

Total No. of Printed Pages: 02

B.Sc. (Semester-V) (CBCS Ordinance)

EXAMINATION APRIL 2023

ZOOLOGY

Biochemistry & Metabolic Processes

[Duration: 2 Hours]

[Total Marks:80]

Q.1 Answer Any Four of the following:

16

1. What are metabolic pathways and metabolic reactions? Give suitable examples of each.
2. Biological systems obey Laws of Thermodynamics. Justify.
3. State the oxidative decarboxylation reactions of Tricarboxylic acid cycle.
4. The tight coupling of electron transport and phosphorylation can be disrupted by certain agents. Name at least two such agents along with their mechanism of action.
5. Mention the metabolic reasons for the occurrence of Black urine disease and Phenylketonuria.
6. In modern times ketogenic diet is being promoted for weight loss. Explain how ketogenic diet can play a role in losing weight.

Q.2 Answer Any Four of the following:

16

1. What is meant by metabolism? What are the main purposes of metabolism?
2. In metabolic pathways which reactions are endergonic reactions? Explain with a suitable example.
3. What is the fate of glucose under aerobic and anaerobic conditions?
4. List any two inhibitors of oxidative phosphorylation along with their mechanism of action.
5. Differentiate between Glucogenic and Ketogenic amino acids.
6. State the major steps of alpha oxidation of fatty acids and mention where in a biological cell it occurs.

Q.3 A) Explain how an organism keeps the flow of metabolites through a given pathway constant and how it can make this flow change in response to changes in its environment. 06

OR

A) Explain how shuttle systems and transporters are important in metabolism and add a note on the mechanism of action of Glycerol-P shuttle. 06

B) Given that the standard free energy change for a biochemical reaction is $-9.912 \text{ kJ mol}^{-1}$. Reaction is happening under standard condition (temperature 25°C). Calculate the equilibrium constant of the reaction. (For calculating e^x , the value of e to be taken as 2.718281828, gas constant to be taken as 8.315 J/mol) 06

ZOC106

- Q.4** A) Elaborate the various regulatory reactions of Gluconeogenesis. 06
 OR
 A) Acetyl CoA is the starting material for Citric acid cycle, which itself is produced 06
 by the oxidation of pyruvate which in turn is originally derived from glucose. Give
 structural details and the mode of action of the enzyme catalysing the reaction in
 the formation of Acetyl CoA from pyruvate.
 B) Enzyme ATP synthase's mode of action is like a rotary motor. Explain. 06
- Q.5** A) Elaborate the metabolic pathway terrestrial animals undertake to metabolize 06
 ammonia, a toxic nitrogenous waste to a lesser toxic nitrogenous compound,
 carbamide and excrete in the urine.
 OR
 A) Mention the chemical formula and draw the structure of ATP. Give an overview 06
 of how ATP is generated in biological cells.
 B) Write a note on amino acid catabolism. 06
- Q.6** A) Explain the steps involved in the beta oxidation of fatty acids. 06
 OR
 A) Discuss any two metabolic disorders (other than phenylketonuria) associated with 06
 amino acid metabolism other than.
 B) Explain the reaction steps for the activation and transportation of fatty acids to the 06
 mitochondria for undergoing beta oxidation.