

Name :
Roll No. :
Invigilator's Signature :

CS/B.Tech (BT-OLD)/SEM-3/BT-301/2012-13

2012

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 :
- $10 \times 1 = 10$
- i) The net gain of ATP molecules resulting from Glycolysis is
- a) 2 b) 4
c) 36 d) 38.
- ii) Any phosphorylation reaction catalysed by Kinase requires
- a) Mn^{+2} / Mg^{+2} b) Inorganic phosphate
c) Epinephrine d) All of these.
- iii) The hexose monophosphate shunt has greater importance in cellular metabolism because it produces
- a) NADH b) ATP
c) Acetyl CoA d) NADPH.

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[Turn over



- iv) The chemical substance that enters the Krebs' cycle for further metabolism is
- a) Ethyl alcohol b) Pyruvic acid
c) Acetyl CoA d) Lactic acid.
- v) Amino acid not involved in urea cycle is
- a) Arginine b) Histidine
c) Citruline d) Aspartic acid.
- vi) A key substance in pyrimidine biosynthesis is
- a) Carbamoyl phosphate b) ATP
c) Thiouracil d) Ribose 5 phosphate.
- vii) The most abundant lipid in a cell membrane is
- a) Phospholipid b) Steroid
c) Cholesterol d) Cutin.
- viii) Calmodulin is a
- a) Fe^{++} binding protein b) Fe^{+++} binding protein
c) Ca^{++} binding protein d) None of these.
- ix) Mono-unsaturated fatty acid is
- a) Palmitic acid b) Stearic acid
c) Oleic acid d) both (a) & (b).
- x) Enzyme responsible for rate limiting step of glycolysis is
- a) Hexokinase b) Phosphofructokinase
c) Pyruvate kinase d) Aldolase.
- xi) In aerobic oxidation, terminal electron acceptor in the electron transport chain is
- a) NO_2 b) NO_3
c) H_2O d) O_2 .



GROUP – B

(Short Answer Type Questions)

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

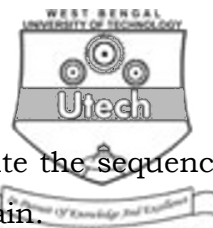
2. What do you mean by photosystem ? How many photosystems are present in plants ? What are the structural components and function of photosystem in plant ? $1 + 1 + 3$
3. What is cori cycle ? Where does it occur ? Mention the significance of this cycle in human system. $2 + 1 + 2$
4. Describe the ubiquitin mediated degradation of protein. 5
5. Discuss the steps in pentose phosphate pathway with overall reactions. 5
6. How is glycogen metabolism controlled by cAMP and insulin ? 5

GROUP – C

(Long Answer Type Questions)

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

7. a) Describe different steps in glycolysis and net gain in ATP.
- b) Explain how pyruvate functions in aerobic and anaerobic metabolic pathways.
- c) Write the difference between glycogenesis and glycogenolysis. How are these two processes regulated by hormones and enzymes ? $6 + 3 + 6$



8. a) What is oxidative phosphorylation ? Write the sequence of electron carriers in the respiratory chain.
- b) State and explain chemiosmotic coupling hypothesis.
- c) Name two inhibitors of electron transport chain and show where they are acting. $2 + 5 + 4 + 4$
9. a) What are the light and dark reactions of photosynthesis ?
- b) Where do they take place in the chloroplast ?
- c) Draw a neat diagram of the chloroplast. $4 + 4 + 2 + 5$
10. a) What is carnitine ? Discuss its role in fatty acid metabolism.
- b) What is β -oxidation ? How many ATP will be produced from palmitic acid by this process ?
- c) What are ketone bodies ? When and how are they formed ? $5 + 5 + 5$
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