Time: 2.5 hours Marks: **75**

Instructions to the candidates:-

1) All the questions are compulsory. Choice is internal.
2) Figures to the right indicate full marks.
3) All questions carry equal marks.
4) Draw flowcharts /diagrams wherever necessary.

Q1A) Choose the MOST appropriate option (**Any Three**) 3

i) The starting material for TCA is _____
a) Acetyl CoA b) Lactate c) Pyruvate

ii) Glycogen is a polymer joined by _____ glycosidic linkage
a) alpha 1,4 b) alpha 1,6 c) alpha 1,4 & 1,6

iii) The substrate for Glucokinase is _____
a) Glucose b) Glucose-6-phosphate c) Fructose

iv) Krebs cycle occurs in _____.
a) Mitochondria b) Cytosol c) Chloroplast

v) Glycogen breaks down into _____
a) Glucose-6-phosphate b) Fructose-6-phosphate c) Glucose- 1-phosphate

vi) _____ is a keto hexose
a) Glucose b) Ribose c) Fructose

Q1B) Define and explain **any one** 2

i) Glycogenolysis

ii) Anabolism

Q1C) Schematically represent **any one**: 4

i) Glycogenesis

ii) HMP Pathway

Q1D) Schematically represent **any one :** 6

i) TCA

ii) Glycolysis

Q2A) Choose the MOST appropriate option (**Any Three**) 3

i) Light reaction takes place in _____
a) grana of chloroplast b) thylokoids of Chloroplast c) both a and b

ii) First stable compound in Calvin cycle after carbon fixation is _____.
a) glyceraldehyde-3-phosphate b) 3-phosphoglyceric acid
c) RuBP

iii) Complex _____ of ETC is not DIRECTLY involved in ATP Synthesis.
a) I b) II c) III

iv) In Complex I, the electron carrier is _____.
a) FAD b) NADP c) NAD d) Cytocrome a3

v) _____ is an uncoupler.
a) Cyanide b) Rotenone c) Dinitrophenol

vi) Electrons flow through ETS in direction _____ reduction potential.

a) decreasing b) increasing c) same

Q2B) Attempt **any one:** 2

i) Schematically depict glycerol phosphate shuttle?

ii) Briefly explain Hill's contribution to the understanding of photosynthesis.

Q2C) In detail answer **any one:** 4

i) Describe in detail malate-aspartate shuttle.

ii) With the help of a diagram explain the structure of ATP synthase Complex. Also state the chemiosmotic hypothesis.

Q2D) Answer**any one** in detail**:** 6

i) Give a detailed explanation of cyclic and non-cyclic photophosphorylation.

ii) With the help of a diagram explain ETC under the following headings: (a) Complexes involved (b) Sites of ATP generation. Add a note on Q cycle.

Q3A) Choose the MOST appropriate option (**Any Three**) 3

i) The adsorbent used in TLC can be _____.
a) Silica gel b) G-250 c) P-400

ii) Distribution coefficient cannot be _____ than 1.0
a) more b) less c) equal to 1

iii) _____ is the detecting agent used for seperation of sugars by paper Chromatography
a) Ninhydrin b) Iodine c) Anilinr Hydrogen Pthalate

iv) _____ is a gas used in GC
a) Nitrogen b) Oxygen c) Helium

v) Diethylaminoethyl (DEAE) ion-exchangers are _____ exchangers.
a) cationic b) anionic c) cationic and anionic

vi) The length of the column and resolution of components are _____ related.
a) directly b) inversely c) not

Q3B) Define and explain **any one** 2

i) Partition Coefficient

ii) Eluent

Q3C) Write a detailed answer for **any one**: 4

i) Explain the technique used to separate a mixture of sugars

ii) Write a note on Column Chromatography

Q3D) Attempt **any one :** 6

i) Elaborate on Ion Exchange Chromatography

ii) Discuss the principle and applications of Gel chromatography

Q4A) Choose the MOST appropriate option (**Any Three**) 3

i) Folic acid is important for _____
a) glycolysis b) Cell division c) krebs cycle

ii) _____ is the most abundant mineral in the body
a) sodium b) calcium c) phosphorous

iii) Lysine is _____ amino acid
a) monoprotic b) diprotic c) triprotic

iv) The physiological pH of the human body is _____
a) 6.2 b) 6.8 c) 7.2

v) Buffers are mixtures of _____.
a) weak acids and conjugate bases
b) strong acids and conjugate bases
c) strong bases and conjugate acids)

vi) pH meter is a _____.
a) colorimeter b) potentiometer c) hydrometer

Q4B) Attempt **any one:** 2

i) Mention the (a) coenzyme form and (b) biochemical role of pyridoxine.

ii) Name any 2 electrodes used in a pH meter.

Q4C) Answer**any one** in detail**:** 6

i) Discuss in detail the chemistry of Vitamin A and its role in vision.

ii) Derive the Henderson Hasselbalch equation.

Q4D) Answer in detail **any one :** 8

i) With the help of a graph, explain the titration curve of a basic amino acid. Mention the pKa and the pI values

ii) With a special mention of the hormones involved, explain the mechanism of absorption and mobilization of calcium in the human body.

Q5 A) Answer in brief **any four**of the following: 12

i) Write a short note on: Gluconeogenesis

OR

i) Elaborate on the pyruvate dehydrogense enzyme complex

ii) Schematically represent Calvin cycle.

OR

ii) Write an elaborate note on Proton motive force.

iii) Give the principles of GLC and Affinity Chromatography

OR

iii) Explain the different types of chromatographic techniques

iv) Compare and contrast: Water soluble and fat soluble vitamins

OR

iv) Draw the titration curve of a neutral amino acid, and mention pKa values and pI.

Q5B) **State TRUE or FALSE: (<u>any four</u>)** 3

i) Amytal inhibits complex IV.
ii) Lysine has two ionizable groups
iii) TCA is also called Citric acid pathway
iv) Anabolism involves expenditure of ATP
v) Only sugar can be seperated by paper chromatography
vi) Fat soluble vitamins include Folic acid