

Sl. No. of Ques. Paper : 911

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Unique Paper Code : 249101

Name of Paper : Biomolecules BCHT- 101

Name of Course : B.Sc. (Hons.) Biochemistry

Semester : I

Duration : : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all. Question No. 1 is compulsory.

Subparts of the questions should be attempted together.

Use of scientific calculator / log tables may be allowed.

1. (a) Name/Give terms for the following (any fifteen) :

- (i) A polysaccharide used in determination of glomerular filtration rate
- (ii) An anticoagulant mucopolysaccharide
- (iii) A sugar alcohol
- (iv) A storage polysaccharide
- (v) A non-proteinaceous amino acid
- (vi) Precursor of Vitamin A
- (vii) A lipid with signal transducing activity
- (viii) A methyl donor in biological reactions
- (ix) A nucleotide containing co-enzyme
- (x) A plant sterol
- (xi) Mirror image of D-glucose
- (xii) Provitamin-D
- (xiii) Most abundant polysaccharide in biosphere
- (xiv) An invert sugar
- (xv) A lipid for mitochondrial membrane
- (xvi) A lipid for chloroplast membrane

(xvii) An unusual nucleoside

(xviii) A mineralocorticoid hormone

(xix) A gram positive bacterium

(xx) A neurotransmitter.

1×15=15

(b) Give one contribution of the following scientists:

(i) C. Funk

(ii) Watson & Crick

(iii) Haworth

(iv) Chargaff.

1×4=4

2. Draw the structures of the following (any *fourteen*):

(i) Cholesterol

(ii) Ceramide

(iii) L-ascorbic acid

(iv) D-galacturonic acid

(v) Threonine

(vi) Cysteine

(vii) Phosphatidyl glycerol

(viii) Thiouracil

(ix) Arachidonic acid

(x) Hydroxy methyl cytosine

(xi) Folic acid

(xii) Pyridoxine

(xiii) Sialic acid

(xiv) Lysine

(xv) Lactose

(xvi) Galactitol

(xvii) Palmitic acid

(xviii) G-C base pair

(xix) Glucopyranose.

1×14=14

3. (a) Differentiate between the following with structures:

(i) Gram positive and gram negative bacterial cell wall

(ii) Starch and Cellulose

(iii) Nucleoside and Nucleotide

(iv) Lecithins and Cephalins.

4×3=12

(b) How many grams of glycine does a 2M aqueous solution of glycine contain?

2

4. (a) Draw the tautomeric forms of adenine and cytosine.

2

(b) Explain:

(i) Why the absorption of UV light by double stranded DNA increases when the DNA is denatured

(ii) The advantage of selecting TAG for long term reserve as compared to polysaccharide

(iii) Specific rotation of freshly prepared solution of glucose changes with time and reaches a stable value

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

3×4=12

5. Give reasons for the following statements:

(i) Mucopolysaccharides have shock absorption and lubrication properties.

(ii) The enzyme hydrolyzing sucrose is also called as invertase.

(iii) Biological membranes have amphipathic molecules.

(iv) Antioxidants are added to prevent butter from getting rancid.

(v) Annealing decreases absorption of light by DNA.

(vi) Vitamins are important in diet.

(vii) Dinucleotides have N-glycosidic as well as 3'-5'-phosphodiester linkage.

7×2=14

6. Differentiate between (any seven):

(i) B and Z conformations of DNA

(ii) Chylomicrons and LDL

(iii) Water soluble and fat soluble vitamins

- (iv) Chitin and glycogen
- (v) Essential and non-essential amino acids
- (vi) Phospholipids and sphingolipids
- (vii) Enantiomers and diastereomers
- (viii) DNA and RNA
- (ix) Omega 6 and omega 3 fatty acid.

7×2=14

7. (a) Calculate:

- (i) The length of double stranded DNA molecule of mol. wt. 3×10^7 (mol. wt. of one base pair = 660 da)
- (ii) Approx. mol. wt. of a protein with 500 amino acids
- (iii) The charge on phosphatidyl choline at pH 7 (explain with structure)
- (iv) The charge on ATP at physiological pH (explain with structure).

2×4=8

(b) Match the vitamins in the left column with their characteristics on the right:

- | | |
|-----------------------|---|
| (i) Vitamin B-12 | (a) Its co-enzyme form is a carrier of acyl group |
| (ii) Niacin | (b) Many animals synthesize it from glucose |
| (iii) Folic | (c) Deficiency causes pernicious anemia |
| (iv) Pantothenic acid | (d) Has PABA in its structure |
| (v) Ascorbic acid | (e) A vitamin that can be synthesized from amino acid |
| (vi) Biotin | (f) Deficiency caused by consuming raw eggs |

6

8. Write short notes on the following (any four):

- (i) Titration curve of glycine
- (ii) *t*-RNA
- (iii) Folic acid
- (iv) Prostaglandins
- (v) Mutarotation.

3.5×4=14