BIOCHEMISTRY
(BTC2103)

Time Allotted : 2½ hrs **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve: **12 × 1 = 12**

Choose the correct alternative for the following

(i) Regulation of glycolysis involves
(a) Allosteric activation by ATP (b) Allosteric inhibition by ATP
(c) Feedback inhibition by ATP (d) Feedback activation by ATP

(ii) The coenzyme involved in the transfer of acetyl group
(a) NADH (b) NADPH (c) Coenzyme A (d) Biotin

(iii) The two unique enzymes of Glyoxalate cycle are
(a) Succinate dehydrogenase and fumerase
(b) Isocitratelyase and malate synthase
(c) Isocitratelyaseand Succinate dehydrogenase
(d) Malate synthaseand fumerase

(iv) Which of the following is a major point of regulation on the pathway to cholesterol?
(a) Thiolase (b) HMG-CoA synthase
(c) HMG-CoA reductase (d) Pyruvate Kinase

(v) Which of the following forms of lipids are referred to as neutral lipids?
(a) TGL (b) Steroids (c) Phospholipids (d) Waxes

(vi) Which of the following are water soluble vitamins?
(a) Biotin (b) Folic Acid (c) Vitamin C (d) All of the above

(vii) Phenylkenonurea results from
(a) Tyrosinase (b) Homogentisatedioxygenase
(c) Phenylalanine hydroxylase (d) Branched chain aminotransferase

(viii) Transamination of alanine gives rise to
(a) Pyruvate (b) Oxaloacetate
(c) α-keto-gluterate (d) Malate

(ix) Which leads to activation of PKC?
(a) Release of intracellular Ca^{2+} + diacylglycerol
(b) Release of intracellular Mg^{2+}+ diacylglycerol
(c) Release of intracellular Ca^{2+}+glycerol
(d) Release of intracellular Ca^{2+}+triacylglycerol

(x) The three stages of cell signalling are
(a) transduction, reception and response
(b) reception, transduction and response
(c) response, reception and transduction
(d) none of the above

Fill in the blanks with the correct word

(xi) In C4 pathway CO_2 is fixed to form the first 4C compound _____.

(xii) Scurvy is caused by the deficiency of Vitamin _____

(xiii) Pantothenic acid forms the backbone of the important coenzyme _____.

(xiv) Steroids, a biologically active organic compound, are derived from _____

(xv) Insulin is an example of _____.

Group - B

2. (a) Differentiate between lock and key model and induced fit model of enzyme-substrate binding. *[(CO3)(Understand/IOCQ)]*
(b) What is neoglucogenesis? What are the three bypasses here? *[(CO3)(Remember/IOCQ)]*
(c) Describe how monosaccharides other than glucose and disaccharides enter glycolytic pathway. *[(CO2)(Apply/IOCQ)]*

4 + 4 + 4 = 12

3. (a) Classify enzymes. Give one example and function of each class. *[(CO1)(Remember/LOCQ)]*
(b) What is Cori cycle? When and how it operates? *[(CO4)(Remember/IOCQ)]*
(c) Write schematically the photosynthetic electron transport chain. *[(CO3)(Illustrate/IOCQ)]*
(d) What are C3 and C4 plants? Which of them is advantageous and why? *[(CO3)(Justify/HOCQ)]*

3 + 3 + 3 + 3 = 12

Group - C

4. (a) What is meant by Omega-oxidation of fatty acids and how is it different from α-oxidation of fatty acids? *[(CO4)(Apply/IOCQ)]*
(b) By using a suitable example decipher α-oxidation of fatty acids. *[(CO4)(Analyse/IOCQ)]*
(c) Draw a flowchart analysing the role of glucose and glucagon during fed and starvation state. *[(CO4)(Analyse/IOCQ)]*

4 + 4 + 4 = 12

5. (a) Classify the different types of steroid hormones in terms of their functions. *[(CO4)(Understand/LOCQ)]*

(b) How is cholesterol regulated? Draw a flow chart for synthesis of cholesterol. *[(CO4)(Apply/IOCQ)]*

(c) Disorders of lipid metabolism gives rise to atherocloresis – Justify this statement. *[(CO4)(Evaluate/HOCQ)]*

4 + 4 + 4 = 12

Group - D

6. (a) What is glutathione? Describe its biosynthetic pathway. *[(CO3)(Analyse/HOCQ)]*

(b) What are the 3 different ways of excretion of ammonia? *[(CO4)(Remember/LOCQ)]*

(c) Describe the entry of two NH_3 molecules in urea cycle. *[(CO4)(Apply/IOCQ)]*

4 + 3 + 5 = 12

7. (a) How alanine is degraded to enter TCA cycle? *[(CO4)(Analyse/HOCQ)]*

(b) Discuss the degradation of purine nucleotides. *[(CO4)(Remember/LOCQ)]*

(c) Mention the cause of Lesch-Nyhan syndrome. *[(CO5)(Apply/IOCQ)]*

4 + 4 + 4 = 12

Group - E

8. (a) Describe the cell signalling termination process using arrestin as an example. *[(CO6)(Understand/LOCQ)]*

(b) Analyse about the different unique properties of cell signalling. *[(CO6)(Analyse/HOCQ)]*

(c) Describe the various process of termination of cell signalling with respect to G-proteins. *[(CO6)(Apply/IOCQ)]*

4 + 4 + 4 = 12

9. (a) Analyze the phenomenon of cross-talk by giving suitable examples. *[(CO6)(Analyze/IOCQ)]*

(b) Distinguish between the six main classes of enzyme linked receptors. *[(CO6)(Analyze/IOCQ)]*

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	18.75	61.5	19.79