

Sl. No. of Ques. Paper : 2034

GC-3

Unique Paper Code : 32491301

Name of Paper : Metabolism of Carbohydrates and Lipids

Name of Course : B.Sc. (Hons.) Biochemistry (CBCS)

Semester : III

Duration : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all. Question No. 1 is compulsory.

1.(a) Comment on the following:

- i. The pyruvate to lactate conversion in animals is reversible but the pyruvate to ethanol fermentation in yeast is irreversible.
- ii. Fatty acid biosynthesis is affected if oxidative phase of HMP pathway is inhibited.
- iii. Odd chain fatty acids in mammals can contribute to oxaloacetate synthesis.
- iv. Phosphorylation of glucose inside cell is advantageous.
- v. An individual with genetic defect in enoyl CoA isomerase will have difficulty in metabolizing oil or butter.
- vi. α -oxidation is an additional step for catabolism of some branched fatty acids.
- vii. Although PEP carboxylase is found in adipocytes but gluconeogenesis does not occur.
- viii. The person having glucose- 6- phosphate dehydrogenase enzyme deficiency may have hemolytic anemia.

(b) Name the enzymes:

- i. Multienzyme complex of TCA cycle
- ii. Enzyme responsible for conversion of malate to pyruvate.
- iii. Enzyme deficient in Von Gierke disease

(16, 3)

2(a) How acetyl CoA is transported from mitochondria to cytosol for fatty acid synthesis?

(b) How is muscle lactate converted to glucose during strenuous exercises?

(c) What do you understand by substrate level phosphorylation? Explain with examples.

(d) PFK is called first committed step of glycolysis. Justify.

(4, 4, 4, 2)

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3. Write down the reactions for the following:

- i. Synthesis of ceramide from serine and palmitic acid.
- ii. Entry of galactose to glycolysis.
- iii. Fatty acid oxidation in mitochondria.

(5, 4, 5)

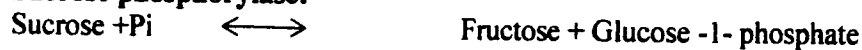
4(a) Differentiate between the following:

- i. Glycolysis and gluconeogenesis
- ii. C3 and C4 plants
- iii. Malate aspartate shuttle and glycerol 3 phosphate dehydrogenase shuttle

(5, 4, 5)

5(a) Sucrose can enter glycolysis by either of the two routes :

Sucrose phosphorylase:



Invertase:



Would either of these reactions offer an advantage over the other in the generation of hexoses for entry into glycolysis?

- (b) What are anaplerotic reactions and how these reactions help in TCA cycle?
- (c) How many ATPs will be obtained on aerobic oxidation of one mole of glucose? Give the overall reaction.
- (d) What is photorespiration and how does it limit the growth of plants?

(2, 4, 4, 4)

6.(a) Give the physiological reasons for the Pompe's disease and Mc Ardle disease.

(b) Write down the reactions for biosynthesis of phosphatidyl ethanolamine and phosphatidyl choline in mammals.

(c) Acetyl CoA can be converted into glucose in plants but not in animals. Explain with reactions.

(4, 5, 5)

7. Justify the following statement with examples:

- i. Carnitine molecule carries acyl group across the mitochondrial membrane.
- ii. Desaturation of fatty acids requires mixed function oxidase.
- iii. An individual with a fructose 1, 6-bis phosphatase enzyme deficiency would have elevated level of pyruvate in blood.
- iv. Arsenate affects ATP synthesis but does not stop glycolysis.
- v. HMG-CoA reductase is a key regulator of cholesterol biosynthesis.

8. Write short notes on the following:

(3, 3, 2, 3, 3)

- i. Ketone bodies synthesis
- ii. Glycogen breakdown
- iii. Multienzyme complex
- iv. β oxidation in peroxisomes

(3.5x4=14)