

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1802

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Unique Paper Code : 6792012401

Name of the Paper : Metabolism and Integration

Name of the Course : **B.Sc. (Hons) Biological Science (NEP)**

Semester : IV

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions. **Question No. 1 is Compulsory.**
3. All questions carry equal marks.

I. A. Justify the following statements. (any 5)

- i. Ammonia is toxic to cells.
- ii. Glycine is an important precursor for de novo synthesis of purines.
- iii. Triglycerides are suitable energy reserves of the cell than carbohydrates.
- iv. Conversion of Glyceraldehyde-3-phosphate to 3-phosphoglycerate is an energy coupling process.
- v. Vertebrates cannot convert fatty acid into glucose.
- vi. Living organisms are open systems.

B. Give an example each of a reaction requiring the following coenzyme:

- i. TPP
- ii. NAD^+
- iii. NADP^+
- iv. PLP
- v. FAD^+

(10, 5)

2. Differentiate between the following pairs:

- i. Glucogenic & ketogenic amino acids
- ii. Carbamoyl phosphate synthetase I & II
- iii. Substrate level phosphorylation and oxidative phosphorylation
- iv. De novo and salvage pathway of purine biosynthesis
- v. Anabolism and catabolism

(15)

3. A. Standard free energy change is directly related to equilibrium constant. Explain.

B. Explain in detail the reciprocal regulation of glycolysis and gluconeogenesis.

C. Explain the symptoms, molecular mechanism and treatment associated with the following diseases: Phenylketonuria, Lesch nyhan syndrome

(3, 6, 6)

P.T.O.

4. A. How is acetyl coA that is produced in the mitochondria transferred to cytosol for fatty acid biosynthesis?
B. Calculate the number of ATP molecules produced when one molecule of Palmitate is completely oxidized.
C. Briefly explain the lipoprotein cycle. (6, 4, 5)
5. A. What is the significance of the Pentose phosphate pathway? Describe the fate of Glucose-6-phosphate when the need for NADPH exceeds that of Ribose-5-phosphate.
B. Explain the metabolic shifts that occur during starvation and the well-fed stage.
C. Describe Malate-Aspartate shuttle system. (5, 5, 5)
6. A. Write down the steps to accomplish the following conversions – any 3
i. Glutamate to α -ketoglutarate
ii. dUMP to dTMP
iii. Stearic acid to Oleic acid
iv. Pyruvate to ethanol
B. Explain in detail the urea cycle and its regulation.
C. Explain the regulation of Glycogen phosphorylase enzyme. (6, 6, 3)