

- (c) At 298 K, consider a reaction that has  $\Delta H = +50$  kJ/mol and  $\Delta S = -100$  J/mol K. Calculate the free energy change and determine whether the reaction is endergonic or exergonic at 298 K. (3)
5. (a) Discuss the tissue of origin/storage, function and the structure of insulin. (9)
- (b) Discuss the biochemical basis of the origin of aerobic organisms. (5)
- (c) The thickness of a cell membrane is 7 nm. If the membrane consists of 100 layers stacked on top of each other, what is the total thickness of the stacked membrane in micrometers? (3)
6. (a) Explain the base-stacking effect in DNA and discuss its significance in maintaining the stability and structure of the DNA double helix. (5)
- (b) Describe the structure of cholesterol and its functions in the body. (5)
- (c) What is the Miller-Urey experiment and explain its significance in explaining the origin of life? (4)
- (d) Explain the role of inorganic ions in living organisms. (3)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5032

J

Unique Paper Code : 3184002001

Name of the Paper : Biochemical Basis of Life (GE)

Name of the Course : B.Sc. (Hons) Biomedical Science

Semester : IV/VI

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. Answer **five** questions in all
3. **Question No.1** is compulsory.
4. Give illustrations and examples wherever necessary
5. Subparts of the questions should be attempted together

P.T.O.

1. (a) Give a one-word answer to the following questions

(1\*4=4)

- (i) Which type of organism obtains energy by oxidizing inorganic or organic compounds
- (ii) What term refers to the process of biological molecules originating from prebiotic compounds?
- (iii) What is the term for a reaction that releases energy?
- (iv) Which element is the most abundant in living organisms?

(b) Define

(2\*4=8)

- (i) Phototroph
- (ii) Endosymbiosis
- (iii) Gibbs Free Energy
- (iv) Peptide bond

(c) State True/False. Give reasons for your answer.

(2.5\*4=10)

- (i) RNA is an ideal genetic material.
- (ii) Carbon-carbon double bonds are common in biomolecules

(iii) Cell walls of both bacteria and plants are composed of cellulose.

(iv) Gelatin is not recommended as a sole protein source.

2. (a) Write short notes on the following: (4\*3=12)

- (i) Panspermia Hypothesis
- (ii) Entropy and Enthalpy
- (iii) Structure and Importance of Water

(b) Draw and explain the structure of glycogen

(5)

3. (a) Differentiate between the following (4\*3=12)

- (i) Endergonic and Exergonic Reaction
- (ii) Polymeric biomolecules and their monomers
- (iii) Enzymes and Hormones

(b) Describe in detail the different levels of organization in living systems. (5)

4. (a) Using a suitable diagram, explain in detail the various structural components of a prokaryotic cell and their functions. (9)

(b) Discuss the reactions catalyzed by proteases and nucleases. How do these enzymes catalyze these substrate-specific reactions? (5)