

(3 Hours)

(100 Marks)

Instructions to the candidates:

Please check that you have received the correct question paper.

- (i) All questions are compulsory. Choice is internal
- (ii) Figures to the right indicate full marks.
- (iii) Draw structures and diagrams wherever necessary.
- (iv) Use of simple calculators is allowed

Q.1 (A) State True or False:

(04)

- (i) 1 Normal solution = equivalent weight in g/1000ml solution.
- (ii) 1 Dalton is equal to 1 atomic mass unit.
- (iii) Latent heat and specific heat are synonyms.
- (iv) Weak acids have low K_a value.

Q.1 (B) Attempt the following: (Any three)

(09)

- (i) If Solution A is at pH 6.0 and solution B is at pH 9.0. Calculate the difference in the H^+ ion concentration between the two solutions.
- (ii) State True or False giving reason: pH scale is from -14 to 14.
- (iii) Define molarity and calculate the molarity of sucrose made by dissolving 180 gm in 500 ml of water (MW=342.)
- (iv) Give mechanism of action of basic buffer with suitable example.
- (v) Justify- Water is a universal solvent.
- (vi) Give an account of structure of a water molecule.

Q.1 (C) Attempt the following: (Any two)

(12)

- (i) Give detailed account of physiological buffers.
- (ii) Explain the significance of (a) surface tension (b) latent heat and (c) specific heat of water.
- (iii) Write a note on hydrogen bond. Explain the action of polar and non-polar compounds on water molecule.
- (iv) Discuss in detail the change in entropy of a system when a compound is dissolved in water.

Q.2 (A) State True or False:

(04)

- (i) Not all proteins have quaternary structure.
- (ii) Ninhydrin gives purple coloured complex after reaction with all amino acids.
- (iii) Albumin is an example of fibrous protein.
- (iv) Zwitter ion refers to the amino acid in neutral pH.

Q.2 (B) Attempt the following: (Any three)

(09)

- (i) Explain derived proteins.
- (ii) Explain the structure of peptide bond.
- (iii) Draw the structure of L-Phenylalanine and D- Serine.
- (iv) State the significance of Dansyl chloride. Name two alternative reagents that can be used instead.
- (v) With the help of a reaction, explain a test that can be used to detect the presence of amino acid in a solution.
- (vi) Comment on the classification of proteins based on nutrition.

Q.2 (C) Attempt the following: (Any two) (12)

- (i) Explain the Edman degradation process in detail.
- (ii) Classify proteins on the basis of their shape and function.
- (iii) Giving suitable example elaborate on secondary structure of proteins.
- (iv) Write a detailed note on protein denaturation.

Q.3 (A) State True or False: (04)

- (i) α -D Glucose and β -D Glucose are anomers.
- (ii) Maltose is non-reducing sugar
- (iii) Ribulose is a pentose sugar.
- (iv) Urine sample of Diabetes mellitus patient will test negative with Benedict's reagent

Q.3 (B) Attempt the following: (Any three) (09)

- (i) Write a short note on heteropolysaccharides.
- (ii) Fructosazones and glucosazones have identical structure. Explain it with the aid of a chemical equation.
- (iii) Explain the reaction of ribose with orcinol.
- (iv) Write a short note on non-digestible carbohydrates.
- (v) Draw the structures of L-Galactose, and D-Glucose
- (vi) Briefly explain glycosidic bond formation.

Q.3 (C) Attempt the following: (Any two) (12)

- (i) Elaborate on the composition of starch. Also explain action of different types of amylase on it.
- (ii) Classify carbohydrates based on (a) Monomeric units (b) Number of carbon atoms and (c) Functional group with suitable examples.
- (iii) Compare and contrast: Sucrose and Lactose
- (iv) In detail, explain the functions attributed to carbohydrates.

Q.4 (a) Define and explain: (Any five) (10)

- (i) Enediol
- (ii) Racemic mixture
- (iii) Isoelectric pH
- (iv) Buffering capacity
- (v) Colligative property
- (vi) pH
- (vii) Molarity

Q.4 (b) Write elaborate notes on: (Any three) (15)

- (i) Isomerism in carbohydrates
- (ii) Oxidation reactions of glucose
- (iii) Importance of water for life
- (iv) Weak interactions of biomolecules in aqueous solutions
- (v) Tertiary structure of proteins
- (vi) Types of bonds in protein molecule