

Unit 5: Enzymes

Multiple Choice Questions

MULTIPLE CHOICE QUESTIONS (EXERCISE)

1. What roles does nicotinamide adenine dinucleotide play in oxidative pathways?
(a) Enzyme (b) Coenzyme
(c) Prosthetic group (d) Inhibitor
2. The enzymes that catalyse the reactions in which two molecules are joined together by synthesis of new bonds, using energy from ATP, are placed in group;
(a) Hydrolase (b) Ligase
(c) Lyase (d) Transferase
3. Which of the following is an example of hydrolases?
(a) Lipase
(b) Glycogen phosphorylase
(c) Pyruvate decarboxylase
(d) Cytochrome oxidase
4. Which of the following statements about enzymes is correct?
(a) They increase the activation energy of a reaction
(b) They are consumed during the reaction
(c) They are specific in terms of the reactions they catalyse
(d) They always work optimally at high temperatures.
5. Enzyme B requires Zn^{+2} to catalyse the conversion of substrate X. The zinc is best identified as a(n):
(a) Coenzyme (b) Activator
(c) Substrate (d) Product
6. If an enzyme solution is saturated with substrate, the most effective way to obtain an even faster yield of products would be:
(a) Add more of the enzymes
(b) Add more substrate
(c) Add an allosteric inhibitor
(d) Add a non-competitive inhibitor
7. How does a non-competitive inhibitor decrease the rate of an enzyme-catalysed reaction?
(a) By binding the active site of the enzyme
(b) By changing the shape of the enzyme
(c) By changing the free energy change of the reaction
(d) By acting as a coenzyme for the reaction
8. Which enzyme class is responsible for catalysing the addition of water to a substrate molecule?
(a) Ligase (b) Lyase
(c) Hydrolase (d) Isomerase

SLO BASED MULTIPLE CHOICE QUESTIONS

Enzyme

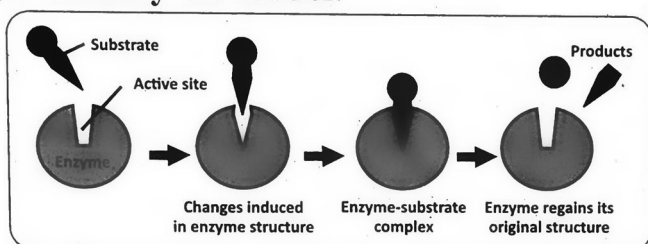
9. Enzymes speed up chemical reactions by lowering:
 - (a) Ionization energy
 - (b) Activation energy
 - (c) Hydration energy
 - (d) Bond energy
10. Rate of enzyme catalyzed reactions are _____ times greater than uncatalyzed reaction rates:
 - (a) 10^2 to 10^3
 - (b) 10^3 to 10^8
 - (c) 10^6 to 10^{11}
 - (d) 10^8 to 10^{10}
11. All enzymes are synthesized inside cells by:
 - (a) Lysosomes
 - (b) Mitochondria
 - (c) Ribosomes
 - (d) Vacuoles
12. The enzymes of glycolysis are present in:
 - (a) Nucleoplasm
 - (b) Mitochondrial matrix
 - (c) Stroma
 - (d) Cytoplasm
13. The enzymes of Calvin cycle and Krebs's cycle
 - (a) Present in karyoplasm
 - (b) Dispersed in cytoplasm
 - (c) Bound to membranes of their organelles
 - (d) Present in periplasmic space
14. Enzymes are _____ globular proteins
 - (a) 2D
 - (b) 3D
 - (c) 4D
 - (d) both (a) & (c)
15. Small cleft or depression in the surface of globular enzyme is:
 - (a) Active site
 - (b) Synaptic cleft
 - (c) T-tubule
 - (d) No such cleft exists
16. Substrate molecule fits into binding site by weak chemical forces such as:
 - (a) Covalent bond
 - (b) Metallic bond
 - (c) Ionic bond
 - (d) Hydrogen bond
17. At which region of active site, substrate is transformed into products?
 - (a) Binding site
 - (b) Catalytic site
 - (c) Peptidyl site
 - (d) Aminoacyl site
18. The non-protein components of enzyme are called:
 - (a) Co-factor
 - (b) Transductor
 - (c) Messenger
 - (d) Both (a) & (b)
19. The kinds or types of co-factor are:
 - (a) One
 - (b) Two
 - (c) Three
 - (d) Four
20. The protein part of enzyme is called:
 - (a) Apoenzyme
 - (b) Co-enzyme
 - (c) Prosthetic group
 - (d) Holoenzyme
21. The complete enzyme including its coenzyme or prosthetic group is termed as:
 - (a) Apoenzyme
 - (b) Ribozyme
 - (c) Holoenzyme
 - (d) Proenzyme
22. The cofactors which are attached with enzyme by covalent bonds are called:
 - (a) Allosteric enzyme
 - (b) Apoenzyme
 - (c) Prosthetic group
 - (d) Proenzyme
23. Prosthetic groups are attached with enzyme by:
 - (a) Hydrogen bond
 - (b) Ionic bond
 - (c) Hydrophobic interaction
 - (d) Covalent bond

