(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 Ka 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
