Of course. Here are the 20 multiple-choice questions with the answer key provided at the end.

Multiple-Choice Questions: Chapter 5 Enzymes

1. Which of the following best defines an enzyme?

a) A carbohydrate that is used up in a chemical reaction.

b) A substance that slows down a chemical reaction.

c) A protein that functions as a biological catalyst.

d) Any substance that increases the rate of a chemical reaction.

2. What is the term for the substance that an enzyme acts upon?

a) Product

b) Active site

c) Catalyst

d) Substrate

3. The part of the enzyme molecule where the substrate binds is called the...

a) active site.

b) enzyme-substrate complex.

c) product site.

d) catalyst center.

4. The specificity of an enzyme is due to the...

a) temperature of the reaction.

b) pH of the surrounding medium.

c) complementary shapes of its active site and substrate.

d) kinetic energy of the enzyme and substrate molecules.

5. What is formed when an enzyme and its substrate temporarily join together?

a) A product

b) A denatured enzyme

c) An enzyme-substrate complex
d) An active site

6. A protease is an enzyme that breaks down proteins. What would happen if a protease was added to a solution of starch?

a) The starch would be broken down into amino acids.
b) The starch would be broken down into sugars.
c) The protease would be denatured.
d) No reaction would occur.

7. How does a rise in temperature from 20°C to 30°C typically affect the rate of an enzyme-controlled reaction?

a) It decreases the rate by denaturing the enzyme.
b) It has no effect on the rate.
c) It increases the rate due to increased kinetic energy.
d) It stops the reaction completely.

8. What happens to most enzymes at temperatures above 50°C?

a) They work at their optimum rate.
b) Their activity is reversibly paused.
c) They are permanently denatured.
d) They become more specific.

9. The term 'denaturation' refers to a permanent change in the...

a) concentration of the substrate.
b) shape of the enzyme molecule's active site.
c) products of the reaction.
d) kinetic energy of the molecules.

10. Why might an organism die if exposed to very high temperatures for a prolonged period?

a) Its enzymes are denatured, and metabolic reactions slow down or stop.

b) Its substrates run out too quickly.

c) The pH of its cells changes dramatically.

d) Its cells run out of kinetic energy.

11. The graph below shows the effect of pH on the activity of three different enzymes. Which enzyme would be most active in the stomach, where the environment is highly acidic?

!(https://i.imgur.com/KqA4G6S.png)

a) Pepsin

b) Most enzymes

c) Pancreatic lipase

d) All three would be equally active.

12. The pH at which an enzyme shows the highest rate of activity is known as its...

a) neutral pH.

b) optimum pH.

c) denaturation point.

d) activation pH.

13. What is a key difference between the effect of extreme pH and high temperature on an enzyme?

a) High temperature effects are always reversible, while pH effects are not.

b) High temperature causes denaturation, but extreme pH does not.

c) The effect of pH can be reversible, whereas denaturation by high heat is permanent.

d) Extreme pH increases kinetic energy, while high temperature does not.

14. Looking at the provided graph, what is the optimum temperature for this enzyme?

!(https://i.imgur.com/s6n5o6b.png)

a) 45°C
b) 50°C
c) 55°C
d) 60°C

15. An enzyme that digests lipids (fats) would most likely be called a...

a) Protease
b) Amylase
c) Lipase
d) Dehydrogenase

16. Enzymes that are released from cells to perform their function, such as digestive enzymes in the intestine, are called...

a) intracellular enzymes.
b) substrate enzymes.
c) extracellular enzymes.
d) specific enzymes.

17. Catalase is an enzyme found inside liver cells that breaks down harmful hydrogen peroxide. Catalase is therefore an example of...

a) a substrate.
b) an extracellular enzyme.
c) an intracellular enzyme.
d) a product.

18. Why is only a small amount of an enzyme needed to catalyse a large number of reactions?

a) The enzyme is denatured after each reaction.
b) The enzyme is not used up in the reaction and can be used repeatedly.
c) The substrate is used up very slowly.
d) The enzyme works very slowly.

19. In an experiment to test the activity of the enzyme catalase, one sample of catalase extract is boiled before being added to hydrogen peroxide. What is the purpose of this step?

a) To prove that high temperatures speed up the reaction.

b) To act as a control, showing that a denatured enzyme is inactive.

c) To remove any impurities from the catalase extract.

d) To measure the optimum temperature of the enzyme.

20. Which statement correctly identifies a difference between enzymes and inorganic catalysts?

a) Inorganic catalysts are proteins, while enzymes are not.

b) Inorganic catalysts are not affected by temperature, while enzymes are.

c) Enzymes are proteins and their activity is stopped by high temperatures, unlike inorganic catalysts.

d) Enzymes are used up in the reaction, while inorganic catalysts are not.

Answer Key

1. [cite_start]**c)** A protein that functions as a biological catalyst[cite: 19, 343].
2. [cite_start]**d)** Substrate[cite: 41, 46].
3. [cite_start]**a)** active site[cite: 7, 48].
4. [cite_start]**c)** complementary shapes of its active site and substrate[cite: 7, 51, 196].
5. [cite_start]**c)** An enzyme-substrate complex[cite: 189, 350].
6. [cite_start]**d)** No reaction would occur[cite: 193, 197].
7. [cite_start]**c)** It increases the rate due to increased kinetic energy[cite: 90, 214].
8. [cite_start]**c)** They are permanently denatured[cite: 91, 93].
9. [cite_start]**b)** shape of the enzyme molecule's active site[cite: 94, 217, 221].
10. [cite_start]**a)** Its enzymes are denatured, and metabolic reactions slow down or stop[cite: 95, 96].
11. [cite_start]**a)** Pepsin[cite: 145, 151].
12. [cite_start]**b)** optimum pH[cite: 147].
13. [cite_start]**c)** The effect of pH can be reversible, whereas denaturation by high heat is permanent[cite: 149, 221].
14. [cite_start]**c)** 55°C[cite: 133].
15. [cite_start]**c)** Lipase[cite: 199, 201].
16. [cite_start]**c)** extracellular enzymes[cite: 167].
17. [cite_start]**c)** an intracellular enzyme[cite: 165, 166].

18. [cite_start]**b)** The enzyme is not used up in the reaction and can be used repeatedly[cite: 18, 21].
19. [cite_start]**b)** To act as a control, showing that a denatured enzyme is inactive[cite: 104, 105, 106].
20. [cite_start]**c)** Enzymes are proteins and their activity is stopped by high temperatures, unlike inorganic catalysts[cite: 18, 91, 257].