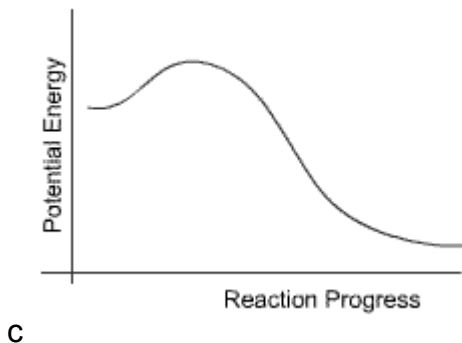
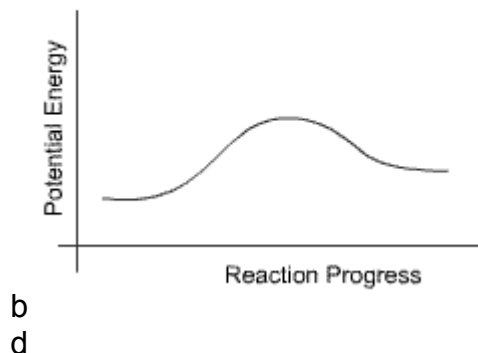
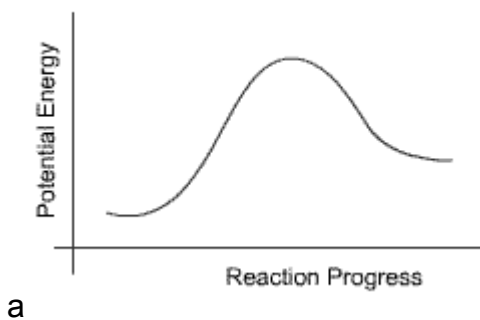
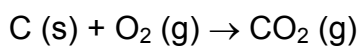
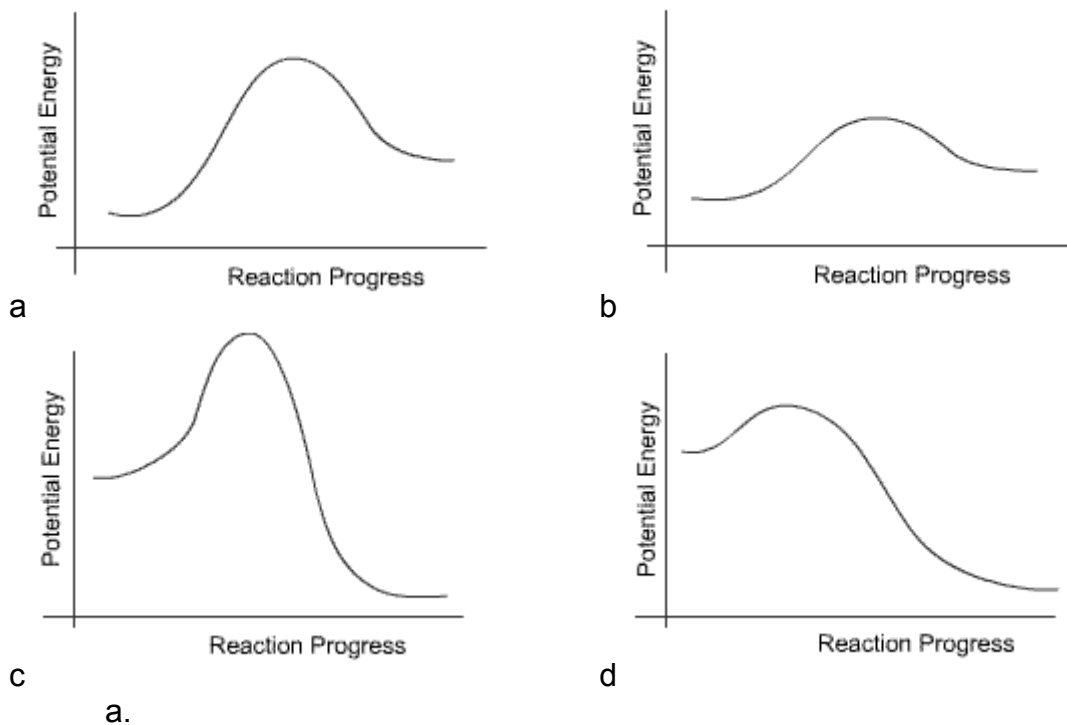


