

M.Sc. (Previous) DEGREE EXAMINATION, DECEMBER 2005
First Year
Microbiology

Paper I - INTRODUCTION TO MICRO ORGANISMS

Time : Three hours

Maximum : 100 marks

PART A - (5 X 8 = 40 marks)
Answer any Five of the following.
All questions carry equal marks.

1. Agrobacterium and its importance.
2. G + C ratio.
3. Symmetry of viruses.
4. Prions
5. Thallus organization in micro algae.
6. Hetero thallism.
7. Sporozoa.
8. Fungi imperfecti.

PART - (4 X 15 = 60 marks)
Answer all the FOUR questions.

UNIT I

9. (a) Describe the important contributions made by Louis Pasteur.
or
(b) What are the three domains of Carl Woese classification ? compare the characteristics of these domains.

UNIT II

10. (a) What are the main criteria used in the classification of bacteria ? Explain the salient features of numerical taxonomy.
or
(b) Write classification and economic importance of archaeobacteria.

UNIT III

11. (a) Describe the chemical structure of viruses.
or
(b) Write an essay on transmission of viruses.

UNIT IV

12. (a) Sketch the classification of fungi down to the class level.
or
(b) Write the general features and economic importance of micro algae.

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Paper II - MICROBIOLOGICAL METHODS

Time : Three hours

Maximum : 100 marks

PART A - (5 X 8 = 40 marks)
Answer any FIVE of the following.
All questions carry equal marks.

1. Phase contrast microscopy.
2. Use of hot air oven.
3. Pour plate method.
4. Winogradsky column.
5. Plaque assay.
6. HPLC.
7. SDS - PAGE.
8. Beer - Lambert Law.

PART B (4 x 15 = 60 marks)
Answer all the FOUR questions.

UNIT I

9. (a) Write the principles and importance of scanning and transmission electron microscopy.
or
(b) Describe the composition and properties of general bacterial media.

UNIT II

10. (a) Write an account on different anaerobic culturing techniques.
or
(b) Explain the methods for maintenance and preservation of microbial cultures.

UNIT III

11. (a) Discuss the principles and applications of paper chromatography.
or
(b) Write a general account on different centrifugational techniques.

UNIT IV

12. (a) Describe the principles and applications of UV - VIS spectrophotometry.
or
(b) Explain the use of radio active substances in biology.

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Microbiology

Paper III - MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

Time : Three hours

Maximum : 100 marks

PART A - (5 x 8 = 40 marks)
Answer any FIVE of the following.
All questions carry equal marks.

1. Chemo autotrophs.
2. Synchronous growth.
3. Substrate level phosphorylation.
4. Isoenzymes.
5. Reverse electron flow.
6. TRNA.
7. Pasteur effect.
8. Carboxydo bacteria.

PART B - (4 x 15 = 60 marks)
Answer all the FOUR questions.

UNIT I

9. (a) Explain the different methods bacterial growth measurements.
- or
- (b) Discuss the different modes of uptake of nutrients with suitable examples.

UNIT II

10. (a) Discuss the light reactions in an oxygenic phototrophs.
- or
- (b) What is methylotrophy? Discuss the metabolism of methylotrophs.

UNIT III

11. (a) Discuss the inter relationship of Krebs cycle and Glyoxylate cycle.
- or
- (b) Differentiate anaerobic respiration and fermentation. Give an account of lactate fermentation.

UNIT V

12. (a) Discuss the different models of enzyme catalysis.
- or
- (b) Describe the structure and functions of nucleotides.

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Microbiology

Paper IV - ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

Time : Three hours

Maximum : 100 marks

PART A - (5 x 8 = 40 marks)
Answer any FIVE of the following.
All questions carry equal marks.

1. Aeroallergens.
2. Water - borne pathogens.
3. Soil microflora.
4. Iron in soil.
5. Plant growth promoting rhizobacteria.
6. Azospirillum.
7. Etiology of blast of rice
8. Importance of seed treatment.

PART B - (4 x 15 = 60 marks)
Answer all the FOUR questions.

UNIT I

9. (a) Explain the significance of aeromicrobiology in relation to plant pathology.
or
(b) Write a detailed account on the anaerobic treatment of sewage.

UNIT II

10. (a) Describe the decomposition of soil organic matter.
or
(b) What are biogeochemical cycles ? Explain the role of microbes in nitrogen cycle.

UNIT III

11. (a) Describe the various types of mycorrhizal and write the importance of VAM fungi.
or
(b) What is biological nitrogen fixation ? Write the biochemistry involved in biological nitrogen fixation.

UNIT IV

12. (a) Elaborate various procedures for the development of disease resistant varieties.
or
(b) Write different symptoms caused by plant pathogenic bacteria.

Paper V - MEDICAL MICROBIOLOGY

Time : Three hours

Maximum : 100 marks

PART A - (5 x 8 = 40 marks)
Answer any FIVE of the following.
All questions carry equal marks.

