
- (a) Pseudomonas (b) Vibrio
(c) Aeromonas (d) Flavobacterium
6. Eutrophication leads to death of fish due do _____
- (a) Increased O₂ content
(b) Increased algae content
(c) Decreased O₂ content
(d) Decreased algae content
7. Which one among the following is a free living aerobic nitrogen-fixing bacteria?
- (a) Azotobacter (b) Rhizobium
(c) Cyanobacter (d) B.Circulans

8. Which of the following statements is not related to mycorrhiza?
- (a) Many members of genus *Glomus* forms mycorrhiza
 - (b) Fungal symbiont absorbs nitrogen
 - (c) Plants show resistance to root-borne pathogens
 - (d) There is an overall increase in plant growth and development
9. Late blight of potato caused by _____
- (a) *Ustilago zeae*
 - (b) *Pseudomonas syringae*
 - (c) *Phytophthora infestans*
 - (d) *Monilinia fructicola*
10. *Bacillus thuringiensis* is used for the production of toxins which can be used as _____
- (a) Pesticides
 - (b) Germicides
 - (c) Insecticides
 - (d) Fungicides

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) List out the different regions of soil.

Or

- (b) What are the factors affecting microbial community in soil?

12. (a) Discuss about Nosocomial infection.

Or

- (b) Give a detailed account on air quality assessment method.

13. (a) What is Eutrophication and redraft the cause of eutrophication?

Or

- (b) Categorize the different types of freshwater ecosystem.

14. (a) What is biofertilizers? Sequence its role in agriculture.

Or

- (b) What is VAM and write down its uses.

15. (a) Explain the sign and symptoms of plant diseases given below :
- (i) Blight of paddy
 - (ii) Stem rust of wheat.

Or

- (b) What is biocontrol agent and explain the mode of action of biocontrol agents.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Portray the different types of soil in India.
- Or
- (b) What is biogeochemical cycle and explicate the steps involved in nitrogen cycle with neat diagram?
17. (a) Differentiate the droplet nuclei and aerosols.
- Or
- (b) Write some bacterial air borne diseases and how to diagnosis, control and prevent it.
18. (a) Explain the hydrothermal vents in detail.
- Or
- (b) Write an essay water borne diseases and its controlling measures.

19. (a) What is rhizosphere? and Elucidate the role of microbes in rhizosphere soil?

Or

- (b) Comment on :
- (i) Rhizobium
 - (ii) Azotobacter
 - (iii) Azospirillum.

20. (a) Criticize the role of transgenesis in crop improvement.

Or

- (b) Describe the characteristic features of diseases given below :
- (i) Late blight of potato
 - (ii) Apple scab.
-

(6 pages)

Reg. No. :

Code No. : 6514

Sub. Code : ZMBM 34

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2022.

Third Semester

Microbiology — Core

RESEARCH METHODOLOGY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which is the main object of research?
 - (a) Discovering new facts
 - (b) Testing old facts
 - (c) Modifying old facts
 - (d) All of the above

2. Which one of the following is pre-requisite to carry research?
 - (a) Developing a research design
 - (b) Formulating research question
 - (c) Deciding about the data analysis procedure
 - (d) Formulating a research hypothesis

3. What is the name of conceptual frame work in which the research is carried out?
 - (a) Research hypothesis
 - (b) Synopsis of research
 - (c) Research paradigm
 - (d) Research design

4. "There is no relationship between higher motivation level and higher efficiency" - is an example of which type of hypothesis?
 - (a) Alternative hypothesis
 - (b) Null hypothesis
 - (c) Co relational hypothesis
 - (d) Research hypothesis

5. A blue print of research work is known as _____
 - (a) Sampling design (b) Research design
 - (c) research hypothesis (d) Research approach

6. Which one forms a part of experimental design?
- (a) Matching
 - (b) Randomization
 - (c) Before - after analysis
 - (d) All of the above
7. A written format of research work is known as
- (a) Research paper (b) Monographs
 - (c) Project report (d) Research report
8. Report present conclusion work based on _____
- (a) Investigation (b) Intuition
 - (c) Belief (d) Impression
9. In a thesis, figures and tables are included in _____
- (a) The appendix
 - (b) A separate chapter
 - (c) The concluding chapter
 - (d) The text itself

10. Why do need to review the existing literature?
- (a) To make sure you have a long list of reference
 - (b) Because without it, you could never reach the required word count
 - (c) To find out what is already known about your area of interest
 - (d) To help in your general studying

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Write the criteria which are followed by the researcher before selection of a research problem.

Or

- (b) Explain the characteristics of pure and applied research.

12. (a) Explain the importance of ethics in research.

Or

- (b) List out the characteristics of hypothesis.

13. (a) Portray the significance of a research design.

Or

- (b) Describe the features of good of research design.

14. (a) Display the techniques and importance of oral presentation of research findings.

Or

(b) Enumerate the steps of research report writing.

15. (a) What is publication ethics?

Or

(b) Give a short note on plagiarism.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

16. (a) Describe the different types of research approaches. Note on criteria of a good research.

Or

(b) Discuss the sources of research problem and the factors affecting research problem.

17. (a) Define and discuss the objectives and importance of hypothesis in research.

Or

(b) Distinguish between the following :

(i) Simple hypothesis and composite hypothesis

(ii) Null hypothesis and alternate hypothesis

(iii) acceptance region and rejection region

(iv) Type I error and type II error.

18. (a) Describe term research design and enumerate the various types of research design.

Or

- (b) Describe important concepts relating to research design.

19. (a) Explain the format and contents of a research report.

Or

- (b) Describe the techniques and significance of report writing.

20. (a) Describe the preparation format of tables, figures and plates in thesis writing.

Or

- (b) Explain the following :
- (i) Reference citing and listing
 - (ii) Conclusion and bibliography.
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