

(c) Consider a reaction with $\Delta H = -125 \text{ kJ/mol}$ and $\Delta S = 300 \text{ J/mol K}$ at 298 K. Calculate the Gibbs free energy for the reaction at 298 K and determine whether the reaction is spontaneous.

(3)

5. (a) Discuss any three different types of polysaccharides and their biological roles. (9)

(b) Discuss any five properties of DNA that make it an ideal genetic material. (5)

(c) How many grams of NaOH are required to make 250 mL of a 0.5 M NaOH solution? (3)

6. (a) Discuss any two major landmark events in the evolutionary history of Life. (5)

(b) ATP is often referred to as the energy currency of the cell. Comment (5)

(c) The process of the evolution of simple monomers into complex polymers was essential for the development of complex living beings. Comment. (4)

(d) Although ice and water are chemically identical (H_2O), ice still floats on water. Explain why this happens. (3)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4620

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 derives energy through the process of photosynthesis?
- (ii) Which theory explains the origin of eukaryotic cells from prokaryotes?
- (iii) What does ΔG stand for?
- (iv) Name the property of water that allows it to dissolve many substances?

(b) Define (2*4=8)

- (i) Heterotroph
- (ii) Anaerobes
- (iii) Endergonic Reaction
- (iv) Ester Linkage

(c) State True/False. Give reasons for your answer.
(2.5*4=10)

- (i) Acetyl CoA is a bifunctional biomolecule.
- (ii) Carbon-carbon triple bonds are common in biomolecules.
- (iii) Primary structure of a protein determines its higher levels of structural organization.

(iv) Triglycerides give less energy than carbohydrates.

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

- (i) Oparin-Haldane hypothesis
- (ii) Energy Coupling Reactions
- (iii) Trace Elements

(b) Draw and explain the structure of a nucleotide
(5)

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

- (i) Entropy and Enthalpy
- (ii) Prokaryotes and Eukaryotes
- (iii) Proteases & Lipases

(b) Describe any five key characteristics that define a living cell?
(5)

4. (a) Explain the structure and biological roles of triglycerides and cholesterol.
(9)

(b) Using suitable diagrams, compare and contrast the physical and biochemical properties of the cell wall architecture in Gram-negative and Gram-positive bacteria.
(5)