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ZOC 106

B.Sc. (CBCS) (Semester-V)
Examination NOVEMBER 2022
Zoology
Biochemistry & Metabolic Processes

[Duration: 2 Hours]

[Total Marks :80]

Q.1 Answer any four of the following: **16**

1. What does the term metabolism imply? What are the main purposes of metabolism?
2. In metabolic pathways which reactions are endergonic reactions? Explain with a suitable example.
3. Write a short note on "fate of glucose under aerobic and anaerobic conditions".
4. Name any two inhibitors of oxidative phosphorylation and their mode of action.
5. Mention the metabolic reasons for the occurrence of Alkaptonuria and Phenylketonuria.
6. Critically analyse the benefits and disadvantages of ketogenic diet.

Q.2 Answer any four of the following: **16**

1. Comment why involvement of glycerol-P shuttle ultimately yields less ATPs via Electron transport chain than Malate Aspartate shuttle.
2. Give the equation to show the quantitative relation between changes in free energy, enthalpy and entropy also, write the equation to show the relationship between standard transformed free energy change and equilibrium constant of a reaction.
3. What is Gluneogenesis? Comment on the physiological conditions which promote gluconeogenesis.
4. State the chemiosmotic coupling hypothesis for oxidative phosphorylation.
5. Mention the steps, significance and place of occurrence of Omega oxidation of fatty acids.
6. List the number of NADH, $FADH_2$, AcetylCoA and thereby the number of ATP produced per Palmitate oxidized to CO_2.

Q.3 A. Explain the stages of catabolism and the role of metabolic pathways in Catabolism. **06**

OR

A. Explain the need of shuttle systems and transporters in metabolism and add a note on the mechanism of action of Malate Aspartate shuttle.

B. Given that the standard free energy change for a biochemical reaction is -7.434 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**

Q.4 A. Write the reaction steps of the Oxidative phase of Pentose Phosphate Shunt. Mention the significance of the pathway and the location of its occurrence in the cell. **06**

OR

A. Explain the structures and mechanisms of the major components of mitochondrial respiratory chain.

B. Explain in detail the structure of F_1, subunit of ATP synthase enzyme involved in Oxidative phosphorylation. **06**

Q.5 A. What is meant by uncouplers of oxidative phosphorylation? Mention the mechanism of action of any two uncouplers of oxidative phosphorylation. **06**

OR

A. Terrestrial animals are known to metabolize ammonia, a toxic nitrogenous waste to a lesser toxic nitrogenous compound, carbamide and excrete it in the urine. Elaborate the pathway for this conversion.

B. Explain the process of oxidative deamination of amino acids. **06**

Q.6 A. Outline the steps involved in the beta oxidation of unsaturated fatty acid (C18:2). **06**

OR

A. Anomalies in Phenylalanine and tyrosine catabolism leads to unique metabolic disorders. Discuss.

B. Role of Acetyl CoA and Carnitine in transfer of fatty acids from cytoplasm to mitochondria. **06**