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 cofactors of pyruvate dehydrogenase complex are
(a) Folate and TPP (b) FAD and NAD^+
(c) NADH and Nicotinic acid (d) all of (a), (b) and (c).

(ii) 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 (a), (b) and (c).

(iii) Which is a phospholipid?
(a) Lecithin (b) Cholesterol
(c) Sterol (d) Steroid.

(iv) Which of the following is not a type of signalling molecule?
(a) Testosterone (b) Insulin
(c) Thyroxin (d) Adenylate cyclase.

(v) Allosteric enzymes are
(a) Larger than simple enzyme
(b) Smaller than simple enzyme
(c) Larger and more complex than simple enzyme
(d) Smaller and less complex than simple enzymes.

(vi) Which of the following is/are unsaturated fatty acids?
(a) Linoleic acid (b) Oleic acid
(c) Palmitic acid (d) All of (a), (b) and (c).

(vii) The two key enzymes of glyoxalate cycle are
(a) Isocitrate lyase and isocitrate dehydrogenase
(b) α keto gluterate dehydrogenase and isocitrate dehydrogenase
(c) Iso citrate lyase and malate dehydrogenase
(d) Isocitrate lyase and malate synthase.

(viii) Liquid form of TG's at ordinary room temperature are called
(a) Oils (b) Solids
(c) Fats (d) none of (a), (b) and (c).

(ix) One non-essential amino acid in human is
(a) Leucine (b) Isoleucine
(c) Valine (d) Alanine.

(x) The metabolite that finally enters TCA cycle is
(a) Pyruvate (b) Ethanol
(c) Acetyl CoA (d) Lactate.

Group – B

2. (a) Discuss with a flow chart the preparatory phase of glycolysis. Why this is called a preparatory phase?

(b) Write short notes on: Lock and key model for enzyme activity.

6 + 6 = 12

3. (a) What is oxidative phosphorylation? Write the sequence of electron carriers in the respiratory chain by a schematic diagram.

(b) State and explain chemiosmotic coupling hypothesis.

6 + 6 = 12

Group – C

4. (a) What are the functions of carrier proteins for hormones?

(b) Outline the mechanism of action of hydrophilic hormones with receptors in target cells.

(c) Using a flow-chart, explain how negative feedback mechanism regulates hormone secretion.

4 + 4 + 4 = 12

5. (a) How α-oxidation of fatty acids occurs?

(b) Explain the process of Ketogenesis.

6 + 6 = 12

Group – D

6. (a) Describe with a suitable example the transammination reaction. Discuss the role of vitamin B_6 in transammination.

(b) Discuss the catabolism of any one glucogenic amino acid.

(4 + 2) + 6 = 12

7. (a) Describe the breakdown of purines.

(b) Discuss the synthesis of: GABA and Dopamine.

6 + (3 + 3) = 12

Group – E

8. (a) Describe the different molecular mechanisms (characteristic) of ligand-receptor signalling.

(b) Describe with the help of a diagram G-protein mediated signalling cascade.

6 + 6 = 12

9. (a) Write down the JAK-STAT pathway with the help of a diagram.

(b) Discuss in detail about the cross talk between signalling pathways (insulin receptor and GPCRs).

6 + 6 = 12