No. of Printed Pages : 3

MBC–005

M. SC. (BIOCHEMISTRY)

(MSCBCH)

Term-End Examination

June, 2025

MBC-005 : CONCEPTS AND CONNECTIONS IN METABOLISM

Time : 3 Hours *Maximum Marks : 100*

Note : *Attempt any* ***five*** *questions. All questions carry equal marks.*

1. (a) Explain second law of thermodynamics. 5

   (b) With the help of suitable diagrams, discuss electron transport chain of mitochondria. 15

2. (a) What is fermentation ? Elaborate with *two* examples. 10

   (b) Describe Pentose-Phosphate pathway with a suitable flowchart. 10

3. (a) Explain the regulation of glycogen metabolism. 10

   (b) Why is gluconeogenesis important ? Enumerate its unique reactions for the conversion of Pyruvate to Glucose. 10

4. Write detailed notes on any *two* of the following : 10+10

   (a) Glycogen storage diseases

   (b) β-oxidation of saturated fatty acids

   (c) Synthesis of unsaturated fatty acids.

5. (a) How is cholesterol synthesis regulated ? 10

   (b) What is transamination ? Give its salient features. 10

6. (a) Give an overview of amino acid catabolism. Explain catabolic pathway of amino acids yielding oxaloacetate. 10

   (b) Describe the biosynthesis of the following : 5+5

      (i) Aspartate family

      (ii) Aromatic amino acid family

7. (a) Discuss de novo synthesis of Inosine Monophosphate (IMP). 12

   (b) Enlist any *four* inhibitors of nucleotide synthesis. Mention their mechanism of action, enzyme inhibited and usage in medicine. 8

8. (a) Compare purine and pyrimidine nucleotide degradation. Explain Lesch-Nyhan syndrome. 10

   (b) Describe the role of liver as the 'metabolic hub' of the body. 10

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