Chapter	5 Enzymes	Class	1st Year	Subject	Biology

Give Short Answers of the Following Questions

1. Define Enzyme and Co-factor.

Ans. Enzymes: A biological catalyst made of globular proteins that speed up chemical reactions without being consumed.

- Enzymes are highly specific to the reactions they catalyze.
- **Co-factor:** A non-protein chemical that helps an enzyme function.
- Co-factor can metal (like Mg^{2+}, Zn^{2+}) or organic molecules.
- Some enzymes are inactive without co-factors.
- They assist in substrate binding or in the catalytic process.

2. Differentiate between co-enzyme and prosthetic group.

Ans.Co-enzyme and Prosthetic group:

Co-enzyme	Prosthetic group
• Organic molecule that temporarily binds with the enzymes. • Lossely attached and separates after the reaction. • Examples: NAD^+, FAD.	• Tightly or permantently bound to the enzyme. • Remain attached during the enzyme's life. • Examples: Heme group in cytochromes.

3. What do you mean by hyrolases? Give two examples.

Ans. Hydrolases:

- Hydrolases are enzymes that catalyze the breaking of bonds using water.
- They are involved in digestion and other metabolic processes.
- These enzymes break down complex molecules into simpler ones.
- Common hydrolase reactions include hydrolysis of proteins, fats, and carbohydrates.

Examples:

- Amylase_____ break starch into sugars.
- Lipase_____ breaks fats into fatty acids and glycerol.

4. What is meant by activation energy?

Ans. Activation energy:

- Activation energy is the minimum energy required to start a chemical reaction.
- It is needed to break bonds in the reactants.
- Enzymes lower the activation energy, speeding up the reaction.

- Lower activation energy means the reaction happens more easily.
- This is a key factor in enzyme efficiency and specificity.

5. Define feedback inhibition.

Ans. Feedback Inhibition:

- Feedback inhibition is when the end product of a pathway inhibits an early enzyme in the same pathway.
- It prevents the cell from making more of a substance than needed.
- It is a self-regulating mechanism to maintain balance.
- Once the product accumulates, it binds to enzyme and halts further production.
- It is a type of negative feedback control in metabolism.

6. Give example of competitive and non-competitive inhibitors.

Ans. Competitive Inhibitor and Non-Competitive Inhibitor:

Competitive inhibitor	Non-competitive inhibitor
• Compete with the substrate for the enzyme's active site due to structural similarity. • Reduce enzyme activity by blocking substrate binding. • Example: Malonate inhibiting succinate dehydrogenase.	• Bind to a site other than the active sites and have no structural similarity. • Change the shape of the enzyme, reducing its function. • Example: Heavy metals like lead or mercury.

7. What is optimum pH? Give optimum pH of three human enzymes.

Ans. Optimum pH:

- Optimum pH is the specific pH at which an enzyme shows maximum activity.
- A change in pH can denature the enzyme or reduce its efficiency.
- Enzymes work best a their specific pH range.
- Example of enzyme with their optimum pH.
- **Pepsin:** pH 1.5-2 (work in the stomach).
- **Trypsin:** pH 7.5-8.5 (works in the small intestine).
- **Salivary amylase**: pH 6.7-7.0 (work in the mouth).