

M.Sc. Chemistry (CBCS)

Chemistry

M.Sc. Sem - III

Paper: CC-8

Group - B

(Bio-organic chemistry)

Question-Bank

Dr. Jagdish Prasad

Asst. Prof of Chemistry

Tata College, Chaitanya

833202.

## Chapterwise Question:

### 1. Enzymes and Mechanism of Enzyme Action

(i) What do you mean by chemical catalysis? Explain its types and characteristics.

(ii) Discuss specificity, catalytic power, Regulation, effect of temp. w.r.t. the properties of enzyme.

(iii) Explain the extraction & isolation of enzymes using Adsorption chromatography and ion-exchange chromatography. What are the criteria of purity?

(iv) Discuss the mechanism of Fisher's Lock and Key Hypothesis and Koshland's induced fit Hypothesis.

(v) Define  $E_a$  (Energy of activation). With reference to Steady-state enzyme kinetics deduce Michaelis-Menten equation and Michaelis-Menten & Lineweaver-Burk Plots.

(vi) Explain Reversible and Irreversible inhibition with its classification

(vii) Prove that

$$a) \frac{d[P]}{dt} = \frac{k_1 k_2 [S][H^+]}{k_{-1}[EA]} = \frac{k_1 k_2 [S][H^+]}{k_{-1} + k_2} \text{ Acid-catalysed mechanism}$$

$$b) \frac{d[P]}{dt} = k_2 [SH^+][A] = \frac{k_1 k_2 [S][AH^+]}{k_{-1} + k_2} \text{ Base-catalysed mechanism}$$

(viii) Discuss orientation and steric effect with reference to regioselectivity, syn, anti, conformational transmission.

(ix) Explain by giving examples of covalent catalysis.

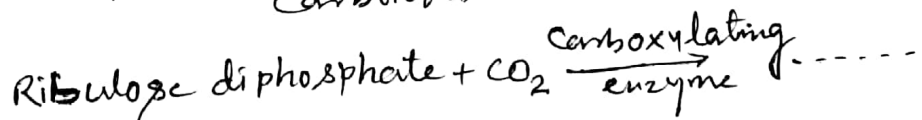
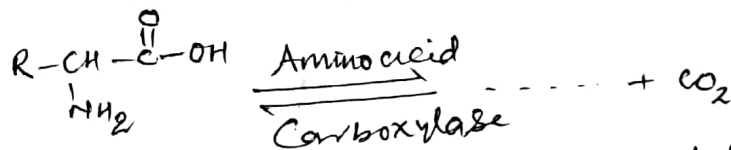
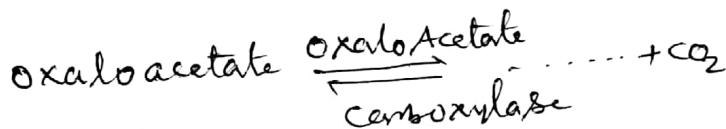
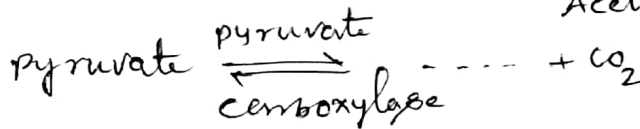
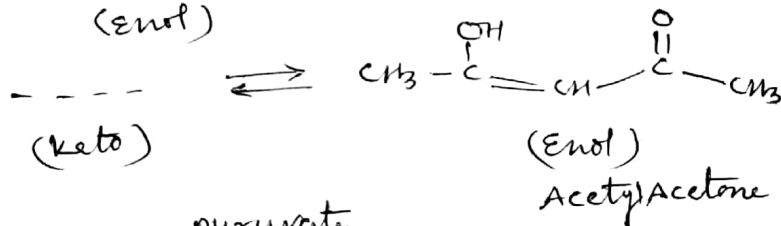
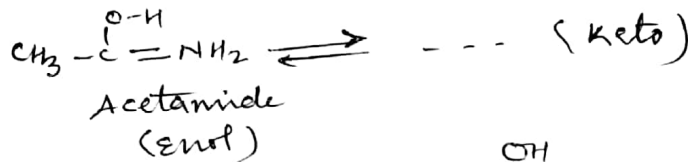
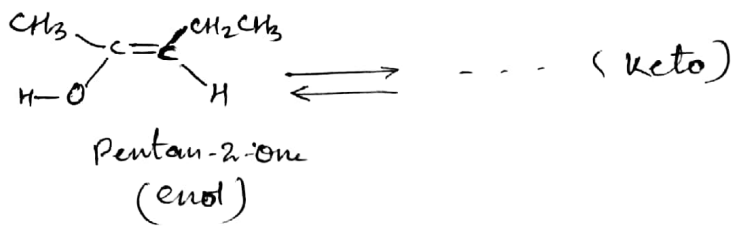
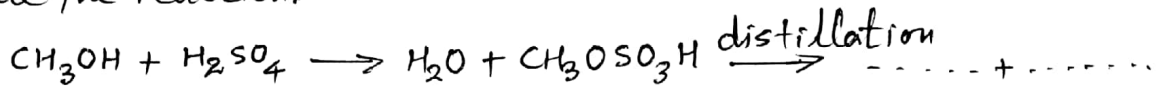
(x) Write short notes on:

