Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Biotechnology) (Sem.–1)

BIOMOLECULES AND BIOTECHNOLOGY

Subject Code : MTBT-103

M.Code : 23003

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. a) Define a receptor. Discuss the structure of GPCR in carbohydrate metabolism. (02+05+03)

   b) Highlight the difference between Autocrine, Paracrine and Endocrine signalling by giving appropriate examples. (10)

2. a) Starch and Cellulose are carbohydrates. Briefly discuss how they differ structurally and functionally. (05)

   b) Basically Gluconeogenesis pathway is reverse of glycolysis but has three bypass reactions. Give the three by pass reactions which occur in glycolysis. (10)

   c) What is β- oxidation? Briefly discuss the β-oxidation of Palmitic acid. How many ATP's are generated? (01+04)

3. a) Thermodynamically unfavourable reactions cannot be carried out *in vitro* but they move in forward directions under *in vivo* conditions. How does this happen? Explain by giving suitable example. (05)

   b) Explain the role of phosphoanhydride bonds in energy generation and highlight the role of Creatine kinase. (08)

   c) Write Short notes on (approx. 500-600 words) : (07)

      i) Pyruvate dehydrogenase complex

      ii) Chemiosmotic coupling hypothesis.

4. a) Give an account on medical and diagnostic applications of enzymes. (10)

   b) Discuss briefly the different mechanism of enzyme inhibition. Give a suitableaccount wherein enzyme inhibitors have been used as therapeutic agents/ drugs. (05+05)

5. a) The enzyme hexokinase has four isoenzymes, Hexokinase I, II, III, IV. Hexokinase IV is also known as Glucokinase. How does Glucokinase differ from other Hexokinase isomers? (05)

   b) Pyruvate is converted into Acetyl CoA which further participates in Citric acid Cycle. Briefly write about the Pyruvate Dehydrogenase Complex (PDC) and explain its mechanism of conversion of pyruvate to Acetyl CoA. (10)

   c) Bacterial signalling is different from mammalian signalling. Explain. (05)

6. a) Write short notes on any two (500 words approx) : (10)

      i) F_oF_1 Particle

      ii) Voltage gated ion channel

      iii) Cori's cycle

      iv) Electron Transport Chain

   b) Briefly discuss the catalytic mechanism of Chymotrypsin. (10)

7. Citric acid is anaplerotic cycle. Draw a well labelled diagram of Citric acid cycle giving names of all intermediates and enzymes. Also show connections of this cycle with amino acid metabolism and fat metabolism. (20)

8. a) Electron transport chain exists in both animals and plants. Give the differences between both electron transport chains. (12)

   b) Steroids communicate in different manner as compared to other hormones. Explain briefly the different mechanisms used by steroids during signal transduction. (8)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.