This question paper contains **4** printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **5687**

Unique Paper Code : **2494002019**

Name of the Paper : **Intermediary Metabolism**

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

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **90**

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

There are 8 questions.

Attempt any *six* questions.

Question No. **1** is compulsory.

All questions carry equal marks.

1. (A) Define the following :

(*a*) Multienzyme complex

(*b*) Fatty acid activation

(*c*) Hyperuricemia

(*d*) Fasting blood sugar

(*e*) Amphibolic pathway.

P.T.O.

(B) Indicate whether true *or* false with justification :

(*a*) The reactions of glycolysis occur only in the mitochondrial matrix.

(*b*) Reduced coenzymes are a source of energy.

(*c*) β-Oxidation of fatty acids is an energy-yielding process.

(*d*) Triacylglycerol is an ideal storage molecule.

(*e*) Liver glycogen is the source of blood glucose. 5,10

2. Differentiate between the following :

(*a*) Preparatory and payoff phase of glycolysis.

(*b*) Krebs bicycle and the Glucose-Alanine cycle.

(*c*) Role of Insulin and Glucagon in sugar metabolism. 5×3

3. Write short notes on the following :

(*a*) Ketogenesis

(*b*) Urea cycle

(*c*) Pyruvate dehydrogenase complex. 5×3

4. Give reasons for the following :

(*a*) The pentose phosphate pathway is overactive in the adipose tissue.

(*b*) Urea cycle is energetically inexpensive.

(*c*) Deficiency of Glucose-6-phosphatase can be of serious consequences.

(*d*) Transaminases are clinically significant.

(*e*) HGPRT is a key enzyme in the purine salvage pathway. 3×5

5. Identify the disease and discuss the biochemical basis of the disease :

(*a*) A young male child was reportedly showing symptoms of self-mutilation and poor mental growth.

(*b*) Ketoacidosis is observed in an adult patient along with polyuria, polyphagia and polydipsia.

(*c*) Swelling of joints and high levels of uric acid in the blood of the patient.

(*d*) Excessive phenylalanine is found in the blood of a young child who is intellectually disabled.

(*e*) Presence of high blood sugar, severe fatigue, increased thirst, weight loss seen in middle aged adults. 3×5

6. Answer the following :

(*a*) Discuss the importance of the TCA cycle and its regulation.

(*b*) Explain the reciprocal regulation of glycolysis and gluconeogenesis.

(*c*) What are the metabolic shifts that occur during the starvation state ? 5×3

7. (*a*) How are fatty acids activated for their breakdown ? Explain the mechanism.

(*b*) Explain the role of triacyl glycerol as an energy source.

(*c*) Explain the Glycerol-3-phosphate shuttle. Why is it considered an expensive shuttle ? 5×3

8. (*a*) Show stepwise the number of ATP produced by the complete oxidation of palmitic acid.

(*b*) Explain the different fates of pyruvate in living systems.

(*c*) How is uric acid synthesized by the degradation of purines ? 5×3