

Enzymes MCQ

1. The best thing that describes the specificity of enzymes is :

- a) k_m
- b) $k_m / k_1 + k_2$
- c) $k_{-1} + k_{-2} / k_m$
- d) none of above

2. The induced fit model when :

- a) the substrate binds to the enzyme
- b) the substrate is at proximity to enzyme
- c) the change occurs in the active site after the binding of substrate
- d) the change in the active site before binding of the substrate

3. The inhibitor that reacts with the ES complex but not directly to enzyme :

- a-uncompetitive
- b-noncompetitive
- c-competitive
- d-allosteric

4. Which one of the following describes the action of aspirin?

- a) adding a sulphate to active site
- b) blocking the active site
- c) applying a conformational change to the enzyme
- d) feedback inhibition

5) can affect the catalytic activity of the enzyme. Which of the following statements concerning that effect is correct?

a. An increase in temperature can stop the reaction by denaturing the enzyme

b. An increase in temperature can increase the reaction rate by increasing the speed at which molecules move

c. An increase in temperature to the optimum temperature maximizes reaction rate

d. More than one correct response

e. No correct response

6) One of the regulatory mechanisms of enzymatic activity is the covalent modification, which statement is false about such a mechanism?

a. It is reversible

b. It is slower than allosteric regulation

c. It is irreversible

d. Phosphorylation is a common covalent modification

e. It is requiring the activity of two enzymes

7- In enzyme chemistry, the active site concept means that?

- a. There may be a covalent bond between enzyme and substrate
- b. Functional groups on the enzyme participate directly in the reaction**
- c. All enzymes are having the flexible model of the active site
- d. For all enzymes, no catalysis in the absence of cofactors
- e. All enzymes are having the rigid model of the active site

8-A plot of enzyme activity (y-axis) versus substrate concentration (x-axis) with other variables constant is a?:

- a. Straight line with an upward slope.
- b. Line parallel to the y-axis
- c. An upward line slope followed by a downward slope.
- d. Straight horizontal line.
- e. Line with an upward slope and a long flat top.**

9- If one continues to increase the temperature in an enzyme-catalysed reaction, the rate of the reaction?

- a. Does not change.
- b. Increases and then levels off.
- c. Decreases and then levels off.
- d. Increases and then decreases rapidly.**
- e. Decreases and then increases rapidly.

10-Different isoenzymes of an enzyme have the same?

- a. Amino acid sequence
- b. Michaelis constant
- c. Catalytic function
- d. Tissues origin
- e. Effect of activators and inhibitors

11-If the substrate concentration is much below the K_m of the enzyme, the velocity of the reaction is?

- a. Directly proportional to substrate concentration
- b. Not affected by enzyme concentration
- c. Nearly equal to V_{max}
- d. Inversely proportional to substrate concentration
- e. Nearly equals to $\frac{1}{2} V_{max}$

12-Why does pH affect enzyme activity?

- a. Changes in pH affect the concentration of the coenzyme
- b. Changes in pH affect the concentration of enzyme
- c. Changes in pH affect the concentration of substrate
- d. Changes in pH affect the enzyme optimum temperature
- e. Changes in pH affect the shape of the enzyme active site

13-For Ligases enzymes?

- a. They catalyse oxidation/reduction reactions
- b. They transfer a functional group
- c. They catalyse the hydrolysis of various bonds
- d. They catalyse isomerization changes within a single molecule
- e. They join two molecules with covalent bonds

14-The "lock and key" model of enzyme action illustrates that a particular enzyme molecule?

- a. Forms a permanent enzyme- substrate complex
- b. May be destroyed and resynthesized several times
- c. Interacts with a specific type of substrate molecule
- d. Reacts at identical rates under all conditions
- e. Can allow the binding of substrate molecule whatever its shape

15-An uncatalysed reaction requires ?

- a. A higher activation energy
- b. A lower activation energy
- c. A Balanced activation energy
- d. No activation energy
- e. A similar activation energy as the catalyzed reaction

16-Active site of an enzyme is ?

- a. A particular gland that secretes a particular enzyme
- b. A portion of the substrate molecule to which the enzyme molecule attaches
- c. A portion of the enzyme in which the substrate molecule fits
- d. An organ in the body where the enzyme works
- e. A portion of the cell in which the enzyme catalysed reaction takes place

17-According to the induced fit model of enzyme function, which of the following is CORRECT?

