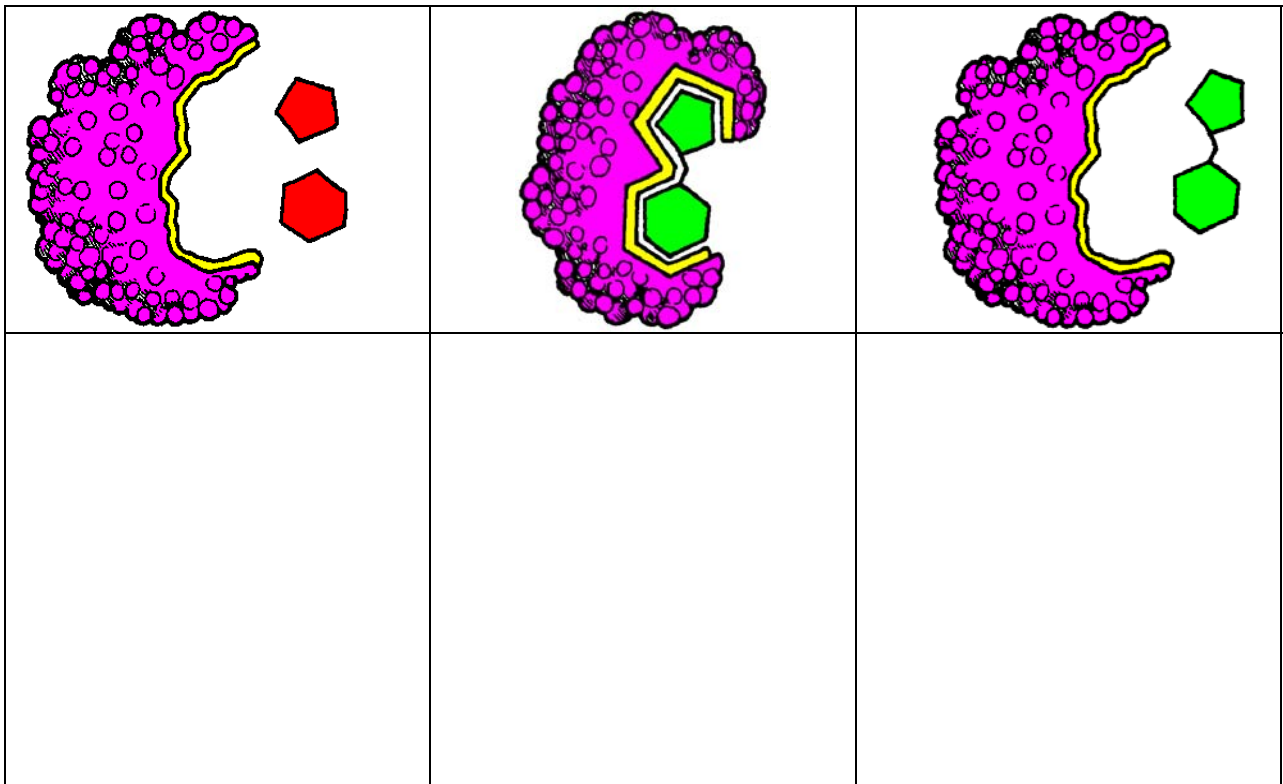


## ENZYMES

### ENZYME PROPERTIES & STRUCTURE



### ENZYME ACTION – INDUCED FIT MODEL

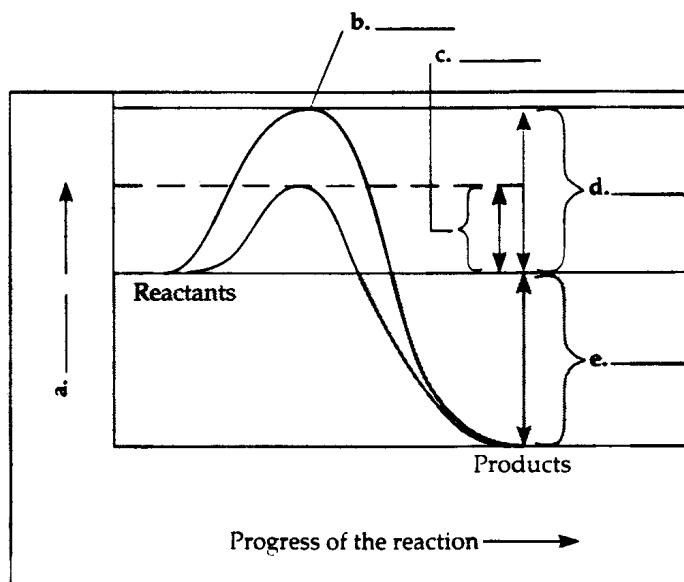


# Enzymes

1. What are the key properties of enzymes and what is their function in biological systems?

| CHARACTERISTICS | FUNCTIONS |
|-----------------|-----------|
|                 |           |

Use the graph below to answer questions 2 – 7.



2. What is happening at letter b?

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3. What is the relationship between the energy of the reactants and the energy of the products?

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4. Define activation energy.

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5. Which letter represents the activation energy for the reaction

a. Without the enzyme? \_\_\_\_\_

b. With the enzyme? \_\_\_\_\_

6. What does letter e represent?

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7. What is the role of enzymes in biological systems?

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8. What is the relationship between enzyme structure and enzyme specificity?

