

Test Review Unit 8: Equilibrium

Name: _____

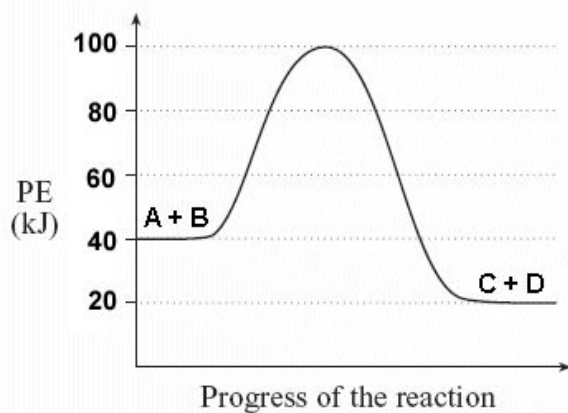
Collision Theory

1. Explain collision theory.
2. What are the two things that must take place in order for a reaction to take place between molecules or atoms?
3. What will alter the rate of a chemical reaction?
4. What is a catalyst and how will it speed up a chemical reaction?
5. Explain why all reactions have an activation energy using collision theory?

Potential Energy Diagrams

6. Draw an energy diagram for the reaction $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$ where the activation energy for the forward reaction is 40.0 kJ with a heat of reaction of +5.0 kJ.

7. Show how the curve in #1 would be affected by the addition of a catalyst.



8. For the above potential energy diagram answer the following questions.

A. Is it endothermic or exothermic?

B. What is the potential energy of the reactants?

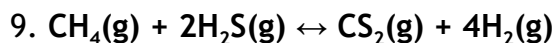
C. What is the potential energy of the products?

D. What is the activation energy of the forward reaction?

E. What is the activation energy of the reverse reaction?

D. What is the heat of reaction?

Le Chatelier's Principle For the reaction below, which direction will the reaction shift?



(a) Decrease the concentration of dihydrogen sulfide.

(b) Increase the pressure on the system.

(c) Increase the temperature of the system.

(d) Increase the concentration of carbon disulfide.

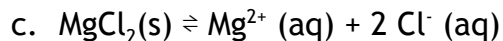
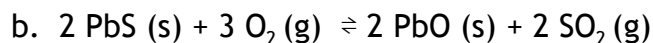
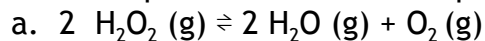
(e) Decrease the concentration of methane.

(f) Increase the volume of the system.

(g) add a catalyst

Equilibrium Expressions

10. Write the equilibrium constant expression for each of the following reactions.



11. For each of the following solve for the missing piece and identify if the products or reactants are favored.

a. For the reaction “1a.” determine the K_{eq} if you have $[\text{H}_2\text{O}_2] = 4.5 \text{ M}$; $[\text{H}_2\text{O}] = 3.0 \text{ M}$; $[\text{O}_2] = 2.25 \text{ M}$.

b. For the reaction “1b.” determine the concentration of SO_2 if the $K_{\text{eq}} = 4.56 \times 10^{-5}$; $[\text{O}_2] = 0.75 \text{ M}$.

c. For reaction “1c” calculate K_{eq} if the magnesium chloride is dissolved into 4.0L of water and you have 3.75 moles Mg ions and 7.50 moles chloride ions.