Shallaka Jatani Ali secondary school grade 11th Biology Work sheet

1. What is an enzyme?

A. A type of lipid. B. A protein that catalyzes biochemical reactions

C. A carbohydrate. D. nucleic acid

2. What is the primary function of enzymes?

A. Provide energy. B. To speed up chemical reactions

C. To store genetic information. D. To transport oxygen

3. Which of the following factors can affect enzyme activity?

A) Temperature. B) pH. C) Substrate concentration. D. All of the above

4. What is the active site of an enzyme?

A) The part of the enzyme that binds to the substrate

B) The part of the enzyme that provides energy

C) The part of the enzyme that regulates pH

D) The part of the enzyme that transports substrates

5. What happens to an enzyme after it catalyzes a reaction?

A) It is consumed in the reaction. B) It changes shape permanently

C) It remains unchanged and can be reused. D) It becomes inactive

6. Which term describes a substance that increases the rate of a reaction without being consumed?

A) Substrate. B) Product. C) Catalyst. D) Inhibitor

7. What is a substrate?

A) The product of an enzyme-catalyzed reactio B) The molecule upon which an enzyme acts

C) A type of enzyme. D) A cofactor

8. Which of the following is NOT a characteristic of enzymes?

A) They are specific to their substrates.

B) They can be denatured by extreme conditions.

C) They are consumed in reactions.

D) They lower the activation energy of reactions.

9. What is denaturation?

A) The process of breaking down substrates

B) The alteration of an enzyme's structure leading to loss of function

C) The formation of products from substrates

D) The binding of substrates to enzymes

10. Which type of inhibitor binds to the active site of an enzyme?

A) Non-competitive inhibitor. . B) Competitive inhibitor

C) Allosteric inhibitor. D) Coenzyme

11. What role do coenzymes play in enzymatic reactions?

A) They act as substrates. B) They enhance enzyme activity.

C) They inhibit enzyme activity. D) They are waste products.

12. Which of the following is an example of a coenzyme?

A) DNA. B) RNA. C) NAD+. D) ATP

13. Which statement about enzyme specificity is true?

A) Enzymes can act on multiple substrates.

B) Enzymes only bind to substrates with similar structures.

C) Enzymes have a specific active site for each substrate.

D) All enzymes have the same specificity.

14. What is the effect of increasing temperature on enzyme activity?

A) It always increases activity. B) It decreases activity due to denaturation.

C. It has no effect. D) It increases activity until a certain point, then decreases.

15. At what pH do most human enzymes function optimally?

A) 2-3. B) 7-8. C) 10-11. D) 12-13

16. Which enzyme is responsible for breaking down hydrogen peroxide?

A) Amylase. B) Catalase. C) Lipase. D) Protease

17. What is the term for the maximum rate of reaction achieved by an enzyme at a given concentration?

A) Vmax. B) Km. C) Turnover number. D) Activation energy

18. Which of the following statements about enzymes is false?

A) Enzymes can be reused multiple times. B) Enzymes are usually proteins.

C) Enzymes can work at any temperature.

D) Enzymes lower the activation energy needed for reactions.

19. What does Km represent in enzyme kinetics?

A) The maximum velocity of an enzyme-catalyzed reaction.

B) The substrate concentration at which the reaction rate is half Vmax.

C) The rate constant of an enzyme reaction.

D) The effect of temperature on enzyme activity.

20. Which factor does NOT affect Km value?

A) Temperature. B) pH. C) Enzyme concentration. D) Substrate concentration

21. What type of enzyme catalyzes the transfer of functional groups?

A) Ligases. B) Transferases. C) Hydrolases. D) Lyases

22. What is the role of allosteric sites in enzymes?

A) They bind substrates

B) They regulate enzyme activity by binding non-substrate molecules.

C) They provide structural support.

D) They are sites for product formation.

23. What effect does a competitive inhibitor have on an enzyme-catalyzed reaction?

A) It decreases Vmax but does not change Km.

B) It increases Vmax and decreases Km.

C) It increases Km but does not change Vmax. D) It has no effect on Km or Vmax.

24. Which statement about non-competitive inhibitors is true?

A) They bind only to the active site. B) They increase Km without affecting Vmax.

C) They decrease Vmax without changing Km. D) They have no effect on enzyme activity.

