



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**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 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.



- 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.



- viii) TCA cycle is
- 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 )**

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

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.  $4 + 4 + 4 + 3$

