

FACULTY OF SCIENCE

M.Sc. I-Semester Examination, December 2018/January 2019

Subject: Biochemistry

Paper – I : Chemistry and Metabolism of Proteins and Lipids and Porphyrins

Time : 3 Hours

Max. Marks: 80

Note : Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

**PART – A (8X4=32 Marks)
(Short Answer Type)**

1. Topology of transmembrane proteins
2. Unusual amino acids
3. Phenylketonuria
4. Which amino acids are degraded to oxaloacetate? Explain
5. Cerebrosides
6. Waxes and their importance
7. Major phospholipids and their functions
8. Physiological impact of Ketone bodies

**PART – B (4x12=48 Marks)
(Essay Answer Type)**

9. (a) Describe the hierarchy in protein structure with suitable representations.
OR
(b) Write about (i) small and cyclic peptides (ii) SCOP & CATH based protein classification.
10. (a) Write down the steps involved in degradation of amino acids leading to formation of pyruvate. Explain transamination reaction.
OR
(b) Explain the degradation of branched chain amino acids and the disorders associated.
11. (a) Give an account of the composition of sterols and steroid hormones with suitable examples.
OR
(b) Write down the classification for simple and complex lipids. Add a note on oils and isoprene units.
12. (a) Explain the breakdown of fatty acids by α and β oxidation pathways and the energy yield.
OR
(b) Give an account of:
(i) Genetic disorders of nucleotide metabolism
(ii) Prostaglandins and thromboxanes

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M.Sc. I-Semester Examination, December 2018/January 2019

Subject: Biochemistry
Paper – II

Chemistry & Metabolism of Carbohydrates, Nucleic Acids & Vitamins

Time : 3 Hours

Max. Marks: 80

Note : Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

PART – A (8X4=32 Marks)
(Short Answer Type)

1. Conformation of Monosaccharides.
2. Hyaluronic acid and Keratan Sulfate.
3. Pasteur and Crabtree effect.
4. Pyruvate Dehydrogenase complex.
5. Linking number and supercoiling.
6. Cot curves.
7. Vit-D biological functions.
8. Vitamin B2 sources and deficiency symptoms.

PART – B (4x12=48 Marks)
(Essay Answer Type)

9. (a) Explain in detail structural organization of bacterial cell wall polysaccharides.
OR
(b) Discuss about structural polysaccharides of cellulose, chitin and pectin.
10. (a) Write down the steps involved in TCA cycle and add a note on its regulation and significance.
OR
(b) Explain the process of glycogen synthesis and breakdown in animals.
11. (a) Compare and contrast the structures of A, B and Z forms of DNA.
OR
(b) Explain the reactions involved in the synthesis of pyrimidine nucleotides. Add a note on regulation of Aspartate transcarbamoylase (ATCase).
12. (a) Discuss about sources, biological roles and deficiency symptoms of Vitamin A and C.
OR
(b) Explain the structural features, co-enzyme roles and deficiency symptoms of Vitamin Thiamine and Folic acid.

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FACULTY OF SCIENCE**M.Sc. I-Semester Examination, December 2018/January 2019****Subject: Biochemistry****Paper – III : Bio Analytical Techniques****Time : 3 Hours****Max. Marks: 80**

Note : Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

PART – A (8X4=32 Marks)
(Short Answer Type)

1. What is molar extinction co-efficient?
2. List out the uses of CD spectroscopy.
3. What is the principle behind the TLC? Explain.
4. How to identify the amino acids terminus regions.
5. How ultracentrifuge useful in biochemical research? Justify.
6. Which techniques are very useful in proteomic research and list their applications.
7. Discuss the applications of ^{32}P isotope.
8. Write a short note on fluorography.

PART – B (4x12=48 Marks)
(Essay Answer Type)

9. (a) Explain in detail X-ray crystallography and uses in protein chemistry.
OR
(b) On what principle spectroscopy works? Explain in step wise.
10. (a) Explain about the affinity chromatography with diagram and comment on applications.
OR
(b) How RP-HPLC is important in analytical chemistry/Biochemistry? Explain.
11. (a) What is the principle behind the electrophoresis? Explain about SDS PAGE.
OR
(b) A fixed-angle rotor exhibits a minimum radius, r_{\min} , at the top of the centrifuge tube of 3.5 cm, and a maximum radius, r_{\max} , at the bottom of the tube of 7.0 cm. what is the relative centrifugal field, RCF, at the top and bottom of the centrifuge tube?
12. (a) Explain the principle and applications of the GM counter.
OR
(b) Explain in detail about Hershey-chase experiment.

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Subject: Biochemistry
Paper – IV : Bioenergetics & Cell Biology

Time : 3 Hours

Max. Marks: 80

Note : Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

PART – A (8X4=32 Marks)
(Short Answer Type)

1. High energy compounds
2. Action potential
3. Bacterial growth Curve
4. Classification of prokaryotes
5. Apoptosis
6. Ultrastructure of animal cell
7. Compound microscope
8. Flow cytometry and cell sorting

PART – B (4x12=48 Marks)
(Essay Answer Type)

9. (a) Describe various types of bonds. Add a note on first and second order reactions.
OR
(b) Write note on biological oxidations and Electron transport chain.
- 10.(a) Describe in detail the staining methods for bacteria and ultrastructure of eubacteria.
OR
(b) Give an account of different methods of sterilization of materials and commonly used minimal media for bacterial growth.
- 11.(a) Describe the structure of chromatin and special chromosomes.
OR
(b) Discuss in detail about cell cycle.
- 12.(a) Enumerate animal and insect tissue culture methods.
OR
(b) Write an essay on different types of electron microscopy.