(a) Ribonuclease (b) Lysozyme and (c) chymotrypsin.

2. Kind of reactions catalysed by Enzymes:

1) Write the mechanism of nucleophilic displacement on a Phosphorus atom, multiple displacement reactions and the coupling of ATP cleavage to endogonic/exergonic process.

11) Complete the reaction:



(11) Explain with reference to catalysed by enzyme:

Addition reactions, Elimination reactions, Isomerisation and Rearrangement reactions  
β-cleavage & condensation.

### 3. CO-Enzyme Chemistry:

- (I) With the help of CO-Enzyme A explain the Biosynthesis of Terpenoids and Steroids. Discuss the structure of CoA.
- (II) What is co-enzyme/apoenzyme? How can be classified on the basis of hydrogen-carrying, group-carrying co-enzyme and co-factor group
- (III) Using Thiamine pyrophosphate / co-carboxylase explain Benzoin condensation.
- (IV) Explain the following terms:
  - (a) Pyridoxal phosphate / co-transaminase (b) Racemization
  - (c)  $\text{NAD}^+$  (Nicotinamide adenine dinucleotide) (d)  $\text{NADP}^+$  (Nicotinamide adenine dinucleotide phosphate) / Co-enzyme-II / TPN / Phosphocoenzyme / cohydrogenase-II (e) FMN and FAD
- (V) What is Lipoic Acid / POF? Discuss its Availability and uses.
- (VI) Discuss the structure and uses of cyano-cobalamine / vitamin-B<sub>12</sub>, Compound A, B, and D.
- (VII) Explain the mechanism of the reactions catalysed by co-factors.  
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### 4. Bio Technological Applications of Enzymes

- (I) Discuss the factors influencing Production of enzyme.
- (II) What do you mean by Large-scale Production and large-scale Purification of enzymes?
- (III) What is immobilized enzyme? Discuss the forces responsible for immobilization.
- (IV) Explain
  - (a) Immobilization Techniques (b) immobilization supports
  - (c) effect of immobilization on enzyme activity (d) Applications of immobilized enzymes.

- (V) How you can use enzymes in food and in drink industry particularly for Brewing and cheese making, syrups and starch?
- (VI) Explain enzymes as targets for drug-design.
- (VII) What are uses of enzyme in medical diagnosis? Enzymes given below  
Acid Phosphatase, Alkaline Phosphatase, Amylase, GOT, GPT, LDH,  
CK and PH (Phospho-Hexose-isomerase)
- (VIII)  $\text{Luciferin} + \text{O}_2 + \text{ATP} \rightleftharpoons \text{Oxyluciferin} + \text{ADP} + \text{P}_i$  Explain.
- (IX) Discuss Enzymes and Recombinant DNA-Technology with application of Recombinant DNA technique.

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