1. Significance of normal flora.
2. Bacterial endotoxins.
3. Clostridium tetani
4. Dermatophytes
5. Hepatitis - B
6. Stool examination for E - histolytica.
7. Antiviral drugs.
8. Anaerobic culture methods.

PART B - (4 x 15 = 60 marks)
Answer all the FOUR questions.
All questions carry equal marks.

9. (a) Enumerate chemical barriers to infection and discuss in detail interferons.
Or
(b) Discuss in detail the mechanism of inflammation and clinical symptoms associated with it.
10. (a) Discuss pathogenesis, epidemiology, laboratory diagnosis and immunoprophylaxis of Salmonella typhi.
Or
(b) Discuss subcutaneous mycoses.
11. (a) Discuss pathogenesis, epidemiology, laboratory diagnosis of influenza virus infection. Add a note on influenza vaccins.
Or
(b) Discuss morphology, lifecycle, clinical features and laboratory diagnosis of plasmodium falciparum.
12. (a) Write an essay on the various methods of transmission of pathogens with examples.
Or
(b) Discuss role of biochemical tests in diagnosis of bacterial infections. Add a note on rapid biochemical tests.

Paper VI - IMMUNOLOGY AND CELLULAR MICROBIOLOGY

Time : Three hours

Maximum : 100 marks

PART A - (5 x 8 = 40 marks)
Answer any FIVE of the following .
All questions carry equal marks.

1. Cytokine activation.
2. Antigen - presenting cells.
3. CFT.
4. Rheumatoid factors.
5. Routes of bacterial invasion.
6. Superantigens.
7. Quorum sensing.
8. Programmed cell death.

PART B - (4 x 15 = 60 marks)
Answer ALL FOUR of the following.
All questions carry equal marks.

9. (a) Give an account on different types of granulocytic cells ? Explain the antimicrobial and cytotoxic activities of macropages.

Or

- (b) Enumerate the cytokines produced by Th 1 and Th2 cells and explain their biological activities.

10. (a) Discuss the structural and functional properties of different types of immunoglobulins.

Or

- (b) Give a brief account on the four types of Hypersensitive reactions.

11. (a) Describe the consequences of the adhesion on both the bacterial and host cells.

Or

- (b) Describe the mode of action of some important gram - negative bacterial toxins.

12. (a) Explain the role of cyclic nucleotide second messengers in the signal transduction pathways.

Or

- (b) Describe the role of pathogenic bacteria in inducing the apoptotic program in their respective hosts.

M.Sc. (Final) DEGREE EXAMINATION, DECEMBER 2005.
Second Year
Microbiology
Paper VII - MICROBIAL GENETICS AND MOLECULAR BIOLOGY

Time : Three hours

Maximum : 100 marks

PART A - (5 x 8 = 40 marks)
Answer any FIVE of the following.
All questions carry equal marks.

1. Ti plasmid and its uses.
2. Conjugational gene mapping in bacteria.
3. DNA mutations.
4. Rolling circle mechanism of replication.
5. Positive and Negative control of gene.
6. Translation in eukaryotes.
7. Cosmids.
8. PCR.

PART B - (4 x 15 = 60 marks)
Answer all the FOUR questions.
All questions carry equal marks.

9. (a) Describe different theories of gene concept.

Or

- (b) Describe the genetic recombination in phage and how is T4 genome mapped.

10. (a) Compare the enzymatic machinery and mechanism of DNA replication in prokaryotes to that of eukaryotes.

Or

- (b) Describe the mechanisms of various DNA lesions and their repair in bacteria.

11. (a) Describe in detail the genetics of Nitrogen fixation and its regulation in Rhizobium

Or

- (b) Describe various RNA components that are involved during transcription and translation in prokaryotes.

12. (a) Describe the structural organization and mechanism for movement of transposons.

Or

- (b) Describe various methods that generate transgenic plants and animals with suitable examples.

Second Year
Microbiology
Paper VIII - FOOD AND INDUSTRIAL MICROBIOLOGY

Time : Three hours

Maximum :100 marks

PART A - (5 x 8 = 40 marks)
Answer any FIVE of the following.
All questions carry equal marks.

1. ATP Photometry.
2. Association of molds and yeasts on foods.
3. Sauerkraut.
4. SCP.
5. Microbial transformation process.
6. Enrichment culture.
7. Semi continuous culture.
8. Cell harvesting.

PART B - (4 X 15 = 60 marks)
Answer all the FOUR questions.
All questions carry equal marks.

9. (a) Describe various methods of preservation of foods.
Or
(b) What are the various causes of food spoilage ? Describe microbial spoilage of vegetable, fruits, cereal grains and meat.
10. (a) Describe various micro flora of milk. How do you make cheddar cheese ?
Or
(b) Describe various food borne infections with suitable examples.
11. (a) How do you screen microorganisms important for production of commercial products?
Or
(b) Define fermentation. Describe the range of fermentation process.
12. (a) Write an essay on solid state fermentations.
Or
(b) Describe industrial production of Citric acid.