2025

(FYUGP)

(5th Semester)

ZOOLOGY

(MAJOR)

Paper Code : ZOO/C–10 (T)

(Biochemistry of Metabolic Processes)

Full Marks : 75

Pass Marks : 40%

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Explain the significance of compartmentalization of metabolic pathways in eukaryotic cells. Illustrate, with examples, how spatial separation enhances regulation and efficiency of metabolism. 15

Or

Justify the statement that ATP is the universal energy currency of the cell. Describe its structural features and role in energy coupling. Explain the role of cofactors in cellular metabolism. 10+5=15

2. Describe the oxidative and non-oxidative phases of the pentose phosphate pathway. Explain its regulation and significance in cellular metabolism. 15

Or

Explain the malate-aspartate shuttle mechanism. How does it facilitate the transfer of reducing equivalents, and what is its physiological significance?

3. Explain the β-oxidation of a fatty acid with an odd number of carbon atoms. How is the final propionyl-CoA metabolized, and why is this pathway important? 15

Or

Explain the sequence of reactions in the de novo biosynthesis of palmitic acid. Highlight the role of acetyl-CoA carboxylase and fatty acid synthase in this pathway.

4. Explain the process of transamination in amino acid catabolism. Describe the role of aminotransferases and pyridoxal phosphate (PLP) in the transfer of amino groups, with suitable examples. 15

Or

Discuss the oxidative deamination of amino acids. Highlight the role of glutamate dehydrogenase and explain how ammonia is released and managed in the body.

(Continued)

5. Explain the concept of redox systems in metabolism. Discuss how electron carriers such as NAD^+/NADH, FAD/$FADH_2$, and cytochromes participate in biological oxidation-reduction reactions. 15

Or

Discuss the action of inhibitors and uncouplers of the electron transport chain. Give examples and explain their effects on oxidative phosphorylation.

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