

Legge Practice Exam I BCHS 3304

Note: This homework will not be collected. However, quizzes and exams will assume that you have completed and understand the homework assignment and could answer related questions. In this homework you are also given a practice exam II, which you may use as a study tool.

1). An enzyme catalyzes a reaction without itself being _____ in the process. It does this by _____ of the reaction. Enzymes preferentially bind the _____ in an ideal situation. The extent to which an enzyme will catalyze a reaction is ultimately dictated by the _____ for the reaction.

2). What happens if you add more enzyme to an enzyme-catalyzed reaction already operating at V_{max} ?

- a). K_M will decrease.
- b). No change.
- c). Observed rate will be faster.
- d). k_{cat} will increase.
- e). Observed rate will be slower.

3). The basis for enzyme-substrate specificity is:

- a). shape/geometry.
- b). K_{eq} .
- c). stereospecificity.
- d). electronic complementarity.
- e). none of the above.
- f). a, d, and c.
- g). all of the above.

4). Given the following equation:



k_1 = the rate of formation of the Michaelis Complex.

k_{-1} = the rate at which the Michaelis Complex falls apart to E + S.

k_2 = the rate at which the Michaelis Complex forms E + P.

When $[E_T] = [ES]$, which of the following expressions defines the V_{max} ?

- a). $V_{max} = \frac{k_1 + k_2}{k_1}$
- b). $V_{max} = k_1[S]$
- c). $V_{max} = k_2[ES]$
- d). $V_{max} = k_{-1}[ES]$
- e). $V_{max} = \frac{[E][S]}{k_1}$

[ES]

5). Some enzymes require a necessary metal ion cofactor for catalysis. Which of the following is not a potential property that a metal ion may impart to an enzymatically catalyzed reaction?

- a). May act as a super acid.
- b). May shield and stabilize charges.
- c). May facilitate redox reactions.
- d). May bind and orient substrates.
- e). May exclude inhibitors from the active site.

6). Two different enzymes have the same value for V_{max} but very different K_M values. Which of the following is true?

- a). The enzyme with the lower K_M will approach V_{max} at lower $[S]$.
- b). The enzyme with the higher K_M will approach V_{max} at lower $[S]$.
- c). The V_{max} values cannot be the same if the enzymes have different K_M values.
- d). The V_{max} and K_M values for each enzyme will increase when more enzyme is added to their respective reactions.
- e). The steady-state $[ES]$ is the same for each enzyme at all $[S]$.

7-8). Write the Michaelis-Menton equation of enzyme kinetics and list and describe the two assumptions that are required for this equation to apply.

9). Discuss the importance of Vitamin C in the creation and stabilization of Collagen Quaternary Structure.

10). Which of the following accurately describes the catalytic strategy and intermediate employed by the RNase A reaction mechanism?

- a). Acid-Base Catalysis with a 2, -3' cyclic intermediate.
- b). Acid-Base Catalysis with a tetrahedral intermediate.
- c). Covalent Catalysis with a tetrahedral intermediate.
- d). Covalent Catalysis with a Schiff Base intermediate.
- e). Electrostatic Catalysis with an oxonium intermediate.

11). Match the appropriate type of inhibition with the resulting effect on kinetic parameters.

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| a). Competitive inhibition | I). Decreases V_{max} |
| b). Non-competitive inhibition | II). Decreases K_M and V_{max} |
| c). Uncompetitive inhibition | III). Increases K_M |
| d). Mixed inhibition | IV). Decreases V_{max} + increases K_M |