**Important instructions:**
- Attempt all questions in order.
- Each question carries 10 marks.
- Read the question carefully and answer to the point neatly and legibly.
- Do not leave any blank pages between two answers.
- Indicate the question number correctly for the answer in the margin space.
- Answer all the parts of a single question together.
- Start the answer to a question on a fresh page or leave adequate space between two answers.
- Draw table/diagrams/flowcharts wherever appropriate.

**Write short notes on:**

1. a) Classify lipoprotein and state their characteristics. 
   b) List the functions of Poly Unsaturated Fatty Acids (PUFA).  
   5+5
2. Describe the role of vitamin K. What are good sources of this vitamin? List deficiency manifestations and explain the biochemical basis for these.  
   2+2+6
3. a) Clinical significance of copper.  
   b) Two genetic disorders of copper metabolism in reference to defective genes and copper metabolism.  
   2+(4+4)
4. What are different types of Glycogen storage diseases? Explain why a patient with Von-Gierke’s disease presents with hyperuricemia.  
   5+5
5. a) Explain Folate trap.  
   b) Role of folic acid and vitamin B₁₂ in megaloblastic and pernicious anemia, respectively.  
   4+(3+3)
6. a) Classify hormones on the basis of their mechanism of action.  
   b) Write about the hormones that are transported by plasma proteins.  
   4+6
7. a) Transamination reaction.  
   b) Chemiosmotic theory of oxidative phosphorylation.  
   c) TCA cycle as a metabolic hub.  
   2+4+4
8. Write major metabolic fates of pyruvate and acetyl CoA in mammals. Describe various adaptive changes if fasting is prolonged to the state of starvation.  
   4+6
9. a) Define reactive oxygen species.  
   b) Role of anti-oxidant vitamins in prevention of oxidative damage.  
   2+8
10. What is meant by protein energy malnutrition (PEM)? What are the types of PEM? Briefly describe the clinical and biochemical features of each type.  
   2+2+6

**POSSESSION / USE OF CELL PHONES OR ANY SUCH ELECTRONIC GADGETS IS NOT PERMITTED INSIDE THE EXAMINATION HALL.**