

Chapter 18 WS

Rates, Le Chatelier, & K_{eq}

Name: _____

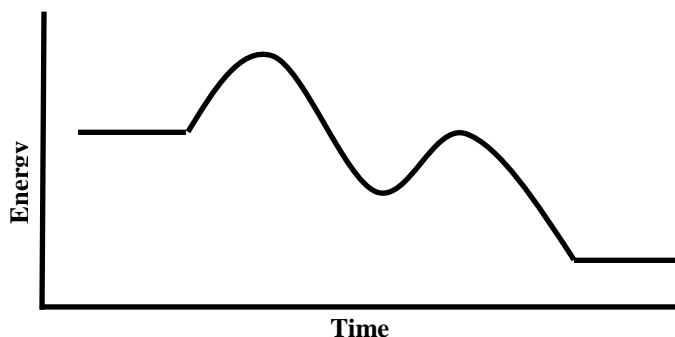
Period: _____ Date: _____

Answer each of the following questions. Be specific and thorough.

- 1) According to Collision Theory, reactions will react to form products as long as they meet which requirements?
- a.
 - b.

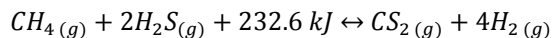
- 2) Label the 2-step reaction to the right with each of the following:

- a. Activated Complex #1
- b. Activated Complex #2
- c. Activation Energy #1
- d. Activation Energy #2
- e. Energy of Intermediates
- f. Energy of Products
- g. Energy of Reactants
- h. Energy of Reaction
- i. Intermediates
- j. Products
- k. Reactants
- l. Transition State



- 3) What are the factors that affect reaction rates and how do they speed up reactions?
- a.
 - b.
 - c.
 - d.
- 4) What is a reversible reaction and how do we indicate that a reaction is reversible?
- 5) At chemical equilibrium, there is no net change in the amounts of products or reactants, but you CANNOT say that there is no more reaction. Explain why there are still reactions occurring, yet no change can be observed.
- 6) What are the factors that affect equilibrium position and what are the rules for determining which direction those changes will push the equilibrium?
- a.
 - b.
 - c.
 - d.

- 7) For the reaction below, describe which way the equilibrium would shift and explain why.



- Decrease the concentration of dihydrogen sulfide
 - Increase the pressure on the system
 - Increase the temperature of the system
 - Increase the concentration of carbon disulfide
 - Increase the concentration of methane
- 8) $N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g)$
At equilibrium, a 1 L flask has 0.15 mol H_2 , 0.25 mol N_2 , and 0.10 mol NH_3 . Calculate the K_{eq} for the reaction. Are the reactants or products favored?

- 9) $N_2(g) + O_2(g) \leftrightarrow 2NO(g)$
At equilibrium, a 2 L flask has 1 mol N_2 , 1 mol O_2 , and 0.040 mol NO . Calculate the K_{eq} for the reaction. Are the reactants or products favored?

- 10) $2BrCl(g) \leftrightarrow Br_2(g) + Cl_2(g)$
If the K_{eq} is 11.1, what would be the concentrations of Br_2 and Cl_2 if the concentration of $BrCl$ is 2.40 M?

- 11) $4HCl(g) + O_2(g) \leftrightarrow 2Cl_2(g) + 2H_2O(g)$
If the K_{eq} is 2.00, what would be the concentration of HCl if the concentration of O_2 is 2.25 M, the concentration of Cl_2 is 3.00 M, and concentration of water is 2.00 M?