



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)  $G1 \rightarrow S \rightarrow G2 \rightarrow M$
  - b)  $G2 \rightarrow S \rightarrow G1 \rightarrow M$
  - c)  $S \rightarrow G1 \rightarrow M \rightarrow G2$
  - d)  $S \rightarrow M \rightarrow G1 \rightarrow G2$ .
- 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.  $3 \times 5 = 15$

2. What are the main features of chemiosmotic hypothesis ?
3. How does cori cycle fulfils the needs for  $\text{NAD}^+$  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 significance 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.

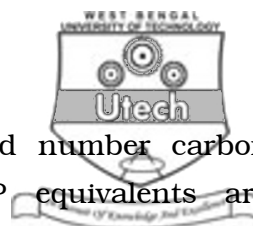
$1 + 1 + 3$

### GROUP – C

#### ( Long Answer Type Questions )

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

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  $\text{IP}_3$  function ?  $2 + 4 + 6 + 3$



8. Discuss the steps of  $\beta$  oxidation for odd number carbon containing fatty acid. How many ATP equivalents are generated during one cycle of  $\beta$  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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