

[This question paper contains 4 printed pages.]

**Your Roll No.....**

**Sr. No. of Question Paper : 1402**

**I**

Unique Paper Code : 2532011103

Name of the Paper : Biochemistry of  
Carbohydrates and Lipids

Name of the Course : **Microbiology**

Semester : I (Part-I)

Duration : 3 Hours

Maximum Marks : 90

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions in all.
3. **All** questions carry equal marks.

P.T.O.

1. (a) Give an example of the following and draw their biochemical structures (**any three**) : (3×5=15)
  - (i) Non reducing disaccharide
  - (ii) Sugar derivative in fungal cell wall
  - (iii) Epimer
  - (iv) Essential fatty acid

(b) Define entropy and enthalpy. Write a mathematical expression relating these two terms. (1+2=3)
2. (a) Differentiate between the following (**any three**) : (3×5=15)
  - (i) Starch and Cellulose
  - (ii) Enantiomers and Diastereoisomers
  - (iii) Phosphoglycerides and Sphingolipids
  - (iv) Standard free energy change and Actual free energy change

(b) What are anomers. Discuss giving an example. (1+2=3)

3. (a) State true or false giving reason/s (**any four**) :  
(4×3=12)

- (i) Deoxyribose is a modified monosaccharide
- (ii) All sugars are optically active
- (iii) All monosaccharides are reducing in nature
- (iv) Oleic acid is a polyunsaturated fatty acid
- (v) Lipids are better storage fuel than carbohydrates

(b) Discuss how is free energy change of a chemical reaction related to the concentration of its reactants and products. (6)

4. (a) Write short note on the following (**any three**) :  
(3×5=15)

- (i) Energy rich compound
- (ii) Sphingomyelin
- (iii) Mutarotation
- (iv) Liposomes

(b) What is pectin? Give its function : (1+2=3)

5. (a) Explain why do the amphipathic lipid molecules form a bilayer structure? How does a bilayer differ from a monolayer? (3+3=6)
- (b) Glycogen with  $n$  branches have an  $n+1$  non-reducing end and one reducing end. Explain. (5)
- (c) Explain the laws of thermodynamics with examples. (7)
6. (a) What feature of Archeal membrane lipids help them to survive in extreme environments. (6)
- (b) Define Gibbs free energy and comment on exergonic and endergonic reactions. (6)
- (c) Explain with an example how a thermodynamically unfavorable reaction can be driven in the forward direction. (6)