24. When the co-factor is a non-protein organic molecule and is loosely attached with enzyme, it is called:
- Allosteric enzyme
 - Co-enzyme
 - Prosthetic group
 - Zymogen
25. Co-enzymes participate in enzyme-catalyzed reactions, often by transporting:
- Electrons
 - Hydrogen atoms
 - Phosphate groups
 - Both (a) and (b)
26. The most important coenzyme in a cell is the hydrogen acceptor.
- NAD⁺
 - FADH₂
 - ATP
 - Co-enzyme Q
27. When food is oxidized in cell, enzymes draw electrons from food molecules and transfer them to:
- Nicotinamide Adenine Dinucleotide
 - Nicotinamide Guanine Dinucleotide
 - Nicotinamide Cytosine Dinucleotide
 - Nicotinamide Thymine Dinucleotide
28. The speed of a chemical reaction depends on the amount of:
- Activation energy
 - Substrate
 - ATP
 - H⁺-ions
29. The energy which works to destabilize existing chemical bonds is called:
- Deactivation energy
 - Activation energy
 - Ionization energy
 - Potential energy
30. Which of the following is correct about enzymes?
- Enzymes increase the activation energy
 - Enzyme are fibrous proteins
 - Enzymes are synthesized by endocrine cells
 - The presence of enzymes does not affect the nature or properties of end products
31. Catalytic site is activated when:
- Enzyme inhibitor complex is formed
 - Substrate attaches at allosteric site
 - ES-complex is formed
 - Spontaneously
32. Activation energy is lowered by:
- Bringing reactants together in correct orientation
 - Stressing particular chemical bonds of reactants
 - Stabilizing bonds of substrate
 - Both (a) and (b)
33. The mechanism of enzyme can be summarized as:
- $E + S \rightarrow ES \rightarrow E + P$
 - $E + P \rightarrow EP \rightarrow E + S$
 - $E + S \rightarrow E + P$
 - $E + S \rightarrow S + P$
34. In complex metabolic pathways, end products formed inhibit (through feedback) the:
- First substrate
 - First enzyme
 - First product
 - Last enzyme
35. Lock and key model of enzyme mechanism was proposed by:
- Norman Haworth
 - Daniel Koshland
 - F-Sanger
 - Emil Fisher
36. Emil Fischer proposed that,
- Active site is rigid
 - Active site is flexible
 - Active site undergo modification
 - All of above
37. Lock and key model was proposed by Emil Fischer in:
- 1890
 - 1882
 - 1958
 - 1894
38. The induced fit model was modified form of lock and key model was proposed by:
- Daniel Stanford
 - Daniel Koshland
 - Emil Fischer
 - Van Neil

39. Which of the following represent induced fit model?

- (a) When substrate combines with the binding site, it induces change in enzyme structure
- (b) Active site is not a rigid structure
- (c) It is modified form of lock-and-key model
- (d) All of above

40. Identify the model:



- (a) Induced fit model
- (b) Lock and key model
- (c) Watson and crick model
- (d) Fluid mosaic model

Factors Affecting the Enzyme Activity

41. Which of the following can affect enzyme activity?

- (a) pH
- (b) Temperature
- (c) Enzyme concentration
- (d) All of above

42. Which of the following can be affected by temperature in an enzyme?

- (a) Hydrogen bond
- (b) Hydrophobic interaction
- (c) Hydrophilic interaction
- (d) Both (a) and (b)

