R4572

Sub. Code
25MMB2C1

M.Sc. DEGREE EXAMINATION, APRIL – 2026

Second Semester

Microbiology

MOLECULAR BIOLOGY AND MICROBIAL GENETICS

(CBCS – 2025 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Tell, which is the monomer of DNA. (CO1, K1)

   (a) Gene (b) Deoxyribonucleotides

   (c) Ribonucleotides (d) Nitrogenous bases

2. Recall, the basic unit of a DNA molecule is _____ (CO1, K1)

   (a) Ribonucleotides
   (b) Gene
   (c) Deoxyribonucleotides
   (d) Nitrogenous bases

3. Identify the correction of changes in DNA by a set of processes known as _____ (CO2, K1)

   (a) DNA repair
   (b) Transcription
   (c) Translation
   (d) Replication

4. Name the repair system, which involves the removal of the damaged segment of DNA. (CO2, K1)

(a) Recombinational repair
(b) Mismatched pair
(c) Direct repair
(d) Excision repair

5. Recall, which of the following is not involved in the post-transcriptional processing of tRNA? (CO3, K1)

(a) Attachment of CCA arm
(b) Attachment of poly-A tail
(c) Base modulation
(d) Splicing

6. Identify which of the following is an incorrect statement about mRNA. (CO3, K1)

(a) Introns are removed and exons are spliced together
(b) Cap is added to the 5' end
(c) Histone mRNAs lack 5' cap
(d) Poly-A tail is added to the 3' end

7. Recite how many tRNAs are required to translate all 61 codons. (CO4, K1)

(a) 32 (b) 31
(c) 29 (d) 30

8. Tell which position of a codon is said to wobble. (CO4, K1)

(a) Fourth (b) First
(c) Second (d) Third

9. Identify how many DNA molecules are transferred after each transformation. (CO5, K1)

(a) 1 (b) 2
(c) Infinite (d) 50

10. Describe in which phase of growth the recipient cell takes up the donor DNA. (CO5, K2)

(a) Early logarithmic phase

(b) Late logarithmic phase

(c) Lag phase

(d) Stationary phase

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) Outline the classification of plasmids by copy number. (CO1, K3)

Or

(b) Illustrate the circular and theta modes of replication by plasmids. (CO1, K3)

12. (a) Outline the SOS repair mechanism. (CO2, K4)

Or

(b) Illustrate the recombination repair mechanism. (CO2, K4)

13. (a) Evaluate the prokaryotic post - transcriptional gene regulation process. (CO3, K5)

Or

(b) Assess the Rho-dependent and Rho-independent termination processes. (CO3, K5)

14. (a) Build the role of rRNA in prokaryotic protein synthesis. (CO4, K6)

Or

(b) Invent the detailed steps for the regulation and attenuation of the tryptophan operon. (CO4, K6)

15. (a) Outline the enzymes involved in the recombination process. (CO5, K4)

Or

(b) Analyze the detailed account of the Holliday model of the recombination process. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Outline a detailed account of the structure of DNA and different forms of DNA. (CO1, K4)

Or

(b) Illustrate the properties of DNA by denaturation, renaturation, melting curve and hyperchromicitv process. (CO1, K4)

17. (a) Justify the detailed process of the biochemical basis of mutation by spontaneous, random and non-adaptive mutation. (CO2, K5)

Or

(b) Evaluate the detection of mutation by the Ames test and in vitro mutagenesis methods. (CO2, K5)

18. (a) Build the detailed account of the prokaryotic DNA replication process. (CO3, K6)

Or

(b) Invent the detailed steps of the prokaryotic transcription process. (CO3, K6)

19. (a) Outline the post-translational modification process. (CO4, K4)

Or

(b) Analyse the regulation of bacterial gene expression by the lactose system and their positive and negative regulation of the Lac operon. (CO4, K4)

20. (a) Justify the detailed process of bacterial transformation. (CO5, K5)

Or

(b) Evaluate the detailed steps of the bacterial transduction process. (CO5, K5)

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R4573

Sub. Code
25MMB2C2

M.Sc. DEGREE EXAMINATION, APRIL – 2026

Second Semester

Microbiology

rDNA TECHNOLOGY

(CBCS – 2025 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct options.

