Name on back only please…

CHEM106 Quiz 5

Please show all equations, all substitutions, all units, and all work to receive any credit

1. At body temperature, an enzyme lowers the activation energy for a certain reaction from 75 kJ mole to 55 kJ/mole. Answer the following questions concerning this:

   a. For the uncatalyzed reaction, calculate the fraction of collisions with sufficient energy to react.

   b. For the catalyzed reaction, calculate the fraction of collisions with sufficient energy to react.

   c. Determine how many times faster the catalyzed reaction occurs.

2. Clearly outline the mechanism of action and explain how a noncompetitve inhibitor would affect the reaction rate of an enzyme catalyzed reaction.

3. Plot, on the same graph, the reaction rates as a function of substrate concentration for an enzyme-catalyzed reaction for two situations: when there is no inhibitor present and when there is a noncompetitive inhibitor present. Clearly label all key aspects of this diagram.

4. An enzyme catalyzed reaction with a specific substrate has a Michaelis constant of 2.5 mM.

   a. At what substrate concentration would you expect that 1/3 of all enzyme active sites would be occupied with substrate molecules?

   b. The Michaelis constant for the same enzyme catalyzed reaction but with a different substrate has a value of 20 mM. Clearly explain why these two substrates have different Michaelis constants. For equal substrate concentrations, predict the relative reaction velocities expected for these two substrates. Fully support your answer