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9. Define or describe each of the following:

|             |  |
|-------------|--|
| Active Site |  |
| Substrate   |  |

10. Explain what happens in the induced-fit model of enzyme action.

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11. List 4 ways enzymes can lower activation energy.

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12. How does substrate concentration affect the rate of an enzyme controlled reaction?

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13. What happens to the rate of an enzyme-controlled reaction when the substrate level is high and remains high?

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Why does this happen?

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14. What environmental conditions affect enzyme activity?

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Use the graph at the right to answer questions 15 – 17.

15. Why did the reaction rate for enzyme J drop when the temperature exceeded 50°C?

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16. What is the optimal temperature for enzyme J?

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How do you know this is the optimal temperature?

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17. Could enzyme J be an enzyme found in the human body?

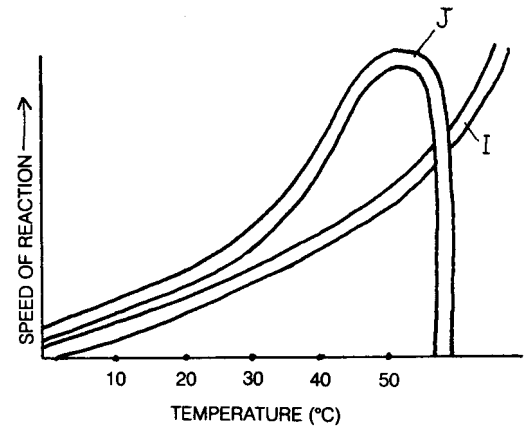
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Why or why not?

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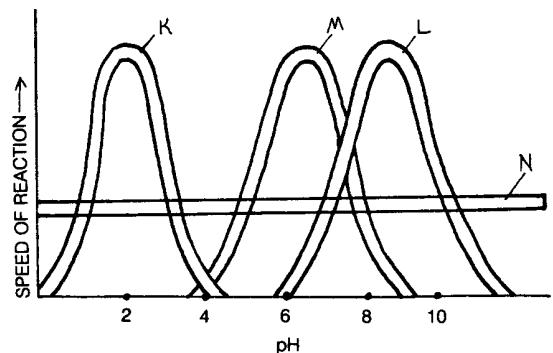


Use the graph at the right to answer questions 18 – 20.

18. What is the optimal pH for:
- Enzyme K? \_\_\_\_\_
- Enzyme M? \_\_\_\_\_
- Enzyme L? \_\_\_\_\_

19. Which letter represents the activity of an enzyme that could be found in the stomach?

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20. What happens to enzyme activity when the pH is higher or lower than the optimal pH?

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Why does this happen?

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21. Match the definition/description with the correct term.

A. Allosteric enzymes

D. Competitive inhibitors

B. Coenzyme

E. Inhibitor

C. Cofactor

F. Noncompetitive inhibitors

\_\_\_\_\_ Small, nonprotein molecules needed for enzyme reactions

\_\_\_\_\_ Organic cofactors; vitamins

\_\_\_\_\_ Chemicals that inhibit enzyme activity

\_\_\_\_\_ Enzyme inhibitors that resemble the substrate and compete with the substrate for the active site

\_\_\_\_\_ Enzyme inhibitors that bind to the enzyme at a site other than the active site and cause the enzyme to change shape

\_\_\_\_\_ Enzymes with two conformations – one active and one inactive

22. What is the role of each of the following in allosteric enzyme action?

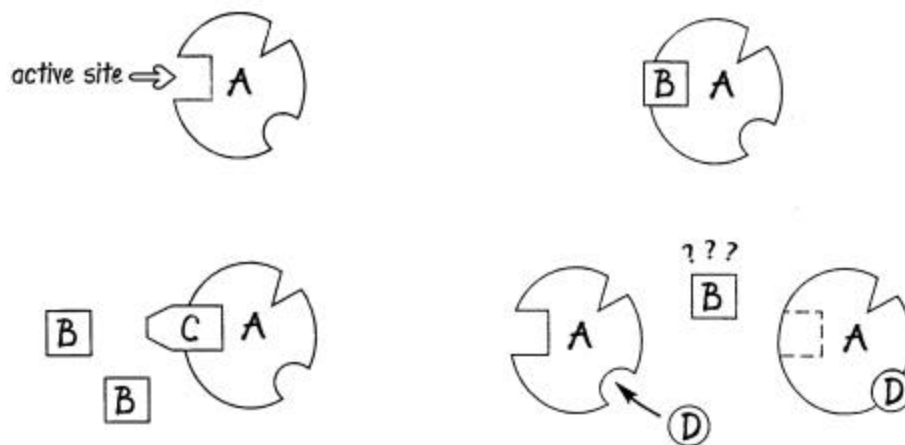
a. Inhibitor: \_\_\_\_\_

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b. Activator: \_\_\_\_\_

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Use the drawings below to answer questions 23– 25.



23. Which letter represents the enzyme? \_\_\_\_\_

24. If letter B represents the substrate, what kind of inhibitor (competitive or noncompetitive) does letter C represent?

\_\_\_\_\_

How do you know? \_\_\_\_\_

\_\_\_\_\_

25. What kind of inhibitor (competitive or noncompetitive) does letter D represent?

\_\_\_\_\_

How do you know? \_\_\_\_\_

\_\_\_\_\_

26. Describe what happens in feedback inhibition.

\_\_\_\_\_

\_\_\_\_\_

27. Describe what happens during cooperativity.

\_\_\_\_\_

\_\_\_\_\_