1. Tell which enzyme adds nucleotides to the 3' end of DNA without a template. (CO1, K1)

   (a) DNA polymerase

   (b) Terminal deoxynucleotidyl transferase

   (c) DNase

   (d) DNA ligase

2. Recall pUC 18 differs from pBR322 mainly by the presence of _____ (CO1, K1)

   (a) Tet^r gene (b) Ori only

   (c) Lac Z gene (d) Cos site

3. Recite, complementation cloning is mainly used to _____ (CO2, K1)

   (a) Identify regulatory sequences

   (b) Restore the function of a mutant gene

   (c) Increase plasmid copy number

   (d) Prevent antibiotic resistance

4. Label blue-white screening is based on the activity of _____ (CO2, K1)

(a) GFP gene (b) β -galactosidase

(c) DNA polymerase (d) Reverse transcriptase

5. Recall RACE is primarily used for _____ (CO3, K1)

(a) Protein purification

(b) Gene cloning

(c) Rapid amplification of cDNA ends

(d) DNA sequencing

6. Tell Coulson's method is another name for _____ (CO3, K1)

(a) Maxam—Gilbert sequencing

(b) Automated sequencing

(c) Chain termination sequencing

(d) Pyrosequencing

7. Define transgenic plants are best defined as plants that _____ (CO4, K1)

(a) Are produced by vegetative propagation

(b) Contain genes transferred from another organism

(c) Are produced by tissue culture

(d) Show hybrid vigor

8. Describe how recombinant human insulin is commercially produced using _____ (CO4, K1)

(a) *Bacillus subtilis* (b) *Saccharomyces cerevisiae*

(c) *Escherichia coli* (d) *Agrobacterium tume faciens*

9. Recall antisense RNA inhibits gene expression by _____ (CO5, K1)

(a) Enhancing transcription

(b) Binding to DNA promoter regions

(c) Hybridizing with complementary mRNA

(d) Activating ribosomes

10. Interpret which protein complex is directly involved in siRNA-mediated gene silencing. (CO5, K2)

(a) RNA polymerase (b) RISC

(c) Cas9 (d) Integrase

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each

11. (a) Illustrate the role of restriction endonucleases and DNA ligase in recombinant DNA technology. (CO1, K3)

Or

(b) Determine the structure and features of the pBR322 plasmid vector. (CO1, K3)

12. (a) Outline the sticky-end and blunt-end cloning with suitable examples. (CO2, K4)

Or

(b) Infer the steps involved in the synthesis of cDNA from mRNA. (CO2, K4)

13. (a) Justify the principle and applications of RT-PCR. (CO3, K5)

Or

(b) Compare the Sanger sequencing and Maxam—Gilbert sequencing. (CO3, K5)

14. (a) Invent the transgenic plants and explain their agricultural applications. (CO4, K6)

Or

(b) Build a short note on recombinant cytokines and their role in the treatment of infectious diseases. (CO4, K6)

15. (a) Outline the types and mechanisms of gene silencing. (CO5, K4)

Or

(b) Analyse the formation of antisense mRNA and its role in the inhibition of gene expression. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each

16. (a) Illustrate the types of DNA modifying enzymes and uses in genetic engineering. (CO1, K4)

Or

(b) Outline a detailed account of viral vectors — SV 40 and adenovirus. (CO1, K4)

17. (a) Assess different cloning methodologies. (CO2, K5)

Or

(b) Compare between genomic and cDNA libraries. (CO2, K5)

18. (a) Develop the various site-directed mutagenesis methods. (CO3, K6)

Or

(b) Build the techniques of oligonucleotide-directed mutagenesis with plasmid DNA. (CO3, K6)

19. (a) Outline the xanthan gum production and its applications. (CO4, K4)

Or

(b) Illustrate the biosynthesis of melanin from *E. coli*. (CO4, K4)

20. (a) Assess the antisense technology in detail and the mechanism of gene silencing. (CO5, K5)

