

Study guide for Catalysis

1) Which of the following statements is FALSE

- a) Biochemists recalculate ΔG^0 to $\Delta G^0'$ to account for the standard biochemical condition of pH=7.0
- b) At the end of an enzyme catalyzed reaction, the functional enzyme becomes available to catalyze the reaction again.
- c) Substrate binds to an enzyme's active site.
- d) For $S \rightarrow P$, a catalyst shifts the reaction equilibrium to the right.
- e) Lowering the temperature of a reaction will lower the reaction rate

2) The benefit of measuring the INITIAL rate of a reaction, V_0 , is that at the beginning of a reaction:

- a) changes in $[S]$ are negligible, so $[S]$ can be treated as a constant.
- b) $[ES]$ can be measured accurately.
- c) $V_0 = V_{\max}$.
- d) changes in K_m are negligible, so K_m can be treated as a constant.
- e) varying $[S]$ has no effect on V_0 .

3) V_{\max} for an enzyme-catalyzed reaction:

- a) generally increase when pH increases.
- b) increases in the presence of a competitive inhibitor.
- c) is twice the rate observed when the concentration of substrate is equal to the K_m .
- d) is limited only by the amount of substrate supplied.

4) Allosteric enzymes:

- a) usually have only one active site.
- b) are regulated primarily by covalent modification.
- c) usually have more than one polypeptide chain.
- d) usually show strict Michaelis-Menten kinetics.
- e) usually catalyze several different reactions within a metabolic pathway.

5) How does pH affect the activity of an enzyme?

Answers

- 1) d)
- 2) a)
- 3) c)
- 4) c)
- 5) The state of ionization of several amino acid side chains is affected by pH, and the activity of many enzymes requires that certain of the amino acid residue side chains be in a specific ionization state.