

## Advanced Enzymes MCQs (Very Hard Level)

1. Which of the following best describes a holoenzyme?

- A) Protein part only
- B) Enzyme without cofactor
- C) Enzyme with its cofactor
- D) Inactive enzyme

2. The systematic classification of enzymes into six major classes was established by:

- A) WHO
- B) FDA
- C) IUBMB
- D) NIH

3. Which enzyme class catalyzes oxidation-reduction reactions?

- A) Transferases
- B) Oxidoreductases
- C) Hydrolases
- D) Ligases

4. The active site of an enzyme is primarily responsible for:

- A) Protein synthesis
- B) Substrate binding and catalysis
- C) Energy storage
- D) Enzyme degradation

5. Enzymes increase reaction rates by:

- A) Increasing  $\Delta G$
- B) Decreasing activation energy
- C) Changing equilibrium
- D) Increasing substrate concentration

6. Which of the following is TRUE about enzyme specificity?

- A) Enzymes catalyze many reactions
- B) Enzymes are non-specific
- C) Enzymes are highly specific
- D) Enzymes bind all substrates equally

7. What happens to enzyme activity at very high temperatures?

- A) Always increases

- B) Decreases due to denaturation
- C) Remains constant
- D) Becomes irreversible

8. At very low substrate concentration ( $[S] \ll K_m$ ), reaction order is:

- A) Zero order
- B) First order
- C) Second order
- D) Mixed order

9.  $K_m$  represents:

- A) Maximum velocity
- B) Substrate concentration at  $V_{max}$
- C) Substrate concentration at  $\frac{1}{2} V_{max}$
- D) Enzyme concentration

10. A low  $K_m$  value indicates:

- A) Low affinity
- B) High affinity
- C) No binding
- D) High  $V_{max}$

11. Which of the following does NOT affect enzyme velocity?

- A) Temperature
- B) pH
- C) Substrate concentration
- D) DNA sequence

12. Lineweaver-Burk plot is used to determine:

- A) Protein structure
- B)  $V_{max}$  and  $K_m$
- C) Enzyme location
- D) Cofactors

13. In Lineweaver-Burk plot, the x-intercept equals:

- A)  $K_m$
- B)  $1/K_m$
- C)  $-1/K_m$
- D)  $V_{max}$

14. Competitive inhibitors:

- A) Bind different site
- B) Increase  $V_{max}$
- C) Increase apparent  $K_m$
- D) Decrease  $K_m$

15. Noncompetitive inhibitors:

- A) Increase  $K_m$
- B) Decrease  $K_m$
- C) Do not change  $K_m$
- D) Compete with substrate

16. Which of the following is TRUE about  $V_{max}$  in competitive inhibition?

- A) Increased
- B) Decreased
- C) Unchanged
- D) Zero

17. Irreversible inhibition is characterized by:

- A) Weak bonds
- B) Covalent binding
- C) Temporary inhibition
- D) Dilution recovery

18. Allosteric enzymes typically show:

- A) Hyperbolic curve
- B) Linear curve
- C) Sigmoidal curve
- D) No curve

19. Homotropic regulation refers to:

- A) Product inhibition
- B) Substrate acting as effector
- C) Drug inhibition
- D) Irreversible inhibition

20. Phosphorylation of enzymes generally:

- A) Always activates enzymes
- B) Always inhibits enzymes
- C) May activate or inhibit
- D) Has no effect

21. Which enzyme increases activity upon phosphorylation?

- A) Glycogen synthase
- B) Glycogen phosphorylase
- C) ALT
- D) LDH

22. ALT enzyme is mainly associated with:

- A) Heart
- B) Liver
- C) Brain
- D) Kidney

23. Elevated plasma enzymes usually indicate:

- A) Normal metabolism
- B) Tissue damage
- C) Increased synthesis
- D) Reduced activity

24. Isoenzymes differ in:

- A) Function
- B) Reaction catalyzed
- C) Amino acid sequence
- D) Substrate

25. Creatine kinase (CK) isoenzymes are composed of:

- A) A and B
- B) M and B
- C) X and Y
- D)  $\alpha$  and  $\beta$

26. CK2 (MB) isoenzyme is specific for:

- A) Liver damage
- B) Kidney failure
- C) Myocardial infarction
- D) Brain injury

27. Troponin levels increase in:

- A) Kidney disease
- B) Liver disease
- C) Cardiac damage
- D) Lung infection

28. LDH levels peak after myocardial infarction at:

- A) 2 hours
- B) 10 hours
- C) 36–40 hours
- D) 5 days

29. When  $[S] \gg K_m$ , reaction rate becomes:

- A) First order
- B) Second order
- C) Zero order
- D) Random

30. Which assumption is part of Michaelis-Menten kinetics?

- A)  $[E] \gg [S]$
- B)  $[S] \gg [E]$
- C) ES is unstable
- D) No product formation

# Answer Key

1. C

2. C

3. B

4. B

5. B

6. C

7. B

8. B

9. C

10. B

11. D

12. B

13. C

14. C

15. C

16. C

17. B

18. C

19. B

20. C

21. B

22. B

23. B

24. C

25. B

26. C

27. C

28. C

29. C

30. B