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S. No. of Question Paper : **5791**

Unique Paper Code : **2492011202**

Name of the Paper : **Metabolism of Carbohydrates**

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

Semester : **II**

Duration : **2 Hours**

Maximum Marks : **60**

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

There are *six* questions.

Attempt any *four* questions.

All questions carry equal marks.

Question No. 1 is compulsory.

1. (A) Justify the following statements :

- (i) Glycogenin is the primer involved in glycogen synthesis.
- (ii) Intermediates of glycolysis are not able to leave the cells in which they are formed.
- (iii) Metabolic pathways are irreversible.
- (iv) Liver glycogen contributes to blood glucose but not muscle glycogen.
- (v) Lactate accumulation takes place in muscles during strenuous exercise.
- (vi) Glucose-6-phosphate dehydrogenase deficient persons show resistance to malarial parasite.

P.T.O.

(B) Give the reaction for the following :

- (i) Committed step of glycolysis
- (ii) Reaction catalyzed by Branching enzyme
- (iii) Reaction involved in substrate level phosphorylation in TCA cycle
- (iv) Conversion of galactose 1-phosphate to glucose 1-phosphate
- (v) Reaction catalyzed by phosphoglucomutase
- (vi) Conversion of pyruvate to phosphoenolpyruvate. 9,6

2. (A) Why does glycolysis and gluconeogenesis not occur simultaneously ?
Explain the reciprocal regulation of glycolysis and gluconeogenesis with respect to PFK I and PFK II.

(B) Give the biochemical basis and symptoms of the following diseases
(any four) :

- (i) Von Gierkés
- (ii) Cori disease
- (iii) Pompe disease
- (iv) McArdle disease
- (v) Lactose intolerance. 7,8

3. (A) Explain why ATP is the most suitable form of energy currency in the cell.

(B) Differentiate between the following :

- (i) Autotrophs and Heterotrophs
- (ii) Lactate fermentation and alcohol fermentation
- (iii) Hexokinase and Glucokinase
- (iv) Oxidative phosphorylation and substrate level phosphorylation

3,12

4. (A) What is the significance of Pentose Phosphate Pathway ? Describe the fate of glucose-6-phosphate when the need for NADPH exceeds that of ribose 5-phosphate.

(B) Describe how increased level of the following molecules will affect the glycolysis rate ?

- (i) Increased level of F-6-P
- (ii) Increased ATP
- (iii) Increased Citrate.

(C) Write down the reactions affected by the following inhibitors/drugs :

- (i) Arsenate
- (ii) Fluoride
- (iii) Iodoacetate
- (iv) Malonate.

5,6,4

5. Write short notes on the following :

(i) Cori cycle

(ii) Anaplerotic reactions

(iii) Regulation of Pyruvate Dehydrogenase complex

(iv) Any *two* feeder pathways for glycolysis

4,3,4,4

6. (A) What are the advantages of storing glucose in the form of glycogen ? How does the glycogen breakdown occur under hypoglycemic conditions ?

(B) Describe in detail the role of *three* enzymes and give coenzymes involved in the conversion of pyruvate to acetyl CoA by Pyruvate dehydrogenase complex.

(C) TCA cycle provides substrate for several biosynthetic processes. Justify.

6,5,4