- a. The active site is not flexible.
- b. Some enzymes become denatured when activators bind to the substrate.
- c. The binding of the substrate depends on the shape of the active site.
- d. The binding of the substrate changes the shape of the enzyme slightly.
- e. The active site creates an environment ideal for the reaction.

18-Which of the following is not a way in which enzymes stabilize a transition state?

- a. Covalent catalysis
- b. Metal ion catalysis
- c. General acid-base catalysis
- d. Environmental temperature increase
- e. Catalysis by approximation

19-Energy of activation?

- a. Increases enzymatic activity
- b. Decreases enzymatic activity
- c. C. Minimum amount of energy for the reaction to occur
- d. Maximum amount of energy for the reaction to occur
- e. Not needed for the reaction to occur

20-If one continues to increase the temperature in an enzyme-catalysed reaction, the rate of the reaction?

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- c. Decreases and then levels off.
- d. Increases and then decreases rapidly.
- e. Decreases and then increases rapidly

21 The enzyme activity in the Y axis substrate in X ,if we increase the substrate?

- a) Straight horizontally
- b) zero -order reaction
- c) first-order reaction
- d) none of above

22-Which of the following is true of enzymes that are regulated by allosteric regulators ?

a)They are usually multimeric enzymes

b)has just positive allosteric

c)has just negative allosteric

d)no conformational change

23-The affinity of enzyme for substance , when the enzyme has $k_m=0.5m$ will bethan the affinity of an enzyme for its substance when the enzyme has an $k_m =0.5$?

a)lesser

b)higher

c)doesn't affect it

d)will be equal

24-When the rate of enzymatic reaction is controlled by amount of enzyme present , which of the following factors controls the enzyme level ?

a)negative feedback back inhibition

b)rate of transcription and protein synthesis

c)competitive

d)non competitive

25-If the absolute concentration of enzyme is unknown , which of the following values is determined experimentally ?

- a) K_m
- b) V_{max}
- c) K_m and v_{max}
- d) none of above

26- Which type of regulation occurs in the slowest time frame?

- a) new synthesis of enzyme through gene induction
- b) covalent
- c) allosteric
- d) compartmentiton

27- Selective qualities of enzyme are recognised as its ?

- a) sensitivity
- b) specificity
- c) intracellular
- d) extracellular

28. K_m is

- a) Substrate concentration
- b) enzyme concentration
- c) site of action
- d) none of these

29- Which of the following can reduce rate of reaction

- a) Increase in Substrate concentration
- b) Increase in enzyme concentration
- c) Increase temp. to optimum .
- d) Increase pH to optimum
- e) increase product concentration

30- Type of inhibition where the inhibitor can bind on E or ES complex?

- a) Non-competitive inhibition
- b) competitive
- c) allosteric
- d) feedback inhibition

31. Non steroidal anti inflammatory drugs, such as aspirin act by inhibiting the activity of the enzyme:

- (A) Lipoxygenase
- (B) Cyclooxygenase
- (C) Phospholipase A2
- (D) Lipoprotein lipase

32. From arachidonate, synthesis of prostaglandins is catalysed by

- (A) Cyclooxygenase
- (B) Lipoxygenase
- (C) Thromboxane synthase
- (D) Isomerase

33. A Holoenzyme is

- (A) Functional unit
- (B) Apo enzyme
- (C) Coenzyme
- (D) All of these

34. Gaucher's disease is due to the deficiency of the enzyme:

- (A) α -Fucosidase
- (B) β -Galactosidase
- (C) β -Glucosidase
- (D) Sphingomyelinase

35. Example of an extracellular enzyme is

- (A) Lactate dehydrogenase
- (B) Cytochrome oxidase
- (C) Pancreatic lipase**
- (D) Hexokinase

36. Enzymes, which are produced in inactive form in the living cells, are called

- (A) Papain (B) Lysozymes
- (C) Apoenzymes (D) Proenzymes**

37. An example of ligases is

- (A) Succinate thiokinase**
- (B) Alanine racemase
- (C) Fumarase
- (D) Aldolase

38. An example of lyases is

- (A) Glutamine synthetase
- (B) Fumarase**
- (C) Cholinesterase
- (D) Amylase

39. The enzyme which can add water to a carbon-carbon double bond or remove water to create a double bond without breaking the bond is

(A) Hydratase

(B) Hydroxylase

(C) Hydrolase

(D) Esterase

40. Fischer's 'lock and key' model of the enzyme action implies that

(A) The active site is complementary in shape to that of substance only after interaction.

