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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 4 b) d) c) 36 38. TCA cycle takes place at ii) mitochondria a) nucleous b) 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.

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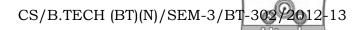


- v) The coenzyme involved in transfer of carboxyl group
  - a) NADH
  - b) coenzyme *A*
  - c) S-adenosyl methionine
  - d) biotin.
- vi) Acyl Carrier Protein takes part in
  - a) amino acid degradation
  - b) glycolysis
  - c) fatty acid biosynthesis
  - d) fatty acid degradation.
- vii) The molecule 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)  $\alpha$  -1, 4 linkage
  - b)  $\alpha$  -1, 6 linkages
  - c)  $\alpha$  -1, 4 and  $\alpha$  -1, 6 linkages
  - d)  $\alpha$  -1, 4 and  $\beta$  -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 enzymeaction.

## **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  $\beta$  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.  $5 + 2\frac{1}{2} + 2\frac{1}{2} + 5$
- 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

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- 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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