Or

(b) Justify the CRISPR-Cas9 system — components, mechanism, and applications in gene silencing. (CO5, K5)

R4574

Sub. Code
25MMB2C3

M.Sc. DEGREE EXAMINATION, APRIL – 2026

Second Semester

Microbiology

FOOD MICROBIOLOGY

(CBCS – 2025 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Recall, the process of preserving food by heat treatment is called (CO1, K1)

   (a) Fermentation

   (b) Pasteurization

   (c) Irradiation

   (d) Freezing

2. Tell, HACCP stands for (CO1, K1)

   (a) High Authority for Control of contamination in products

   (b) Hazard Analysis and Critical control point

   (c) Health and Chemical control process

   (d) Hazard and chemical check program

3. Recite: the factor related to the storage environment of food is (CO2, K1)

(a) Nutrient content

(b) Redox potential

(c) Relative humidity

(d) Buffering capacity

4. Define: low-temperature preservation mainly works by (CO2, K1)

(a) Increasing microbial growth

(b) Slowing enzyme and microbial activity

(c) Increasing pH

(d) Raising water activity

5. Recall, bacteriocins are produced by (CO3, K1)

(a) Viruses (b) Fungi

(c) Bacteria (d) Algae

6. Tell, storage of food at refrigeration temperature mainly (CO3, K1)

(a) Destroys all microbes

(b) Slows microbial growth

(c) Increases enzyme activity

(d) Raises water activity

7. Define, SCP stands for (CO4, K1)

(a) Single Cell Protein

(b) Standard Culture Product

(c) Sterile Cheese Process

(d) Safe Cultured Probiotics

8. Tell, probiotics are (CO4, K1)

(a) Harmful bacteria in milk

(b) Beneficial live microorganisms

(c) Chemical preservatives

(d) Milk enzymes

9. Recite, The regulatory authority for food safety in India is (CO5, K1)

(a) WHO (b) ISO

(c) FSSAI (d) FAO

10. Discuss: Norwalk virus is mainly associated with (CO5, K2)

(a) Skin infection

(b) Respiratory infection

(c) Gastroenteritis

(d) Eye infection

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Illustrate the type and causes of food spoilage. (CO1, K3)

Or

(b) Examine the concept of food safety and microbiological quality assurance. (CO1, K3)

12. (a) Outline the role of water activity and pH in food microbial incidence. (CO2, K4)

Or

(b) Analyze the extrinsic factors affecting food microorganisms. (CO2, K4)

13. (a) Justify the chemical preservatives and bacteriocins used in food preservation. (CO3, K5)

Or

(b) Evaluate the aseptic packaging and low-temperature storage methods. (CO3, K5)

14. (a) Build the sources of microbial contamination in raw milk. (CO4, K6)

Or

(b) Develop the concept of probiotics. (CO4, K6)

15. (a) Infer the food-borne fungal toxins and their health effects. (CO5, K4)

Or

(b) Outline the notes on food safety standards and quality control systems. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Analyze the mechanisms of food spoilage and various preservation methods used to control microbial growth. (CO1, K4)

Or

(b) Outline the Microorganisms and Food Materials. Diversity of habitat. (CO1, K4)

17. (a) Assess the water activity and its importance in controlling microbial growth in different food materials. (CO2, K5)

Or

(b) Justify the different growth factors affecting food microbial incidence. (CO2, K5)

18. (a) Invent low-temperature storage and chemical preservatives. (CO3, K6)

Or

(b) Develop advanced food preservation techniques. (CO3, K6)

19. (a) Outline the fermentation processes in dairy products. (CO4, K4)

Or

(b) Illustrate the detailed account on SCP and its uses. (CO4, K4)

20. (a) Justify the detailed account of food-borne fungal and viral pathogens. (CO5, K5)

Or

(b) Assess the modern food safety and control systems. (CO5, K5)

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R4575	Sub. Code
	25MMB2E1

M.Sc. DEGREE EXAMINATION, APRIL – 2026

Second Semester

Microbiology

Elective – SOIL, AGRICULTURAL AND ENVIRONMENTAL MICROBIOLOGY

(CBCS – 2025 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Tell, the degradation of complex molecules in soil by fungi for utilisation by bacteria is an example of which type of association? (CO1, K1)

