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) Glycolyis.

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 × 5 = 15

2. What are the main features of chemiosmotic hypothesis ?
3. How does cori cycle fulfils the needs for NAD+ in the actively working muscle cells ?
4. Discuss the significance of Pentose Phosphate Pathway in cellular metabolism.
5. What are the different phases in meiosis ? State the sigificance of meiosis cell division. 3 + 2
6. 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 × 15 = 45

7. 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) Descibe 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