(B) The active site is complementary in shape to that of substance

(C) Substrates change conformation prior to active site interaction

(D) The active site is flexible and adjusts to substrate

41. From the Lineweaver-Burk plot of Michaelis-Menten equation, K_m and V_{max} can be determined when V is the reaction velocity at substrate concentration S , the X-axis experimental data are expressed as

(A) $1/V$

(B) V

(C) $1/S$

(D) S

42. A sigmoidal plot of substrate concentration ($[S]$) versus reaction velocity (V) may indicate

(A) Michaelis-Menten kinetics

(B) Co-operative binding

(C) Competitive inhibition

(D) Non-competitive inhibition

43. The K_m of the enzyme giving the kinetic data as below is

(A) -0.50

(B) -0.25

(C) $+0.25$

(D) $+0.33$

44. An inducer is absent in the type of enzyme:

- (A) Allosteric enzyme
- (B) Constitutive enzyme**
- (C) Co-operative enzyme
- (D) Isoenzymic enzyme

45. A demonstrable inducer is absent in

- (A) Allosteric enzyme
- (B) Constitutive enzyme
- (C) Inhibited enzyme**
- (D) Co-operative enzyme

46. In reversible non-competitive enzyme activity inhibition

- (A) V_{max} is increased
- (B) K_m is increased**
- (C) K_m is decreased
- (D) Concentration of active enzyme is reduced

47. In reversible non-competitive enzyme activity inhibition

- (A) Inhibitor bears structural resemblance to substrate
- (B) Inhibitor lowers the maximum velocity attainable with a given amount of enzyme
- (C) K_m is increased**
- (D) K_m is decreased

48. An enzyme which uses hydrogen acceptor as substrate is

- (A) Xanthine oxidase
- (B) Aldehyde oxidase**
- (C) Catalase
- (D) Tryptophan oxygenase

49. The pH optima of most of the enzymes is

- (A) Between 2 and 4
- (B) Between 5 and 9**
- (C) Between 8 and 12
- (D) Above 12

50. Coenzymes are

- (A) Heat stable, dialyzable, non protein organic molecules**
- (B) Soluble, colloidal, protein molecules
- (C) Structural analogue of enzymes
- (D) Different forms of enzymes

51. An example of hydrogen transferring coenzyme is

- (A) CoA
- (B) NAD⁺**
- (C) Biotin
- (D) TPP

52. Isoenzymes are

- (A) Chemically, immunologically and electrophoretically different forms of an enzyme
- (B) Different forms of an enzyme similar in all properties
- (C) Catalysing different reactions
- (D) Having the same quaternary structures like the enzymes

53. Isoenzymes can be characterized by

- (A) Proteins lacking enzymatic activity that are necessary for the activation of enzymes
- (B) Proteolytic enzymes activated by hydrolysis
- (C) Enzymes with identical primary structure
- (D) Similar enzymes that catalyse different reaction

54. The isoenzymes of LDH

- (A) Differ only in a single amino acid
- (B) Differ in catalytic activity
- (C) Exist in 5 forms depending on M and H monomer contents
- (D) Occur as monomers

55.LDH1 and LDH2 are elevated in

- (A) Myocardial infarction
- (B) Liver disease
- (C) Kidney disease
- (D) Brain disease

56.The CK isoenzymes present in cardiac muscle is

- (A) BB and MB
- (B) MM and MB
- (C) BB only
- (D) MB only

57. In acute pancreatitis, the enzyme raised in first five days is

- (A) Serum amylase
- (B) Serum lactic dehydrogenase
- (C) Urinary lipase
- (D) Urinary amylase

58.Phosphofructokinase key enzyme in glycolysis is inhibited by

- (A) Citrate and ATP (B) AMP
- (C) ADP (D) TMP

59. All the enzymes of glycolysis pathway are found in

- (A) Extramitochondrial soluble fraction of the cell
- (B) Mitochondria
- (C) Nucleus
- (D) Endoplasmic reticulum

60. Most major metabolic pathways are considered mainly either anabolic or catabolic. Which of the following pathway is most correctly considered to be amphibolic?

