

Time: 3 Hours

(100 Marks)

Instructions:

- (i) All questions are compulsory. Choice is internal
- (ii) Figures to the right indicate full marks.
- (iii) Draw structures and diagrams wherever necessary.
- (iv) Normal calculator or log tables can be used if required.

Q1 A State True or False:

(04)

- (i) Bases are proton acceptors.
- (ii) In water, non-polar molecules precipitate.
- (iii) It takes less time to boil an egg on Mount Everest than in Mumbai.
- (iv) Gastric juice is more acidic than milk.

Q1 B) Give reasons for: (Any three)

(09)

- (i) When a lake freezes, animals underwater live comfortably.
- (ii) H^+ concentration gives an idea about pH of a solution.
- (iii) N_2 is water soluble.
- (iv) Butane and butanol both are able to form hydrogen bonds.
- (v) Mercury has a convex meniscus.
- (vi) Bicarbonate buffer is made up of two components.

Q1 C) Answer the following: (Any two)

(12)

- (i) With a suitable diagram, explain the molecular structure of water molecule. Explain why charged solutes like NaCl are readily soluble in water.
- (ii) Write a note on ionisation of water.
- (iii) Why are buffers important in the human body? Explain phosphate buffer as a physiological buffer.
- (iv) Define Normality. How many grams of solid NaOH will be required to prepare 850ml of 1.5 M NaOH solution? Express your answer in terms of Normality and g/lit. (Mol. wt of NaOH = 40gms)

Q2 A State True or False:

(04)

- (i) Phenylalanine is an imino acid.
- (ii) Haemoglobin is a transport protein.
- (iii) Peptide bond is a disulfide bond.
- (iv) Silk fibroin consists of polypeptide chains arranged in a α helix.

Q2 B) Give reasons for: (Any three)

(09)

- (i) Amino acids are zwitterions.
- (ii) Isoleucine has two chiral carbons.
- (iii) Proline gives a negative Ninhydrin test.
- (iv) Isoelectric pH of leucine is 6. At pH 10 it exists as anion.
- (v) Gelatin is an example of an incomplete protein.
- (vi) Denaturation only affects the secondary structure.

Q2 C) Answer the following: (Any two)

(12)

- (i) Justify the given statement: 'Amino acids can be classified into different groups based on polarity'.
- (ii) Explain the four levels of protein structural organization.
- (iii) What are Enantiomers? Write the structures of D- and L-Serine.
- (iv) Write an elaborate note on simple, conjugated and derived proteins.

Q3 A) State True or False:

(04)

- (i) Hyaluronic acid has ONLY $\beta 1 \rightarrow 3$
- (ii) Glycogen resembles amylose.
- (iii) Formation of stable ring structure of glucose involves C1 and C2.
- (iv) Reaction of ketone group with hydroxyl group leads to formation of hemiketal.

Q3 B) Answer the following: (Any three)**(09)**

- State True or False, giving reasons: "Glucose and galactose gives the same osazones"
- Write a detailed note on stereoisomerism in carbohydrates. How many isomers will a sugar having three asymmetric carbons have?
- With the help of reaction, explain the "Lobry de bruyn Alberda Van Ekenstein transformation".
- Justify in detail: "Carbohydrates have diverse functions"
- Giving reactions, explain the difference between Aldonic, aldaric and uronic acids.
- Discuss the structure, monomeric units and function of glycogen.

Q3 C) Answer the following: (Any two)**(12)**

- Draw the Haworth projections of alpha and beta-glucose. Also, specify the anomeric carbon. Explain the conversion of α to β anomers.
- Explain the disaccharide lactose under the following headings:
 - Structure
 - Type of linkage/bond
 - Occurrence
 - Characteristic properties
- Elaborate on the similarities and differences between cellulose and hyaluronic acid.
- With the help of structures, explain the reaction of (a) glucose with phenylhydrazine (b) Ribose with Orcinol

Q4 A) Define the following: (Any five)**(10)**

- Tautomerisation
- Racemic mixture
- pOH
- Van der Waal's force
- Polypeptide
- pI
- Furfural

Q4 B) Answer the following: (Any three)**(15)**

- Explain the significance of the carbohydrate present in sweet potato. Also, add a note on the action of amylases on it.
- Compare and contrast Maltose and Sucrose, under the following headings:
 - Structure
 - Glycosidic linkage
 - Function/Role
- Elaborate on **any two** chemical reactions of amino acids.
- Explain the role of entropy in the dissolution of solutes in water.
- Classify proteins based on shape and function.
- Between acetone and water, which one is a universal solvent? Give reasons for your answer.

XXXXXX

XXXXX