

(3 hours)

Total Marks: 100

Instructions to the candidates :-

1. All questions are compulsory. Choice is internal
2. Figures to the right indicate full marks.
3. Draw structures, diagrams or flowcharts wherever necessary.
4. Normal calculator or log tables can be used if required

- Q1 A) **State true or false:** 4
- i) Almost all enzymes are proteins.
 - ii) NAD acts as a cofactor.
 - iii) Iodoacetate is a reversible inhibitor.
 - iv) IU stands for Indian units of enzyme.
- Q1 B) **Attempt any three of the following** 9
- i) Differentiate between Fischer and Koshlands model of enzyme action.
 - ii) The rate of an enzyme catalyzed reaction is 45 mol/min at $[S] = 10^{-8}$ M. K_m for this substrate is 5×10^{-5} M. Calculate the rate where $[S] = 2 \times 10^{-6}$ mol.
 - iii) Discuss the properties that differentiate an enzyme from a catalyst.
 - iv) Describe the factors affecting enzyme activity.
 - v) Write a note on active site of an enzyme.
 - vi) With the help of a diagram explain how the activation energy of reaction is modulated in presence of an enzyme.
- Q1 C) **Answer any two of the following** 12
- i) Compare and contrast: Competitive and Noncompetitive inhibition of enzyme.
 - ii) Derive an equation for Michaelis Menten constant for monosubstrate reaction.
 - iii) Give an account of enzyme specificity.
 - iv) Graphically represent Lineweaver-Burk plot for enzyme catalysed reaction. Given an enzyme with a $K_m = 10$ mM and $V_{max} = 100$ mmol/min. Calculate V_o . If $[S]=10$ mM, which will increase the velocity more: a 10-fold decrease in K_m , or a 10-fold increase in V_{max} ?
- Q2 A) **Give an example of the following:** 4
- i) The largest endocrine gland in the body
 - ii) Hormone helping reabsorption of water
 - iii) An aldosterone
 - iv) An auxin
- Q2 B) **Attempt any three of the following:** 9
- i) Write a note on 'Cytokinin'
 - ii) Distinguish between endocrine and exocrine secretion.
 - iii) Discuss the biochemical functions of progesterone.
 - iv) Explain chemistry and functions of oxytocin.
 - v) Describe various hormone receptors.
 - vi) Write a short note on ethylene as a plant hormone.

- Q2 C) **Answer any two of the following** 12
- i) With the help of schematic representation explain amplification cascade in epinephrine.
 - ii) Write an informative note on chemistry and physiological role of thyroxine.
 - iii) Give an elaborative account of physiological role of gibberellins.
 - iv) Write a note on hormone.
- Q3 A) **Match the following:** 4
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|-------------------------|--|
| i) Hydroponics | a) carbon dioxide fixation |
| ii) Trypan blue | b) developmental biology |
| iii) <i>Scenedesmus</i> | c) cultivation of plant in nutrient medium |
| iv) Potassium chloride | d) agglutination of liver homogenate |
| | e) tracer for protein synthesis |
| | f) assessment of viability of cells |
- Q3 B) **Attempt any three of the following:** 9
- i) Explain the working of a French Press.
 - ii) State the disadvantages involved in perfusion of isolated organs.
 - iii) Write in brief about the different techniques adopted for isolation of individual cells from the tissue.
 - iv) Give a brief account on any two techniques of membrane separation.
 - v) Elaborate on the importance of enzymes in biochemical investigations
 - vi) Write advantages and disadvantages of *Arabidopsis* as model organisms.
- Q3 C) **Answer any two of the following:** 12
- i) Write a detailed account of any one equipment used for determination of cell size and population.
 - ii) With the help of a flow chart describe the steps involved in isolation of different cell organelles using centrifugation.
 - iii) Write a short note on whole plant studies. Also give examples of the plants used for the same.
 - iv) Write an elaborative note on *C. elegans* and *Dictyostellium* as model organism.
- Q4 A) **Define and explain any five terms:** 10
- | | | | |
|----------|-----------------------|-------------------------|----------------|
| i) Katal | ii) Km | iii) Apoenzyme | iv) Acromegaly |
| v) LH | vi) Isotonic solution | vii) Cell fractionation | |
- Q4 B) **Attempt any three of the following:** 15
- i) Explain IUB classification of enzymes in detail.
 - ii) Define coenzyme. Give an account of vitamins and their coenzyme forms.
 - iii) Explain mode of action of steroid hormone.
 - iv) Give an account of Absciscic acid as plant growth regulator.
 - v) Draw a diagram representing path analysis of a biochemist's approach to study exogenous compound.
 - vi) Give an account of cell counting.
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