25. Which type of enzyme is involved in forming covalent bonds between molecules?

A) Ligases. B) Hydrolases. C) Isomerases. D) Lyases

26. What is a zymogen?

A) An active form of an enzyme. B) An inactive precursor of an enzyme

C) An inhibitor of enzymes. D) A cofactor for enzymes

27. Which of the following statements about enzymes is true?

A) Enzymes can only catalyze one type of reaction.

B) Enzymes are not affected by environmental conditions.

C) Enzymes can be denatured by extreme heat or pH changes.

D) Enzymes are consumed during the reaction they catalyze.

28. Which class of enzymes catalyzes the addition or removal of groups to form double bonds?

A) Lyases. B) Isomerases. C) Ligases. D) Hydrolases

29. The lock-and-key model describes how:

A) Enzymes bind to any substrate. B) Enzymes change shape to fit substrates.

C) Substrates fit perfectly into an active site

D) Enzymes are inhibited by competitive inhibitors.

30. Which enzyme breaks down starch into sugars?

A) Amylase. B) Lactase. C) Maltase. D) Sucrase

31. What is the primary source of energy for cellular processes?

A) DNA B) RNA C) ATP D) NADH

32. In what way do enzymes lower activation energy?

A) By increasing temperature B) By providing an alternative pathway

C) By increasing substrate concentration D) By decreasing product concentration

33. Enzymes that catalyze reactions involving the rearrangement of atoms within a molecule are called:

A) Lyases B) Isomerases C) Ligases D) Hydrolases

34. The energy required to initiate a chemical reaction is known as:

A) Activation energy B) Kinetic energy C) Potential energy D) Free energy

35. The process by which an enzyme loses its shape and functionality is called:

A) Activation B) Denaturation C) Inhibition D) Hydrolysis

36. Which type of inhibition can be overcome by increasing substrate concentration?

A) Non-competitive inhibition B) Competitive inhibition

C) Irreversible inhibition D) Feedback inhibition

37. Enzymes that require metal ions for activity are called:

A) Coenzymes B) Cofactors C) Zymogens D) Inhibitors

38. Which statement about feedback inhibition is true?

A) It prevents substrate from binding to the active site.

B) It occurs when end products inhibit earlier steps in a metabolic pathway.

C) It increases the activity of enzymes in a pathway.

D) It does not involve allosteric regulation.

39. An enzyme's activity can be measured by:

A) The amount of substrate consumed over time

B) The amount of product formed over time

C) Both A and B D) None of the above

40. Which term describes molecules that assist enzymes but are not proteins themselves?

A) Substrates B) Cofactors C) Products D) Inhibitors

41. What happens to an enzyme when it reaches its optimal temperature?

A) Activity decreases rapidly B) Activity increases indefinitely

C) Activity remains constant

D) Activity peaks and then declines if temperature continues to rise

42. Enzymes that act on proteins are known as:

A) Lipases B) Amylases C) Proteases D) Nucleases

43. The primary site where substrates bind to enzymes is known as:

A) Active site B) Allosteric site C) Inhibitory site D) Binding site

44. Which factor does NOT typically affect enzyme activity?

A) Temperature B) Pressure C) pH levels D) Substrate concentration

45. Which type of reaction do oxidoreductases catalyze?

A) Hydrolysis reactions B) Oxidation-reduction reactions

C) Condensation reactions D) Rearrangement reactions

46. What happens to the rate of an enzymatic reaction as substrate concentration increases, assuming all other factors remain constant?

A) It decreases linearly B) It increases until it reaches a maximum velocity (Vmax)

C. It remains constant regardless of substrate concentration

D) It decreases after a certain point

47. Which component is NOT considered a cofactor for enzymes?

A) Zinc ions (Zn^{2+}). B) Vitamin K C) Iron ions (Fe^{2+}). D) Glucose

48. What type of bond holds substrates in place at an enzyme's active site?

A) Ionic bonds only B) Covalent bonds only

C) Hydrogen bonds and van der Waals forces D) All types of chemical bonds

49. An irreversible inhibitor:

A) Can be removed by increasing substrate concentration

B) Permanently binds to an enzyme, preventing its activity

C) Only affects competitive inhibition

D) Is always a cofactor

50. Allosteric regulation involves:

A) Binding at the active site only

B) Changes in enzyme shape at sites other than the active site

C) Permanent changes in enzyme structure

D) Only competitive inhibition

51.What effect does temperature have on enzymatic reactions at low temperatures?

