

- (viii) The regulation of glycolytic pathway involves
 - (a) Allosteric stimulation by ADP
 - (b) Allosteric inhibition by ATP
 - (c) Feed back inhibition by ATP
 - (d) All of these.
- (ix) Three amino acids that donate amino group for purine biosynthesis are
 - (a) Glycine, glutamine and aspartate
 - (b) Glycine, beta-alanine and aspartate
 - (c) Glycine, alanine and aspartate
 - (d) Lysine, glutamine and asparagine.
- (x) The disease caused by lipid metabolism is
 - (a) liver cirrhosis
 - (b) atherosclerosis
 - (c) both (a) and (b)
 - (d) none of the above.

Group - B

- 2. (a) Discuss the lock and key model for enzyme activity.
- (b) Discuss the feeder pathways of glycolysis.
- (c) How blood glucose level is regulated in mammals by hormone and cAMP?
- (d) Discuss Cori cycle.

3 + 3 + 3 + 3 = 12

- 3. (a) Diagrammatically represent TCA cycle with structure of all intermediates mentioning all enzymes and cofactors.
- (b) How cytoplasmic NAD⁺ is regenerated?
- (c) State and explain chemiosmotic coupling hypothesis.
- (d) Name two inhibitors of electron transport chain and explain their mechanism of action.

6 + 2 + 2 + 2 = 12

Group - C

- 4. (a) Describe the main steps behind biogenesis of fatty acids.
- (b) Describe the reactions of β-oxidation of fatty acids.
- (c) Draw a comparison between fatty acids synthesis and breakdown via β-oxidation.

4 + 4 + 4 = 12

- 5. (a) What are hormones?
- (b) Distinguish between steroid and peptide hormones?
- (c) What is the mechanism by which steroid hormones work?

3 + 3 + 6 = 12

Group - D

- 6. (a) What do you mean by transamination? Discuss the role of vitamin B₆ in transamination.
- (b) Discuss catabolism of one glucogenic amino acid.
- (c) Discuss catabolism of one ketogenic amino acid.
- (d) What do you mean by oxidative deamination?
- (e) Give a brief account of disorders of purine nucleotide metabolism.

(2 + 2) + 2 + 2 + 2 + 2 = 12

- 7. (a) What are essential and non-essential amino acids? Give examples.
- (b) What is glutathione? Describe its synthesis and function in cell.
- (c) Describe the salvage pathway for purine biosynthesis.
- (d) Which enzyme is involved with Lesch-Nyhan syndrome?

3 + 3 + 4 + 2 = 12

Group - E

- 8. (a) What is a second messenger? Give an example.
- (b) What are G-proteins and how it can be activated?
- (c) How can the process of cell signaling be desensitized?

3 + 3 + 6 = 12

- 9. (a) How does tyrosine kinase works?
- (b) Describe the process of insulin signaling cascade.
- (c) Describe different types of gap junctions.

3 + 6 + 3 = 12

**BIOCHEMISTRY
(BIOT 2103)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.
Candidates are required to give answer in their own words as far as
practicable.*

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) The net gain of ATP molecule resulting from glycolysis is
(a) 2 (b) 4 (c) 38 (d) 32.
- (ii) Fatty Acids are oxidized by
(a) α oxidation (b) β oxidation
(c) Ω oxidation (d) all of the above.
- (iii) Long chain fatty acids are first activated to acetyl CoA in
(a) Cytosol (b) Mitochondria
(c) microsomes (d) Lysosomes.
- (iv) Hexokinase _____ .
(a) Catalyses transfer of phosphate group from ATP to any hexose
(b) Catalyses transfer of phosphate group from ATP to only glucose
(c) Transfers inorganic phosphate to hexose
(d) Converts fructose 6 phosphate to fructose-1,6-bisphosphate.
- (v) Which enzyme converts cAMP to ordinary AMP?
(a) Phosphodiesterase (b) Phosphoesterase
(c) Esterase (d) None of these.
- (vi) The storage form of starch in animals is
(a) Starch (b) cellulose
(c) glycogen (d) glucose.
- (vii) The coenzyme involved in transfer of acetyl group is
(a) NADH (b) Coenzyme A
(c) S-adenosyl methionine (d) Biotin.