43. The temperature at which an enzyme works at its maximum rate is called

- (a) Specific temperature
- (b) Maximum temperature
- (c) Optimum temperature
- (d) Initial temperature

44. The optimum temperature for human enzymes is:

- (a) 36.1°C
- (b) 37.8°C
- (c) 37.0°C
- (d) 36.5°C

45. When the temperature of body falls below 37.0°C the bonds that determine enzymes shape becomes:

- (a) Less flexible
- (b) More hard
- (c) Less hard
- (d) More flexible

46. The enzymes of thermophilic bacteria can function at:

- (a) 70°C
- (b) 170°C
- (c) 210°C
- (d) 340°C

47. The loss of globular shape of enzyme is called:

- (a) Saturation
- (b) Renaturation
- (c) Denaturation
- (d) Flexion

48. A slight increase or decrease in pH of an enzyme causes:

- (a) Increase in enzyme activity
- (b) Decrease in enzyme activity
- (c) No effect on enzyme activity
- (d) All of above

49. The pH at which an enzyme works at maximum rate is called:

- (a) Optimum pH
- (b) Maximum pH
- (c) Average pH
- (d) Top pH

50. Pepsin works its best in:

- (a) Acidic medium
- (b) Low pH
- (c) High pH
- (d) Both (a) and (b)

51. The enzyme papain is present in:

- (a) Yellow papaya
- (b) Green papaya
- (c) Red papaya
- (d) Blue papaya

52. Papain works in:

- (a) Acidic pH
- (b) Alkaline media
- (c) Low pH
- (d) All of above

53. Pepsin's optimum pH is:

- (a) 1.5 – 1.6
- (b) 4.6 – 5.2
- (c) 8.0
- (d) 7.8 – 8.7

54. 7.0 is the optimum pH of:

- (a) Catalase and urease
- (b) Urease and source
- (c) Pepsin and arginase
- (d) Pancreatic lipase

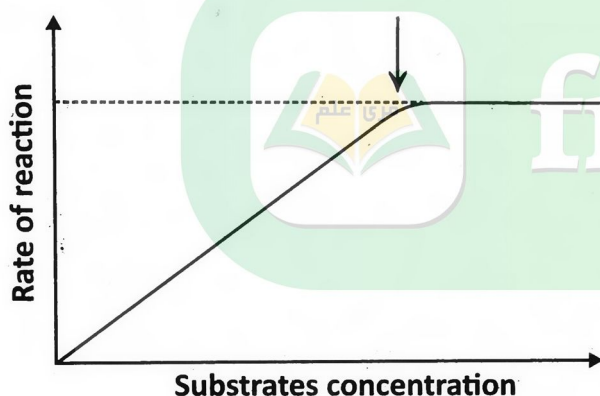
55. At unlimited substrate concentration at a specific time, rate of reaction directly depends on:

- (a) Enzyme concentration
- (b) Substrate concentration
- (c) Temperature
- (d) pH

56. If enzyme concentration goes on increasing, and rate of reaction stays constant and does not increase further means that:

- (a) Substrate concentration was increased
- (b) Substrate concentration was the same
- (c) Less amount of enzymes is active
- (d) Enzymes have no effect

57. What does the middle arrow indicate?



- (a) No more substrate available
- (b) No more active sites for substrates
- (c) Free active sites are present
- (d) Enzyme has been denatured

Enzyme Inhibition

58. A chemical that interferes and block an enzyme's activity is called:

- (a) Activator
- (b) Inhibitor
- (c) Accelerator
- (d) Suppressor

59. Which of the follow is a potent inhibitor of prostaglandin?

- (a) Dispirin
- (b) Aspirin
- (c) Paracetamol
- (d) Tetracycline

60. Pick up the irreversible inhibitor:

- (a) Cyanide
- (b) Aspirin
- (c) Succinate dehydrogenase
- (d) Malonate

61. Which inhibitors are used as antibiotics to kill bacteria?

- (a) Irreversible
- (b) Non-competitive
- (c) Competitive
- (d) Non-reversible

62. Which of the following is structurally similar with succinic acid?

- (a) Malonic acid
- (b) Acetic acid
- (c) Mavlonic acid
- (d) Malic acid

63. A none competitive inhibitor binds to:

- (a) The active site
- (b) The substrate
- (c) The site other than active site
- (d) Catalytic site

