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CS/B.TECH (BT)(N)/SEM-3/BT-302/2012-13

2012

BIOCHEMISTRY

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) The net gain of ATP molecules resulting from Glycolysis is
   - a) 2 b) 4
   - c) 36 d) 38.

   ii) TCA cycle takes place at
   - a) nucleous b) mitochondria
   - c) cytosol d) chloroplast.

   iii) The storage form of carbohydrate in animal is
   - a) starch b) cellulose
   - c) glycogen d) glucose.

   iv) The largest energy reserve (kilocalories) in humans is
   - a) blood glucose
   - b) liver glycogen
   - c) muscle glycogen
   - d) adipose tissue triglyceride.

v) The coenzyme involved in transfer of carboxyl group
   a) NADH
   b) coenzyme *A*
   c) *S*-adenosyl methionine
   d) biotin.

vi) Acyl Carrier Protein takes part in
   a) amino acid degradation
   b) glycolysis
   c) fatty acid biosynthesis
   d) fatty acid degradation.

vii) The molecule which does not contain a high-energy bond is
   a) ATP b) AMP
   c) ADP d) ppi.

viii) Glycolytic pathway regulation involves
   a) allosteric stimulation by ADP
   b) allosteric inhibition by ATP
   c) feedback, or product, inhibition by ATP
   d) all of these.

ix) Glycogen has
   a) α-1, 4 linkage
   b) α-1, 6 linkages
   c) α-1, 4 and α-1, 6 linkages
   d) α-1, 4 and β-1, 6 linkage.

x) The lipid bilayer is impermeable to
   a) hydrocarbons
   b) hydrophobic molecules
   c) small uncharged polar molecules
   d) large uncharged polar molecules.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. How Vibrio cholerae toxin reacts with our body ?

3. Describe in brief the process of omega oxidation.

4. What is glyoxylate cycle ? Name two key enzymes of glyoxylate cycle and write the reactions catalyzed by these enzymes. 1 + 4

5. What do you mean by transamination ? Discuss the role of vitamin B_6 in transamination. 2 + 3

6. Discuss the induced fit hypothesis to describe the enzyme-action.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Calculate how many ATPs are formed by complete β oxidation of one molecule of stearic acid.

   b) Discuss catabolism of arginine.

   c) What do you mean by oxidative deamination ?

   d) Give a brief account on disorders of purine nucleotide metabolism. 5 + 2½ + 2½ + 5

8. a) What is signal transduction ?

   b) What are the different types of receptors involved in cell signaling ?

   c) How *G* protein is activated by epinephrine ?

   d) What are second messengers ? Name two second messengers molecules. 3 + 4 + 4 + 4

9. a) How do PRPP levels influence purine and pyrimidine nucleotide synthesis ?

   b) How are folate cofactors involved in nucleotide metabolism ?

   c) What is glutathione ? Describe its synthesis and function in cell. 4 + 5 + 6

10. a) What are the differences between Oxidative and Reductive pentose phosphate pathway.

    b) Give the other names of these pathways.

    c) Explain with the help of a schematic diagram the PPP pathway of a cell.

    d) Does this pathway occur in all cells ?

    e) Give at least two importance of this pathway.

    3 + 2 + 8 + 1 + 1

11. a) What is oxidative phosphorylation ? Write the sequence of electron carriers in the respiratory chain ?

    b) State and explain chemiosmotic coupling hypothesis.

    c) Name two inhibitors of electron transport chain and show where they are acting ? 2 + 5 + 4 + 4

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