

PART B — (5 × 16 = 80 marks)

11. (a) (i) Outline the concept of active site and explain the role of catalytic triad in ES complex formation.
- (ii) Differentiate collision theory and transition state theory of enzyme catalysis.

Or

- (b) Explain the different types of enzyme inhibitions and outline the estimation of K_i value for each type of inhibitor.
12. (a) Explain the turn over number, catalytic efficiency of an enzyme. How they are affected by reversible and irreversible inhibitors.

Or

- (b) An enzyme with a K_m value of 2.4×10^{-4} M was assayed at the following substrate concentration.
- (i) 2×10^{-7} M
- (ii) 6.3×10^{-5} M
- (iii) 10^{-4} M
- (iv) 2×10^{-3} M and
- (v) 0.05 M. The velocity observed at 0.05 M was 128 nmoles/lit/min.
- (1) Calculate the initial velocities at other substrate concentrations.
- (2) If the enzyme concentration was increased ten fold, what would the initial velocities at each of the given substrate concentration.
13. (a) Outline the various methods of enzyme immobilization with their major advantage and disadvantage. Write briefly on the production of semi synthetic penicillin in immobilized enzyme reactors.

Or

- (b) Describe the principle involved in different methods of enzyme purification. Write a note on affinity purification of enzymes.

14. (a) How do you characterize the molecular weight and thermal stability of the purified enzymes?

Or

- (b) How do you identify whether the purified enzyme is an allosteric enzyme or not using enzyme kinetic studies? Design and outline the suitable experimental protocols for your task.
15. (a) You have been given a task of developing biosensor for alcohol in blood. Describe how you would set about your task. Include within your answer
- (i) the type or types of biosensor that you might investigate
 - (ii) the mechanism for biosensor response
 - (iii) the likely advantage and disadvantage of analysis using your biosensor(s) relative to analysis by other methods.

Or

- (b) Discuss :
- (i) the applications of enzymes in food and pharmaceutical industries.
 - (ii) analytical and diagnostic applications of enzymes.
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