



Name :

Roll No. :

Invigilator's Signature :

**CS/B.TECH (BT)/SEM-3/BT-301/2009-10
2009**

CELL BIOLOGY AND 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 any *ten* of the following :

10 × 1 = 10

- i) The right order of the phases during the cell cycle is
- a) G1 → S → G2 → M b) G2 → S → G1 → M
c) S → G1 → M → G2 d) S → M → G1 → G2.
- ii) The enzyme which catalyses the reaction of substrate level phosphorylation in glycolysis is
- a) Phosphoglycerate kinase
b) Phosphofructokinase
c) Phosphoglycerate mutase
d) Pyruvate dehydrogenase.



- iii) Glyceraldehyde 3 phosphate dehydrogenase is inhibited by
- a) magnesium b) zinc
c) iodide d) iodoacetate.
- iv) What is the net gain of ATP in anaerobic glycolysis ?
- a) 1 b) 2
c) 3 d) 0.
- v) Acetyl CoA is produced by
- a) TCA cycle
b) Pentose phosphate pathway
c) Beta oxidation
d) Glycolysis.
- vi) cAMP is the second messenger for
- a) epinephrine b) glucagon
c) both (a) and (b) d) none of these.
- vii) S value of ribosome in eukaryote cell is
- a) 70S b) 30S
c) 20S d) 80S.
- viii) In lower primates uric acid is converted to
- a) urea b) urease
c) allantoin d) ammonia.
- ix) Cholesterol is
- a) glycoprotein b) oligosaccharide
c) lipid d) nucleotide.
- x) Microtubule molecule is a/an
- a) monomer b) dimer
c) tetramer d) octamer.



- xi) Amino acid not involved in urea cycle is
- | | |
|---------------|-------------------|
| a) Arginine | b) Histidine |
| c) Citrulline | d) Aspartic acid. |
- xii) Maximum number of ATP is synthesized in
- | | |
|-------------|------------------|
| a) Nucleus | b) Cytoplasm |
| c) Ribosome | d) Mitochondria. |

GROUP – B

(Short Answer Type Questions)

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

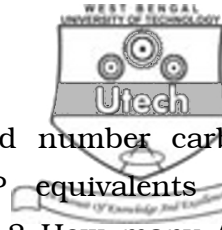
- What are the main features of chemiosmotic hypothesis ?
- How does cori cycle fulfils the needs for NAD^+ in the actively working muscle cells ?
- Discuss the significance of Pentose Phosphate Pathway in cellular metabolism.
- What are the different phases in meiosis ? State the significance of meiosis cell division. $3 + 2$
- What is Ubiquitin ? In which process of metabolism is this involved ? Write the function of this in cellular metabolism. $1 + 1 + 3$

GROUP – C

(Long Answer Type Questions)

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

- What is signal transduction ? What are the different types of receptors involved in cell signalling ? Give an example of signal transduction where stimulating G protein is involved. How does IP_3 function ? $2 + 4 + 6 + 3$



8. Discuss the steps of β oxidation for odd number carbon containing fatty acid. How many ATP equivalents are generated during one cycle of β oxidation? How many ATP equivalents are generated during complete oxidation of C16 fatty acid? 7 + 3 + 5
9. a) Explain schematically with structures the overall chemical changes that occur during one complete turn of the TCA cycle.
- b) What is the difference between glycogenesis and glycogenolysis? 10 + 5
10. a) Discuss catabolism of purines to uric acid.
- b) Describe the urea cycle. $7\frac{1}{2} + 7\frac{1}{2}$
11. a) Name the complexes of the respiratory chain.
- b) Schematically represent how electron is transported from NADH to O_2 .
- c) Write a short note on ATP synthetase. 3 + 7 + 5
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