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# CS/B.Tech (BT-NEW)/SEM-3/BT-302/2011-12 2011 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) Which of the following is Not a typical event associated with cell signalling?
    - a) Activation of G-proteins by exchanging GTP for  $\operatorname{GDP}$
    - b) Production of the second messengers cAMP and  $IP_3$
    - c) Stimulation of apoptosis
    - d) Activation of protein kinases.
  - ii) Estrogen and testosterone are steroid hormones, and are most likely to bind to
    - a) membrane ion channel
    - b) enzyme linked membrane receptor
    - c) G-protein linked membrane receptor
    - d) cytoplasmic receptor.

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## CS/B.Tech (BT-NEW)/SEM-3/BT-302/2011-12

- iii) Acetyl CoA is produced by
  - a) Pentose phosphate pathway
  - b) Beta oxidation
  - c) TCA cycle
  - d) None of these.
- iv) In plants, under anaerobic conditions pyruvate is converted into
  - a) Ethanol
- b) Lactate

c) Water

- d) Acetyl CoA.
- v)  $\beta$ -alanine is the degraded product of
  - a) thymidine
- b) cytidine
- c) aspartic acid
- d) cholesterol.
- vi) Three amino acids that donate amino groups for the purine biosynthesis are
  - a) glycine, glutamine, aspartate
  - b) glycine, beta alanine, aspartate
  - c) glycine, alanine, aspartate
  - d) lysine, glutamine, aspartate
  - e) lysine, glutamate, asparagine
  - f) lysine, glycine, asparagine.
- vii) Inactive precursors of some enzymes that are activated through hydrolysis reactions are called
  - a) allosteric enzymes
  - b) apoenzymes
  - c) holoenzymes
  - d) prosthetic groups
  - e) zymogens.





- a) catabolic
- b) amphibolic
- c) anabolic
- d) cyclic.
- ix) Example of a second messenger is
  - a) cAMP
  - b) ATP
  - c) GTP.
- x) Nitric oxide and urea have in common the fact that they both have as an immediate precursor amino acid
  - a) aspartate
- b) arginine
- c) glutamate
- d) phenyl alanine.

#### **GROUP - B**

## (Short Answer Type Questions)

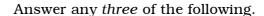
Answer any *three* of the following.

 $3 \times 5 = 15$ 

- 2. Describe in brief the pentose phosphate pathway.
- 3. Briefly explain the effect of a bacterial toxin on G-protein.
- 4. Write down a short note on allosteric regulation.
- 5. What are the end products of odd carbon fatty acids after complete  $\beta$ -oxidation ? Explain with reactions.
- 6. How glycogen breakdown has been stimulated in response to hormone action?

#### **GROUP - C**

### (Long Answer Type Questions)





- 7. Classify enzymes in six different categories with examples. What do you mean by enzyme unit and specific activity? Differentiate coenzyme and prosthetic group. Explain the effect of pH and temperature on enzyme activity. 6 + 3 + 2 + 4
- 8. Explain the main three extracellular signalling types with examples. Define second messenger with example. Explain the role of a second messenger regarding glycogen metabolism. What do you mean by cellular adhesion?

6 + 1 + 6 + 2

- 9. In a diagrammatic representation, describe all steps of TCA cycle with the structure of the intermediates mentioning the enzymes and the cofactors. Briefly describe in a flow chart how acetyl CoA is produced from pyruvate? 7 + 3 + 2 + 3
- 10. Mention catabolic pathway of phenyl alanine. What defect in this pathway results in phenyl ketonuria? Discuss urea cycle. Discuss how C4 plants share advantage over C3 plants. 4+1+5+5
- 11. Discuss about any one disorder of amino acid metabolism. Write down a short note on transamination. Describe catabolism of tyrosine. "Protein turnover is tightly regulated." Explain. 4+4+4+3