A) Increased kinetic energy speeds up reactions

B) Decreased kinetic energy slows down reactions

C) No effect on reaction rates D) Enzymes become denatured

52. How do enzymes specifically recognize their substrates?

A) Through random interactions with all molecules present

B) Through complementary shapes and chemical properties at the active site

C) By using electrical charges only

D) By changing their structure

53. Enzymes that catalyze the addition or removal of phosphate groups are called:

A) Kinases and phosphatases B) Ligases and transferases

C) Isomerases and hydrolases D) Oxidoreductases and lyases

54. The term "turnover number" refers to:

A) The number of substrates converted per unit time by one enzyme molecule at Vmax

B) The total number of products formed in a reaction cycle

C) The number of times an enzyme can be reused before denaturation occurs

D) The total number of active sites available for substrate binding

55. The primary function of lactase is to:

A) Hydrolyze lactose into glucose and galactose

B) Synthesize lactose from glucose and galactose

C) Hydrolyze starch into maltose

D) Degrade proteins into amino acids

56. The term "enzyme-substrate complex" refers to:

A) The final product formed after enzymatic action

B) The intermediate formed when an enzyme binds its substrate

C) The inactive form of an enzyme

D) The cofactor bound to an enzyme

57. What happens when an enzyme is exposed to extreme pH levels?

S) Its activity increases. B) Its structure may denature, losing functionality

C) It becomes more efficiency D) It binds more strongly to substrates

58. Enzyme inhibitors that mimic substrates are classified as:

A) Non-competitive inhibitors. B) Competitive inhibitors

C) Uncompetitive inhibitors D) Irreversible inhibitors

59. Which statement about enzymes and activation energy is true?

A) Enzymes increase activation energy requirements

B) Enzymes decrease activation energy requirements

C) Enzymes have no effect on activation energy

D) Enzymes only affect end products, not activation energy

60. Which factor would most likely result in decreased enzymatic activity?

A) Increased substrate concentration

B) Decreased temperature within optimal range

C) Extreme changes in pH outside optimal range

D) Increased cofactor availability

61. Enzymes that catalyze hydrolysis reactions are classified as:

A) Ligases B) Transferases C) Hydrolases D) Lyases

62. An example of a feedback inhibition mechanism would be:

A) Increased production when substrate levels rise

B) End product inhibiting an earlier step in its own synthesis

C) Continuous production regardless of end product levels

D) Substrate binding enhancing product formation

63. Enzyme specificity refers to:

A. An enzyme's ability to bind multiple substrates

B) An enzyme's ability to catalyze multiple reactions

C) An enzyme's ability to bind only one specific substrate

D) An enzyme's ability to change shape upon binding

64. What happens when you increase temperature beyond an enzyme's optimal range?

A) Enzyme activity increases indefinitel. B) Enzyme activity remains unchanged

C) Enzyme may denature and lose function. D) Reaction rates become slower

65. Which type of inhibitor binds irreversibly to an enzyme's active site?

A) Competitive inhibitor. B) Non-competitive inhibitor

C) Uncompetitive inhibitor. D) Irreversible inhibitor

66. The primary function of trypsin is to:

A) Break down starch into sugar. B) Hydrolyze proteins into peptides

C) Synthesize nucleotides from nucleic acids. D) Convert fats into fatty acids

69. Enzyme kinetics studies focus on determining how fast a reaction occurs under varying conditions such as:"

A)Temperature and pressure only". B)Substrate concentration and pH only"

C) substrate concentration, pH, and temperature". D)Only product formation rates"

70. The maximum velocity (Vmax)" refers to:"

A) The highest rate achieved by an enzymatic reaction under saturation conditions"

B) The lowest rate achieved by an enzymatic reaction under saturation conditions"

C) The rate at which half-maximal velocity occurs"

D) The speed at which substrates bind to enzymes"

71. "Inhibition caused by end products acting on earlier steps in metabolic pathways is known as:"

"A) Competitive inhibition. B) Non-competitive inhibition"

C). Feedback inhibition. D) Irreversible inhibition"

72. The primary role of amylase in digestion involves:"

A) Breaking down lipids into fatty acids and glycerol"

"B) Hydrolyzing starch into simpler sugars like maltose and glucose"

C) Synthesizing glycogen from glucose units only"

D) Converting proteins into amino acids directly"