(3 hours) **Total marks:100**

Instructions to the candidates, if any:-

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.

Q1B)	Fill in the blanks: (**any three**)	**3**
i)	_____is a enzyme requiring ATP as substrate	
ii)	The starting material for TCA is _____.	
iii)	Glycogen is a polymer of _____	
iv)	_____ is a pentulose	
Q1B)	Define and explain **any one**	**3**
i)	Glycogenesis	
ii)	Catabolism	
Q1C)	Attempt **any one**:	**6**
i)	Schematically represent TCA	
ii)	Write a note on Pyruvate Dehydrogenase Enzyme complex.	
Q1D)	Attempt **any one :**	**8**
i)	Write notes on a) Glycogenolysis and (b) Glyoxylate cycle	
ii)	If C3 and C4 of Glucose are labelled with C-14, trace the fate of C-14 in Glycolytic pathway	
Q2A)	Fill in the blanks: **(Any three)**	**3**
i)	Dark reaction takes place in _____	
ii)	The initial electron donor of the ETC is _____, which gives its two electrons off to FMN, within Complex II.	
iii)	The key enzyme that accomplishes the fixing of carbon is _____.	
iv)	Most abundant enzyme on earth is _____.	
Q2B)	Attempt **any one:**	**3**
i)	Explain (a) where (b) how cyanide stops ATP production in the mitochondria.	
ii)	How has Hill contributed to our understanding of photosynthesis.	
Q2C)	In detail answer **any one:**	**6**
i)	What is the significance of Malate-Aspartate Shuttle? With the help of a representation explain the same.	
ii)	Explain by means of a diagram the process of ATP formation by oxidative phosphorylation.	

Q2D) Answer **any one** in detail**:** **8**

i) Schematically represent the Z scheme with all the electron carriers involved.

ii) Discuss the electron chain carriers in ETC

Q3A) Fill in the blanks: (**any three**) **3**

i) Calcium carbonate can be used for _____ chromatography.

ii) Distribution coefficient cannot have a value _____

iii) _____ can be a mobile phase in GC

iv) Antibodies can be separated by _____ chromatography

Q3B) Define and explain **any one** **3**

i) Rf

ii) Gradient elution

Q3C) Write a detailed answer for **any one**: **6**

i) Describe a technique to separate glucose, lactose and xylose

ii) Discuss the principle and applications of Ion exchange chromatography

Q3D) Attempt **any one :** **8**

i) Elaborate on Gel Chromatography

ii) Write notes on a) TLC and (b) Column Chromatography

Q4A) **Fill in the blanks: (Any three)** **3**

i) The pH of a carbonated drink is _____.

ii) A solution with pH 2 is ____ acidic compared to a solution of pH 4

iii) Biotin is a coenzyme for _____ reactions.

iv) The coenzyme form of thiamine is _____

Q4B) **Attempt any one:** **3**

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

ii) Justify: 'pH meter works on the principle of ion exchange'

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

i) What is the visual cycle? What is the role of Vitamin A in the visual cycle?

ii) Derive the Henderson Hasselbalch equation.

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

i) With the help of a graph, explain the titration curve of a acidic amino acid. Mention the pKa values and the pI value as well. What is the relevance of titration curve to human physiology?

ii) Justify the statement: 'Vitamin D metabolism is both regulated by and regulates calcium homeostatsis'

Q5 A) **Answer in brief <u>any four</u> of the following:** **16**

i) Explain giving suitable examples anapleurotic reactions

OR

i) Discuss the reactions of Gluconeogenesis

ii) Discuss the significance of Calvin cycle.

OR

ii) Write an elaborate note on Chemiosmotic hypothesis.

iii) Give the principles of Affinity chromatography and HPLC

OR

iii) Write briefly on the different types of paper chromatography

iv) Write a detailed note on vitamin K

OR

iv) Define: Titration curve. Draw the titration curve of glycine, with special mention of pKa values and pI.

Q5B) **State TRUE or FALSE: (<u>any four</u>)** **4**

i) Rotenone inhibits complex II.

ii) Lysine has four ionizable groups

iii) Ninhydrin is the detecting agent for visualising sugar separation through paper chromatography

iv) Fat soluble vitamins include Riboflavin

v) TCA is also called EMP

vi) Catabolism involves expenditure of ATP