   (a) Commensalism (b) Neutralism
   (c) Antagonism (d) Mutualism

2. Recall, the dominant mineral particles in most soils are compounds of ————————. (CO1, K1)

   (a) Potassium (b) iron
   (c) Sodium (d) Magnesium

3. Identify which of the following is not a bacterial plant pathogen. (CO2, K1)

   (a) Puccinia (b) Xanthomonas
   (c) Clostridium (d) Pseudomonas

4. Name the following that is not a symptom of bacterial diseases in plants. (CO2, K1)

   (a) Mosaic (b) Blight
   (c) Rots (d) Wilts

5. Recall, ammonia oxidizers and nitrite oxidizers are ————————. (CO3, K1)

(a) Gram-positive photolithotrophs

(b) Gram-negative photolithotrophs

(c) Gram-positive chemolithotrophs

(d) Gram-negative chemolithotrophs

6. Identify *Agrobacterium* is involved in which of the following processes? (CO3, K1)

(a) Reduction of nitrate to ammonia

(b) Ammonification

(c) Denitrification

(d) Nitrification

7. Recite why organisms in food chains are grouped into categories. (CO4, K1)

(a) To get more energy

(b) To form trophic levels

(c) To form community

(d) To share the energy

8. Tell which of the following factors diminishes as the food chain proceeds. (CO4, K1)

(a) Energy (b) Nutrition

(c) Temperature (d) Pressure

9. Identify what the intermediate zone is composed of in aerobic-anaerobic ponds. (CO5, K1)

(a) Aerobic bacteria (b) Facultative bacteria

(c) Organic solids (d) Algae

10. Describe a process that is involved in the further removal of the nitrogen. (CO5, K2)

(a) Denitrification (b) Reduction

(c) Nitrification (d) Ammonification

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Outline the diversity and distribution of soil microflora of actinomycetes. (CO1, K3)

Or

(b) Illustrate the seaweed extracts as biostimulant. (CO1, K3)

12. (a) Outline the plant protection by phenolics-related compounds. (CO2, K4)

Or

(b) Illustrate the *Trichoderma* as a bioinsecticide and its application. (CO2, K4)

13. (a) Evaluate the bioleaching principle and its applications. (CO3, K5)

Or

(b) Assess the phosphorus cycle. (CO3, K5)

14. (a) Build the food chain and food web. (CO4, K6)

Or

(b) Invent the marine habitats in estuaries and the deep sea. (CO4, K6)

15. (a) Outline the treatment of solid wastes. (CO5, K4)

Or

(b) Analyze the production of bigas from waste. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Outline a detailed account of the classification, physical, chemical properties and structure of soil. (CO1, K4)

Or

(b) Illustrate the Rhizobium as a bio fertilizer and its application. (CO1, K4)

17. (a) Justify the detailed account of Bacillus thuringiensis as a biocontrol agent and its applications. (CO2, K5)

Or

(b) Evaluate the bacterial diseases of agricultural crops (paddy and cotton) — pathogens, symptoms and control measures. (CO2, K5)

18. (a) Build the detailed account of the nitrogen cycle — nitrification and denitrification process. (CO3, K6)

Or

(b) Invent the detailed account of the introduction about aerobiology and airborne transmission of microbes and diseases. (CO3, K6)

19. (a) Outline the role of microorganisms in aquatic habitats. (CO4, K4)

Or

(b) Analyse the factors affecting microbial growth in aquatic regions. (CO4, K4)

20. (a) Justify the detailed process of the wastewater treatment process. (CO5, K5)

Or

(b) Evaluate the detailed steps of the vermicomposting process. (CO5, K5)

