Sr. No. 757203

May-2026

M.Sc. (Zoology)– II SEMESTER

Metabolism (MLS-202)

Time: 3 Hours **Max. Marks:75**

Instructions: 1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 Define the following:

(a) Anabolism (1.5)

(b) Substrate level phosphorylation (1.5)

(c) ATP (1.5)

(d) Cori cycle (1.5)

(e) Fermentation (1.5)

(f) Ketone Bodies (1.5)

(g) Glucogenic amino acids (1.5)

(h) Nucleotide (1.5)

(i) Vitamins (1.5)

(j) Biosynthesis of triacylglycerols (TAGs) (1.5)

PART -B

Q2 (a) Explain the Electron Transport Chain (ETC) in detail. Describe the components, sequence of electron carriers, and their role in energy generation. (10)

(b) Explain the concept of bioenergetics. Discuss the laws of thermodynamics and their significance in biological systems. (5)

Q3 (a) Write a detailed note on glycogenesis. Discuss the steps involved in glycogen synthesis and explain hormonal regulation of the pathway. (5)

(b) Give a detailed account of the Citric Acid Cycle (TCA cycle). Discuss its reactions, regulation, amphibolic nature, and energetic significance. (10)

Q4 Describe the synthesis of cholesterol in detail. Explain the role of HMG-CoA reductase and regulation of cholesterol biosynthesis. (15)

Q5 (a) Explain the transport of fatty acids into mitochondria through the carnitine shuttle mechanism. (5)

(b) Explain the catabolism of fatty acids through β-oxidation. Describe the steps, energetics, and regulation of the pathway. (10)

Q6 (a) Describe the de novo synthesis of pyrimidine nucleotides with suitable diagrams. (10)

(b) Discuss disorders of nucleotide metabolism with reference to Gout and Lesch–Nyhan syndrome (5)

Q7 Write detailed notes on the following (**any two**): (15)

a) Amino acid catabolism and Urea cycle
b) Fatty acid synthesis
c) Glycolysis in eukaryotic cells