



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
- Pentose phosphate pathway
 - Beta oxidation
 - TCA cycle
 - None of these.
- iv) In plants, under anaerobic conditions pyruvate is converted into
- Ethanol
 - Lactate
 - Water
 - Acetyl CoA.
- v) β -alanine is the degraded product of
- thymidine
 - cytidine
 - aspartic acid
 - cholesterol.
- vi) Three amino acids that donate amino groups for the purine biosynthesis are
- glycine, glutamine, aspartate
 - glycine, beta alanine, aspartate
 - glycine, alanine, aspartate
 - lysine, glutamine, aspartate
 - lysine, glutamate, asparagine
 - lysine, glycine, asparagine.
- vii) Inactive precursors of some enzymes that are activated through hydrolysis reactions are called
- allosteric enzymes
 - apoenzymes
 - holoenzymes
 - prosthetic groups
 - 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 β -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. $4 + 4 + 4 + 3$