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R4576

Sub. Code
25MMB2S1

M.Sc. DEGREE EXAMINATION, APRIL – 2026

Second Semester

Microbiology

VETERINARY MICROBIOLOGY

(CBCS – 2025 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Tell, which of the following are true for Gram-negative bacteria? (CO1, K1)
   (a) Alcohol treatment increases the permeability of the cell wall and the C V-I complex can be extracted
   (b) Upon alcohol treatment, the permeability of the cell wall increases
   (c) Crystal violet-iodine (CV-I) complex is extracted
   (d) Pore size decreases and the CV-I complex cannot be extracted

2. Recall. Gram-positive bacteria are usually more susceptible to? (CO1, K1)
   (a) Tetracyclin (b) Penicillin
   (c) Streptomycin (d) Ampicillin

3. Identify Mastitis' refers to (CO2, K1)
   (a) Inflammation of neurons
   (b) Inflammation of Udders
   (c) Inflammation of nephrons
   (d) Inflammation of mast cells

4. Name which of the following is not a bacterium which causes disease in a poultry farm. (CO2, K1)

(a) *Haemophilus gallinarium*

(b) *Salmonella gallinarium*

(c) Tapeworm

(d) *Pasteurella avicida*

5. Recall: which of the following viruses causes foot and mouth disease? (CO3, K1)

(a) Cowpox virus (b) Retrovirus

(c) Reovirus (d) Coxsackievirus

6. Identify which of the following is not a characteristic symptom of foot and mouth disease. (CO3, K1)

(a) Increase in appetite

(b) An eruption of vesicles over the lips

(c) Lameness

(d) Fever

7. Recite: Which of the following fungal infections causes circular rashes? (CO4, K1)

(a) Coccidioidomycosis

(b) Ringworm

(c) Histoplasmosis

(d) Jock itch

8. Tell, what is the fungal infection that occurs in the mouth called? (CO4, K1)

(a) Tinea capitis (b) Tinea pedis

(c) Oral thrush (d) Groin

9. Identify Lyme disease is a common zoonosis transmitted by which vector? (CO5, K1)

(a) Flea (b) Mosquito

(c) Mite (d) Tick

10. Describe what term describes diseases that originate in animals and can spread to humans, with over 60% of known infectious diseases falling into this category? (CO5, K2)

(a) Parasitosis (b) Anthroponosis

(c) Zoonosis (d) Epizootic

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Outline the scope and importance of veterinary microbiology. (CO1, K3)

Or

(b) Illustrate the classification and characteristics of bacteria. (CO1, K3)

12. (a) Outline the laboratory diagnosis of bacterial infection in animals. (CO2, K4)

Or

(b) Illustrate the antibiotics and antimicrobial resistance in veterinary medicine. (CO2, K4)

13. (a) Evaluate the general properties of animal viruses. (CO3, K5)

Or

(b) Assess the laboratory diagnosis of animal viral infections. (CO3, K5)

14. (a) Build the control and prevention measures of fungal and parasitic infections in animals. (CO4, K6)

Or

(b) Invent the general characteristics of pathogenic fungi affecting animals. (CO4, K6)

15. (a) Outline the emerging and re-emerging infectious diseases in animals. (CO5, K4)

Or

(b) Analyze the detailed account of major zoonotic diseases. (CO5, K4)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Outline a detailed account of the classification of bacteria based on staining techniques and microscopic methods. (CO1, K4)

Or

(b) Illustrate the classification of viruses on genetic mechanisms and pathogenesis. (CO1, K4)

17. (a) Justify the morphology, classification and identification of pathogenic bacteria *Clostridium* and control measures. (CO2, K5)

Or

(b) Evaluate the morphology, classification and identification of the pathogenic bacterium *Brucella* and lab diagnosis. (CO2, K5)

18. (a) Build the detailed account of the foot and mouth disease, rabies. (CO3, K6)

Or

(b) Invent the detailed steps of the replication and pathogenesis of animal viruses. (CO3, K6)

19. (a) Outline the importance of fungal infection.(CO4, K4)

Or

(b) Analyse the introduction to parasitic protozoa and helminths relevant to veterinary health. (CO4, K4)

20. (a) Justify the detailed account of principles of vaccination and types of vaccines. (CO5, K5)

Or

(b) Evaluate the host-pathogen interaction based on immune system relevance. (CO5, K5)

