3 Hours **Total Marks: 100**

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat and labeled diagrams** wherever necessary.
4. The use of **log tables** and **non-programmable calculators** is **allowed**.

Q.1 a. Do as directed: (Any Six) **06**

1. What type of secondary structure does Fibroin have?
2. Name a chemical denaturant used for protein denaturation.
3. **Select the correct alternative:**
   If Protein A is more thermostable than Protein B, then the temperature denaturation curve of Protein A will be _____
   a) To the right of Protein B b) To the left of Protein B
   c) Overlapping that of Protein B d) Crossing that of Protein B
4. Which technique is used to separate soluble proteins from insoluble cellular debris?
5. Which law determines the concentration of a protein from its absorbance?
6. **Fill in the blank:** Protein shows absorbance at _____nm
7. What does the 'G' in G-actin stand for?
8. **Select the correct alternative:**
   Native-PAGE separates proteins based on their _____
   a) Shape and function b) Shape and charge
   c) size and charge d) size and shape.
9. How many subunits is a myosin molecule made of?

Q.1 b. Answer the following questions: (Any Two) **14**

1. Discuss the significance of protein motifs as the structural foundation for protein classification.
2. Provide a rationale & graphical representation for the assertion that polypeptides fold rapidly through a step-wise process.
3. Elaborate on the concept of cooperative binding of hemoglobin with oxygen, including a graphical representation for clarity.

Q.2 a. Do as instructed: (Any Six) **06**

1. **Choose one correct answer:**
   What is the starting molecule of cholesterol synthesis?
   a) acetyl-CoA b) acyl-CoA c) glucose d) pyruvate
2. Define glycogenesis.
3. Name the glycogen–branching enzyme.
4. **Choose one correct answer:**
   How many carbons are present in HMC-CoA?
   a) 2 b) 4 c) 5 d) 6
5. **Choose one correct answer:**
   Peptidoglycan is made up of _____
   a) N-acetylglucosamine
   b) N-acetylmuramic acid
   c) N-acetylglucosamine, N-acetylmuramic acid
   d) N-acetylglucosamine, N-acetylmuramic acid, amino acids
6. Name the hormones that regulate cholesterol biosynthesis.
7. **State True or False:** In the daytime, starch synthesis takes place in the cytosol.

8. What is bactoprenol?
9. **State True or False:** Cholesterol's carbon atoms come solely from acetate.

Q.2 b. Answer the following questions: (Any Two) **14**

1. Give details on the synthesis of peptidoglycan in bacteria.
2. How cholesterol biosynthesis is regulated at the transcriptional level and by hormones?
3. Diagrammatically explain starch biosynthesis.

Q.3 a. Attempt the given questions: (Any Six) **06**

1. Which gland controls the basal metabolic rate (BMR)?
2. Name a hormone of the anterior pituitary gland.
3. Which hormone is responsible for converting the glycogen to glucose?
4. Which of the following hormones maintains the integrity of the uterine wall during pregnancy?
5. Which cells are responsible for the secretion of testosterone?
6. Which gland/organ is responsible for the secretion of human chorionic gonadotropin?
7. What is the primary function of ADH?
8. Which hormone is produced when the adrenal cortex is stimulated?
9. **Fill in the blank:** Group I hormone binds to _____ receptors.

Q.3 b. Answer the following questions: (Any Two) **14**

1. Explain the metabolic effects of insulin on carbohydrate and protein metabolism.
2. Discuss the biosynthesis, physiological, and biochemical functions of androgens.
3. Describe the metabolic fate of T_3 & T_4 & abnormalities in thyroid function.

Q.4 a. Do as directed: (Any Six) **06**

1. Name the vitamin whose deficiency causes scurvy in humans.
2. Name the chief cation of extracellular fluid.
3. **Select the correct alternative:**
   Which of the following elements prevent the development of dental caries?
   a) Fluorine b) Calcium c) Phosphorus d) Sodium)
4. Name the fat-soluble vitamin that is regarded as the sunshine vitamin
5. Give any one example of an essential trace element concerning human nutrition.
6. Name the protein that transports iron in the plasma in a bound form.
7. Give any one example of a vitamer of vitamin A.
8. **State True or False:** Vitamin K helps in blood clotting.
9. Name the vitamin that is exclusively synthesized by microorganisms.

Q.4 b. **Answer the following questions: (Any Two)** **14**

1. Discuss the biochemical functions, dietary requirements, sources, and absorption of calcium.
2. Give a brief account of vitamin C for its biochemical functions, dietary sources, dietary requirements, deficiency, and megadoses.
3. Describe obesity: its cause, classification based on BMI, and its treatment.

Q.5 **Write Short notes on the following: (Any Four)** **20**

a. ELISA
b. Insulin-associated disorders
c. Role of ADH & Diabetes insipidus
d. Ketogenesis
e. Marasmus
f. Justify - Vitamin D is a hormone
