

## MSc Sem.-1 Examination

401

Bio-Chemistry

February-2025

Time : 2-30 Hours]

[Max. Marks : 70

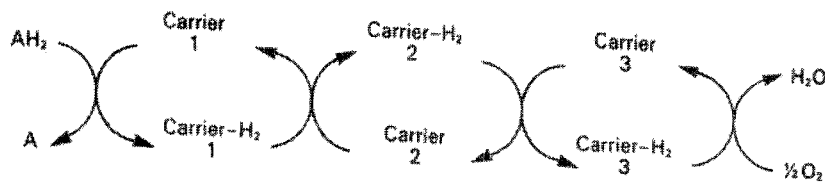
**Instructions:** Illustrate your answers with neat diagrams wherever necessary.

**Que 1 Write the following**

- What is complex III? Describe its function in the electron transport chain with a (7 Marks) diagram.
- What is quinone? What is FMN center? State the electron transfer reaction from Co-Q to cytochrome C. (7 Marks)

OR

- What is redox potential? From the given equation, state the name of the enzymes (7 Marks) and point out the oxidation and reduction steps of a metabolite in a respiratory chain.



- Explain chemo-osmotic model for ATP generation with a diagram. Write a short (7 Marks) note on "superoxide free radical may account for oxygen toxicity".

**Que 2 Write the following**

- Describe in detail about Starch. What is the difference between Amylose and Amylopectin? (7 Marks)
- Write a short note on Compound lipids (7 Marks)

OR

- What are Carbohydrates? Classify briefly with examples (7 Marks)
- Define Protein. What are the characteristics of peptide bond? What happens in protein conformation that leads to sickle cell disease? (7 Marks)

**Que 3 Write the following**

- What is Glycogenin? How does Glycogenin initiate glycogen synthesis? (7 Marks)
- Discuss the hormonal regulation of gluconeogenesis when blood glucose level is low. (7 Marks)

OR

- Discuss the regulation of HMP shunt when cells require more NADPH than ATP. (7 Marks)

- (ii) How many ATP molecules are generated in a single glucose molecule catabolism? (7 Marks)  
Discuss in brief with only energy formation steps.

**Que 4 Write the following**

- (i) What is the role of carnitine in fatty acid metabolism? Discuss with a proper (7 Marks) diagram.
- (ii) Give an account of  $\beta$  – oxidation of saturated even carbon fatty acid (Palmitic acid) (7 Marks) along with its energetics and regulation.

**OR**

- (i) How many ATP molecules will be generated after completely oxidizing Lauric acid (C12) and heptadecanoic acid (C17) Fatty acids? (7 Marks)
- (ii) Discuss the regulation of fatty acid synthesis and oxidation in high and low blood (7 Marks) glucose levels.

**Que 5 Attempt any seven out of twelve**

(14  
Marks)

- (i) Distinguish between saturated and unsaturated fatty acids with examples.
- (ii) What are the characteristics of glycogen?
- (iii) What is produced when Glutamic acid is decarboxylated?
- (iv) Give the clinical importance of  $\omega$ - oxidation of fatty acid.
- (v) Write the stages of Mitochondrial oxidation of fatty acids.
- (vi) Write the key importance of Phosphorylated Intermediates in the glycolytic pathway.
- (vii) Write the importance of Cori's cycle.
- (viii) Who is the competitive inhibitor of carnitine acyl transferase-I?
- (ix) What is the most common bonding orbital for carbon? When are carbons chiral and optically active?
- (x) What is the difference between equilibrium constant and dissociation constant?
- (xi) Why can't G6PD-deficient patients be given G6PD injections in the same manner that Type 1 Diabetic can be treated using insulin injections?
- (xii) Write the metabolic significance of the TCA cycle.