

09/01/25

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Your Roll No.....

Sr. No. of Question Paper : 1350

I

Unique Paper Code : 2492011101

Name of the Paper : Biomolecules

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

Semester : I

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions. Attempt any 4 questions.
3. All questions carry equal marks. Question no. 1 is compulsory.

1. (a) Identify the following statements as true or false and justify your answer :

- (i) All other amino acids except proline are optically active.
- (ii) Melting point of DNA is directly related to GC content.

P.T.O.

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(iii) Glycine acts as biological buffer at physiological pH.

(iv) Chitin is an example of storage polysaccharides.

(v) At pH more than p_i amino acids exists in negatively charged form.

(vi) Oleic acid has a higher melting point than stearic acid.

(b) Name the following :

(i) Methyl donor in biological reaction

(ii) Most abundant polysaccharide in biosphere

(iii) Active form of vitamin B1

(iv) An unusual base found in tRNA

(v) An example of ω -3 fatty acid

(vi) A hormone derived from amino acid

(9,6)

2. Differentiate between the following :

(a) Proteoglycans and Glycoproteins

(b) Glycerophospholipids and Sphingophospholipids

(c) Standard and non-standard amino acid

(d) B-DNA and Z-DNA

(e) Water soluble and Fat- soluble vitamins
(3×5=15)

3. (a) Explain why :

(i) Glucose is not stored in monomeric form.

(ii) Glycosaminoglycans have gel like consistency.

(iii) Amino acid can act as both acid and base.

(iv) Arginine is highly soluble in water however tryptophan is poorly soluble.

(v) DNA is resistant to alkali hydrolysis.

(vi) Vitamin K is called an anti-hemorrhagic vitamin.

(b) Give the active form of vitamin D along with its deficiency diseases.
(12,3)

4. (a) Draw the structure of the following :

(i) N- acetyl D glucosamine

(ii) Trehalose

(iii) Lysine

(iv) Aspartic acid

(v) Phosphatidyl Choline

(vi) 7 methyl Guanosine

(b) Triglycerides are considered as an ideal storage molecule. Comment.

(c) What do you mean by mutarotation? Explain with the help of example. (9,3,3)

5. (a) What are eicosanoids? Briefly describe the function of three classes of eicosanoids.

(b) Give the biological function of different forms of RNA.

(c) Draw the titration curve of glycine and discuss the information you obtained from the titration curve. (5,5,5)

6. Write short notes on the following :

(a) Lectins

(b) Biologically important nucleotides

(c) Glycolipids

(d) Waxes (3,5,4,3)

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Your Roll No.....

Sr. No. of Question Paper : 1389

I

Unique Paper Code : 2492011103

Name of the Paper : Biochemical Techniques

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

Semester : I

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. **All** questions carry equal marks. Question no. 1 is compulsory.

1. (a) Justify the following :

- (i) Glass cuvettes are not used to measure absorbance of DNA solutions.

P.T.O.

- (ii) A denser particle will have a higher sedimentation coefficient.
 - (iii) All fluorescence compounds have cyclic structures.
 - (iv) Why can be molecular weight of proteins not be estimated by Native-gel electrophoresis but can be calculated by SDS-PAGE?
 - (v) A spacer arm is interposed between ligand and the matrix in affinity chromatography.
 - (vi) Electrophoresis cannot be used for separation of lipids.
- (b) The absorbance of a 12×10^{-5} M solution at a wavelength of 280 nm is 0.5. The pathlength of the cuvette is 1 cm. Calculate the molar extinction coefficient. (12,3)

2. (a) Define the following :

- (i) Void volume
- (ii) Partition coefficient
- (iii) Exclusion limit
- (iv) Chromophore

- (v) Molar extinction coefficient
 - (vi) Stoke's shift
 - (vii) Retention factor
 - (b) Derive Beer-Lambert's Law and discuss its limitations.
 - (c) Describe the different types of rotors used for centrifugation. (7,5,3)
3. Mention the role of the following in SDS-PAGE :
- (a) SDS in the sample buffer
 - (b) β -mercaptoethanol
 - (c) TEMED
 - (d) Ammonium persulphate
 - (e) Coomassie Brilliant Blue
 - (f) Separating gel
 - (g) Bromophenol blue
 - (h) Glycerol
 - (i) Glycine

- (j) Tris buffer (15)
4. Differentiate between the following pairs :
- (a) Cation and anion exchangers
 - (b) Fixed angle and swinging bucket rotors
 - (c) Paper and thin layer chromatography
 - (d) Extrinsic and intrinsic fluorophores
 - (e) Isopycnic and rate zonal gradient centrifugation (15)
5. (a) Describe the principle and applications of affinity chromatography.
- (b) Explain the working of a double beam spectrophotometer with the help of a diagram.
- (c) Write the principle of ion-exchange chromatography and write two applications of this technique. (5,5,5)
6. (a) What are the properties of good matrix used in chromatography? Write two examples of matrices used in gel filtration chromatography.
- (b) Elaborate the principle of isoelectric focusing technique.
- (c) Explain the principle of agarose electrophoresis and cite two examples of its applications. ((200))