64. In feedback inhibition, the final product inhibits:

- (a) The last enzyme in the metabolic pathway
- (b) The 1st enzyme in the pathway
- (c) no enzyme is inhibited in pathway
- (d) all enzymes are inhibited in pathway

65. The enzyme which uses ATP to join molecules is:

- (a) Isomerases
- (b) Ligases
- (c) Hydrolases
- (d) Oxidoreductases

66. The mechanism of enzyme inhibition, used to understand the factors that influence enzyme activity is called:

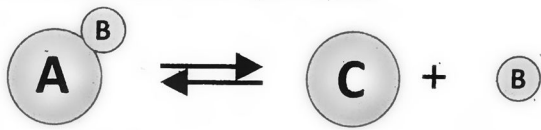
- (a) Enzyme kinetics
- (b) Enzyme dynamics
- (c) Enzyme pathology
- (d) Enzyme energetics

67. Reversible inhibitors make ____ bonds with enzymes:

- (a) Covalent
- (b) Ionic
- (c) Hydrogen
- (d) Metallic

68. Penicillin permanently disables the enzymes responsible for building bacterial cell walls because it acts as:

- (a) Competitive inhibitor
- (b) Non-competitive inhibitor
- (c) Reversible inhibitor
- (d) Irreversible inhibitor

69. Succinic acid and CoA react to form succinyl CoA which is catalysed by: succinyl-CoA:
 (a) Synthetase (b) Decarboxylase
 (c) Hydroxylase (d) Reductase
70. The phenomenon where the products of a process controls the process itself, often limiting the production of more products is called:
 (a) Feedback activation
 (b) Feed forward activation
 (c) Feedback inhibition
 (d) Feed forward inhibition
- Classification of Enzymes**
71. The enzymes which remove or add H^+ ions or electrons from substrate are called:
 (a) Isomerases
 (b) Lyases
 (c) Oxidoreductases
 (d) Transferases
72. Which of the following is NOT a hydrolase
 (a) Cytochrome oxidase (b) Amylase
 (c) Lipase (d) Peptidase
73. The enzymes catalyse non-hydrolytic addition or removal of groups from substrates are:
 (a) Hydrolases (b) Transferases
 (c) Lyases (d) Isomerases
74. The enzyme which catalyses the conversion of glucose to fructose is:
 (a) Pentose isomerase
 (b) Hexokinase
 (c) Hexoreductase
 (d) Hexoisomerase
75. Which enzyme breakdown small polypeptides into dipeptides?
 (a) Erypsin (b) Aminopeptidase
 (c) Pepsin (d) Trypsin
76. Which enzyme is responsible for the breakdown of DNA?
 (a) DNA polymerase
 (b) DNA synthase
 (c) DNA ligase
 (d) DNAase
77. Choose the correct class:
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- (a) Lyases (b) Hydrases
 (c) Transferases (d) Ligases
78. Pick the enzyme which is not related to others:
 (a) Dehydrogenase (b) Oxidase
 (c) Reductase (d) Epimerase
79. The reaction indicates.
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- (a) Oxidoreductases
 (b) Transferase
 (c) Hydrolyases
 (d) Isomerases
80. Mark the disaccharide
 (a) Cellulose (b) Chitin
 (c) Cellobiose (d) Mannose

ANSWER KEY

1.	b	2.	b	3.	a	4.	c	5.	b	6.	a	7.	b
8.	c	9.	b	10.	b	11.	c	12.	d	13.	c	14.	b
15.	a	16.	d	17.	b	18.	a	19.	c	20.	a	21.	c
22.	c	23.	d	24.	b	25.	d	26.	a	27.	a	28.	a
29.	b	30.	d	31.	c	32.	d	33.	a	34.	b	35.	d
36.	a	37.	d	38.	b	39.	d	40.	a	41.	d	42.	d
43.	c	44.	c	45.	a	46.	a	47.	c	48.	b	49.	a
50.	d	51.	b	52.	d	53.	a	54.	a	55.	a	56.	b
57.	b	58.	b	59.	b	60.	a	61.	c	62.	a	63.	c

64.	b	65.	b	66.	a	67.	c	68.	d	69.	a	70.	c
71.	c	72.	a	73.	c	74.	d	75.	b	76.	d	77.	a
78.	d	79.	b	80.	c								



free ilm.