R4994

Sub. Code
530401

M.Sc. DEGREE EXAMINATION, APRIL – 2026

Fourth Semester

Microbiology

APPLIED MICROBIOLOGY – II

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following does not help in disinfecting water? (CO1, K1)

   (a) Filtration

   (b) Chlorine

   (c) Alums

   (d) Boiling

2. Which type of hepatitis spreads through water? (CO1, K1)

   (a) Hepatitis A

   (b) Hepatitis B

   (c) Hepatitis C

   (d) Hepatitis A and B

3. Which of the following food additives can be used for inhibition of mold growth? (CO2, K1)

(a) Propionates

(b) Sulphur dioxide

(c) Propionates & Sulphur dioxide

(d) Carbon-di-oxide

4. Which of the following microorganisms is used to biologically monitor the low temperature gas plasma sterilizer? (CO2, K1)

(a) *Bacillus stearothermophilus*

(b) *Bacillus subtilis*

(c) *Clostridium Sporogenes*

(d) *Geobacillus stearothermophilus*

5. Which of the following tests is not for the detection of endotoxin? (CO3, K2)

(a) Get clot Test

(b) Rabbit pyrogen test

(c) Coagulase test

(d) Limulus Amoebocyte Lysate test

6. _____ is called Jockers of the microbiological park. (CO3, K1)

(a) Nostoc

(b) Mycoplasma

(c) Cyanobacteria

(d) Actinomadura

7. Pulsed light has been shown to have a significantly higher_____ (CO4, K1)

(a) Germicidal effect

(b) Stimulating growth of microbes

(c) Toxic for microbes

(d) Denature the food

8. How many principles are there in a HACCP system? (CO4, K2)

(a) Four (b) Seven

(c) Eighteen (d) Ten

9. An abnormal response to food triggered by the body's immune system is called (CO5, K1)

(a) Food intolerance

(b) Food allergy

(c) Food poisoning

(d) Food borne disease

10. Food safety and authentication are two areas where DNA barcoding is used. What is the food industry's use of DNA barcoding for? (CO5, K3)

(a) Enhancing food flavors

(b) Improving food package

(c) Increasing shelf life food items

(d) Identifying allergens in food products

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Explain the importance of the determination of BOD in a water sample. (CO1, K3)

Or

(b) Demonstrate the performance of the multiple-tube fermentation test and its importance in the assessment of water quality. (CO1, K3)

12. (a) Discuss the methods of microbial enumeration in the finished pharmaceuticals. (CO2, K1)

Or

(b) Give an account on 'sterilization validation process'. (CO2, K2)

13. (a) What is endotoxin? Add a note on the detection of endotoxin by turbidimetric assay. (CO3, K4)

Or

(b) Relate the pyrogen test with sterility of medical devices. (CO3, K2)

14. (a) Write down the principles of light pulse generation. How is light pulse technology used in the control of microbes? (CO4, K4)

Or

(b) Illustrate the methods of biological risk assessment in the food industry. (CO4, K4)

15. (a) What are the immunological assays used for the assessment of microbial quality of sea foods. (CO5, K4)

Or

(b) Give the significance of barcodes and its uses in the food industry. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Describe the microbiology of drinking water in detailed manner. (CO1, K2)

Or

(b) Explain the methods of microbial quality assessment in water. (CO1, K4)

17. (a) Emphasize the role of chemical preservatives in the storage of raw materials and finished products. (CO2, K3)

Or

(b) Highlight the importance of sterility tests for pharmaceutical products. (CO2, K3)

18. (a) Explain the methods for the detection of the toxicity of endotoxin. (CO3, K4)

Or

(b) Elaborate on the principle and methods of vitamin assay. (CO3, K5)

19. (a) What are the effects of light pulses on foods and microorganisms? Write the advantages and limits of light pulse treatment, (CO4, K5)

Or

(b) Delineate the quality control process for fruits and vegetables. (CO4, K4)

20. (a) Explain the applications of modern methods in microbial quality assessment in sea foods. (CO5, K5)

Or

(b) What is food adulteration? Describe the food standards for food safety. (CO5, K2)

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