- (A) Citric acid cycle
- (B) Gluconeogenesis
- (C) Lipolysis
- (D) Glycolysis

61. The enzymes of the citric acid cycle are located in

- (A) Mitochondrial matrix
- (B) Extramitochondrial soluble fraction of the cell
- (C) Nucleus
- (D) Endoplasmic reticulum

62. Allosteric activator of glycogen synthase is

- (A) Glucose
- (B) Glucose-6-Phosphate
- (C) UTP
- (D) Glucose-1-phosphate

63. HMG-CoA is converted to mevalonate by reduction catalysed by

- (A) HMG-CoA synthetase
- (B) HMG-CoA reductase**
- (C) Mevalonate kinase
- (D) Thiolase

64. In the biosynthesis of cholesterol, the rate limiting enzyme is

- (A) Mevalonate kinase
- (B) HMG-CoA synthetase
- (C) HMG-CoA reductase**
- (D) Cis-prenyl transferase

65. There are different mechanisms for regulating enzyme activity including the allosteric one. Which of the following would usually be found in such a mechanism? Select one:

- a. The need for cofactors
- b. The enzyme is a monomeric molecule
- c. Both activating and inhibitory activity by one modulator
- d. Feedback inhibition by the reaction end product is not existing
- e. Cooperativity**

66. Neimann-Pick disease is due to the deficiency of the enzyme:

- (A) Hexosaminidase A and B
- (B) Ceramidase
- (C) Ceramide lactosidase
- (D) Sphingomyelinase**

67. Activation or inactivation of certain key regulatory enzymes is accomplished by covalent modification of the amino acid:

- (A) Tyrosine
- (B) Phenylalanine
- (C) Lysine
- (D) Serine**

68. In competitive enzyme activity inhibition

- (A) The structure of inhibitor generally resembles that of the substrate**
- (B) Inhibitor decreases apparent K_m
- (C) K_m remains unaffected
- (E) Inhibitor decreases V_{max} without affecting K_m

69. An example of group transfer ing coenzyme is

- (A) NAD+
- (B) NADP+
- (C) FAD
- (D) CoA

70. One of the enzymes regulating glycolysis is

- (A) Phosphofructokinase
- (B) Glyceraldehyde-3-phosphate dehydrogenase
- (C) Phosphotriose isomerase
- (D) Phosphohexose isomerase

71. The hormone activating the glycogen synthase activity is

- (A) Insulin
- (B) Glucagon
- (C) Epinephrine
- (D) ACTH

72. The kinetic effect of purely competitive inhibitor of an enzyme

- (A) Increases K_m without affecting V_{max}
- (B) Decreases K_m without affecting V_{max}
- (C) Increases V_{max} without affecting K_m
- (D) Decreases V_{max} without affecting K_m

73. Covalent modifications that increase the activity of allosterically regulated enzymes do so by?

- a. Adding phosphate groups to essential amino acids in the active site
- b. Causing the enzyme to fold into a more active configuration
- C. The involvement of the main source of cellular energy
- d. Increasing the amount of total enzyme present
- e. Increasing the rate of enzyme degradation

74. Upon adding an inhibitor to an enzyme-catalyzed reaction, the rate of reaction is markedly decreased, then, the rate does not show any increase upon increasing the substrate concentration. What is your conclusion about the inhibitor?

- a. That it is a kinase
- b. That it is a competitive or noncompetitive inhibitor
- C. That it binds the enzyme's active site only
- d. That it is an inorganic or competitive inhibitor
- e. That it is a noncompetitive or uncompetitive inhibitor

75. Why does the rate of an enzyme-catalysed reaction increase as temperature is raised from 0 to 37 °C?:

- a. Enzyme and substrate molecules have more kinetic energy to get the transition state
- b. The shape of the active site changes to be suitable for binding substrate
- c. The shape of the substrate binding site changes at high temperature
- d. Enzymes are denatured at high temperature
- e. Enzyme substrate complex will take longer time to be in the transition state

76. Action of glycogen synthase is inhibited by

- (A) Insulin
- (B) Glucose
- (C) Mg²⁺
- (D) Cyclic AMP

77. Which one of the following statements is not true about enzyme ?

- a) molecules that catalyse the reaction
- b) enzymes are named for the product formed
- c) their shape is affected by their function
- d) can be intracellular and extracellular

78. pepsin, an enzyme found in the stomach acts best at pH = 2, but it's not active at pH = 7, why ?

- a) the optimal pH helps to maintain the tertiary structure of the enzyme
- b) because it is active in all forms
- c) can't digest proteins
- d) digestion of lipids

79. Which of the following statements concerning enzyme active site is incorrect ?

- a) for binding of substrate
- b) for binding of inhibitors in competitive
- c) consecutive correct responses
- d) it can be affected by substrate concentration