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Sr. No. of Question Paper : 7781

F-2

Your Roll No.....

Unique Paper Code : 2161202

Name of the Course : **Bachelor with Honours in Botany**

Name of the Paper : Fundamentals of Biochemistry

Semester : II

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FIVE** questions in all including Question No. 1 which is compulsory.

1. (a) Define any **four** of the following : (1×4=4)

- (i) Free energy
- (ii) Hydrogen bond
- (iii) Reducing sugars
- (iv) pH
- (v) Turnover number
- (vi) Redox reaction

(b) Give structures of any **three** of the following : (1×3=3)

- (i) α -D-glucose
- (ii) Sucrose
- (iii) Adenine
- (iv) α – amino acid at pH 7.0
- (v) Sterol

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- (c) Name any **four** of the following : (1×4=4)
- (i) An amino acid in which sulfur is present in R group
 - (ii) The pH at which proteins precipitate
 - (iii) The noncovalent bonds responsible for holding secondary structure of protein
 - (iv) An epimer of glucose
 - (v) A flavonoid that serves to attract insect pollinators
 - (vi) Monomeric unit of chitin
- (d) Fill in the blank in any **four** of the following : (1×4=4)
- (i) Sphingolipids do not contain glycerol but they do contain the long chain amino alcohol _____ .
 - (ii) Enzymes act by lowering the _____ of the reaction.
 - (iii) Mirror -image stereoisomers are also called _____ .
 - (iv) Hydrogen bonded portions of t-RNA molecule are called _____ .
 - (v) A chemical reaction would be _____ if ΔG^0 , value of the reaction is negative.
 - (vi) Ribose and deoxyribose are examples of _____ sugars.
- (e) Write the following statements as *True or False* in any **four** of the following :
- (i) An adenine thymine pair contains three hydrogen bonds.
 - (ii) A competitive inhibitor changes V_{\max} of the reaction but not K_m value for substrate.
 - (iii) Waxes are the esters of glycerol with long chain fatty acids.
 - (iv) The two strands of DNA run parallel from their 5' to 3' ends.
 - (v) Sucrose is a nonreducing sugar. (1×4=4)

2. Differentiate between any **four** of the following : (3½×4=14)
- (i) Covalent bonds and Noncovalent bonds
 - (ii) B and Z- DNA
 - (iii) Nucleoside and Nucleotide
 - (iv) Competitive and Noncompetitive enzyme inhibition
 - (v) Fibrous and Globular proteins
 - (vi) Homopolysaccharides and Heteropolysaccharides
3. (a) What is active site of an enzyme ? Explain some of the features of the active site. (7)
- (b) Why is ATP a high energy molecule ? Explain it with the help of structure of the molecule. (7)
4. (a) Explain the double helical structure of DNA with the help of a well labeled diagram. (8)
- (b) What do you understand by protein denaturation ? Discuss it with respect to the effect of temperature. (6)
5. (a) What are lipids ? Describe in detail their nomenclature, classification and roles in biological system. (10)
- (b) What properties of the water molecule allow it to function as a support to all living organisms ? (4)
6. Give reasons for any **four** of the following : (3½×4=14)
- (i) Change in fatty acyl components of the membrane when the organisms adapt to change in temperature.

- (ii) Presence of proline in a polypeptide chain causes a kink in the α -helical structure.
 - (iii) Membrane lipids are amphipathic molecules.
 - (iv) Artificial straightening and curling of hair can be done by chemical treatment.
 - (v) Fats are the preferred reserve energy source.
 - (vi) A diet rich in trans fats is a health risk.
7. Write short notes on any **four** of the following : (3½×4=14)
- (i) Second law of thermodynamics
 - (ii) Alkaloids
 - (iii) Hemicellulose
 - (iv) Nomenclature and classification of enzymes
 - (v) Sugar alcohols
 - (vi) t-RNA