

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 6361

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Your Roll No.....

Unique Paper Code : 249101

Name of the Course : B.Sc. (Hons.) / Bio-Chemistry

Name of the Paper : Biomolecules (BCHT 101)

Semester : I

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 ayfive questions.
3. Question No. 1 is compulsory.
4. Use of scientific calculator/log tables may be allowed.

1. (a) Fill in the blanks :

- (i) _____ is the biologically active form of pantothenic acid.
- (ii) Bees wax is rich in _____ .
- (iii) _____ is the most unstable species of RNA
- (iv) _____ is the mucopolysaccharide found primarily in² cornea.
- (v) _____ is an imino acid.
- (vi) Steroids are derivatives of _____ .
- (vii) _____ is a structural polysaccharide in insects.
- (viii) _____ is an amino acid that absorbs at 280 nm. (8)

(b) Give an example of :

- (i) A lipid, abundant in myelin sheath.
- (ii) A water soluble vitamin associated with oxidation reduction reactions,
- (iii) A standard amino acid that can link the polypeptide chains covalently.

P.T.O.

:

- (iv) An enantiomer of D fructose.
- (v) A biomolecule other than nucleic acid that has phosphodiester bonds.
- (vi) An amino acid that can be phosphorylated.
- (vii) Pro-vitamin A.
- (viii) An epimeric pair of sugars. (8)

(c) Give one significant contribution of the following scientists :

- (i) E. Chargaff.
- (ii) Emil Fisher
- (iii) D. Hodgkin (3)

2. Explain why ?

- (i) Sweetness of honey gradually decreases at high temperatures.
- (ii) Fructose on reduction gives a mixture of mannitol and sorbitol.
- (iii) The α -carboxyl group of amino acid is a stronger acid than the carboxylic group of comparable aliphatic acids.
- (iv) Alkali denaturation of DNA is preferred over acid denaturation.
- (v) Coconut oil contains low percentage of unsaturated fatty acids yet it has low melting point.
- (vi) Population that subsists on a corn rich diet often suffers from pellagra.
- (vii) Dipeptides do not give the biuret reaction. (14)

3. What happens when (for any seven) ?

- (i) RNA is treated with alkali.
- (ii) Glucose is treated with phenyl hydrazine.
- (iii) Glycerol is heated in the presence of KHSO_4 .

- (iv) Alanine is treated with ninhydrin reagent.
- (v) Cytosine is reacted with nitrous acid.
- (vi) Fructose is treated with bromine water.
- (vii) Cystine is treated with β -mercaptoethanol.
- (viii) Valine is treated with Sanger's reagent.
- (ix) Phosphatidyl choline (PC) is hydrolyzed with dilute alkali.
- (x) Glucose is treated with concentrated HNO_3 . (14)

4. Draw the structures of any 14 of the following :

- (i) 16:1^{Δ11}
- (ii) Lysine at pH 7.0
- (iii) α -L Fucose
- (iv) D-glucuronic acid
- (v) Psuedouridine
- (vi) Testosterone
- (vii) Ganglioside GM1
- (viii) Lysolecithin
- (ix) γ -Carboxy glutamic acid (Gla)
- (x) A-T base pair
- (xi) Citrulline
- (xii) Mono galactosyl diacyl glycerol
- (xiii) Retinol
- (xiv) Arachidonic acid
- (xv) Methylcytosine
- (xvi) Cholesterol
- (xvii) Lactose (14)

- 5
- (a) What is the approximate number of amino acid residues present in a protein of MW 200 kilodaltons (kD) ?
 - (b) Define Iodine number. What do you infer from the statement that a fat has low iodine number and high saponification number ?
 - (c) Indicate the roles of representative peptides.
 - (d) Name the major types of RNA in a eukaryotic cell and indicate their roles. (2,3,4,5)

6. (a) Match the vitamins with their characteristic :

Vitamin	Characteristic
(i) Vitamin B ₁₂	(a) A carrier of acyl groups.
(ii) Niacin	(b) It's deficiency can be induced by consuming raw eggs
(iii) Folic acid	(c) Is an antioxidant.
(iv) Ascorbic acid	(d) Deficiency causes pernicious anemia.
(v) Pantothenic acid	(e) Can be synthesized from a standard amino acid.
(vi) Biotin	(f) It is a versatile carrier of one carbon units.

(6)

(b) Indicate any two roles of waxes ?

(2)

(c) A disaccharide containing only glucose was exhaustively methylated and acid hydrolyzed. The only products obtained were 3,4,6-tri O-methyl D-glucose and 2,3,4,6 tetra O-methyl glucose. Deduce the structure of disaccharide.

(4)

(d) Nucleosides are more soluble in water than corresponding bases. Explain.

(2)

7. Compare the following pairs :

- (i) Z-DNA and B-DNA
- (ii) Starch and glycogen
- (iii) Plant and animal sterols
- (iv) Racemic mixture and meso form
- (v) Androgen and estrogen

(3,3,3,2.5,2.5)

8. (a) Write short notes on any three :

- (i) Lipoproteins
- (ii) Cell wall structure in gram positive bacteria
- (iii) Titration curve of glycine
- (iv) Blood group polysaccharides

(12)

(b) Chargaff's rules are not universal. Explain.

(2)

(200)