**Reaction Kinetics - Dynamic Equilibrium -  $K_{eq}$**   
**– Practice Problems for Assignment 3**

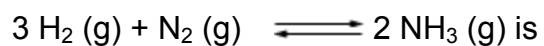
1. Enzymes are catalysts. They will function to
  - a. decrease the activation energy of a reaction
  - b. increase the activation energy of a reaction
  - c. increase the temperature of the reaction
  - d. decrease the temperature of the reaction
2. All of the following are factors that affect reaction rate except
  - a. density of the reactants
  - b. physical state of the reactants
  - c. concentraton of the reactants
  - d. temperature of the reactants
3. Which of the following is the potential energy diagram for burning chunks of barbeque charcoal briquettes.



4. Which potential energy diagram represents the reaction of phosphorus,  $P_4$ . When  $P_4$  is exposed to air it will spontaneously burn to form  $P_4O_{10}$  and release 712 kcal/mole of  $P_4$ ?



5. The numerator of the equilibrium constant expression for the reaction



- a.  $[\text{NH}_3]$   
 b.  $3 \cdot [\text{H}_2] \cdot [\text{N}_2]$   
 c.  $[\text{H}_2]^3 + [\text{N}_2]$   
 d.  $[\text{NH}_3] \cdot [\text{NH}_3]$

6. The equilibrium constant for the following reaction is 6.50.



It means that at equilibrium

- a. the reactants are at a higher concentration than the products
- b. the reactant and the product concentration are the same concentration because the reaction is at equilibrium
- c. the products are at a higher concentration than the reactants
- d. the equilibrium favours the reactants.

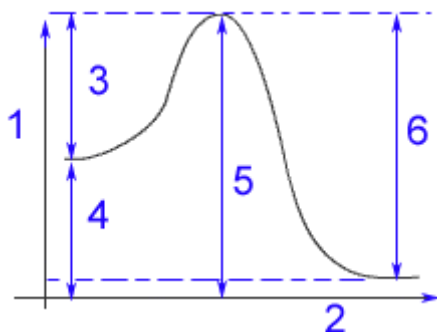
7. The rate of a reaction is affected by all of the following except

- a. the heat of reaction
- b. the concentration of the reactant
- c. surface area of the reactant
- d. the temperature at which the reactants are kept

8. As reactant molecules approach each other

- a. potential energy is converted products
- b. kinetic energy and potential energy are interconverted
- c. an activated complex forms
- d. heat is released

9. Consider the following reaction profile.



The y-axis label is '1'. It is

- a. Concentration (M)
- b. Time (sec)
- c. Potential Energy (joules)
- d. Rate (M/s)

10. When a catalyst is added to a reaction,  $\Delta H$  will

- a. increase
- b. decrease
- c. be unaffected
- d. increase by the amount that  $E_a$  is lowered

11. Dynamic equilibrium means

- a. forward and reverse reaction continues until it finally stops
- b. forward and reverse reaction continues until the concentrations of all the reactants and products become the same
- c. forward reaction continues until it finally stops
- d. forward and reverse reactions continues until their rates become the same

12. The value of the equilibrium constant will change when

- a. temperature changes
- b. a catalyst is used
- c. the concentration of the reactants and products change
- d. the pressure of the system changes

13. A chemical reaction requiring a large  $E_a$  will proceed

- a. at a fast rate
- b. at a slow rate
- c. when the reaction is cooled
- d. the reaction is kept in darkness

14. Which of the following statements is correct?

- a.  $K_{eq}$  determines how fast a reaction is completed
- b.  $K_{eq}$  is unaffected by temperature changes
- c.  $K_{eq}$  is the rate constant of an equilibrium reaction
- d.  $K_{eq}$  is an indicator whether the reactants or the products are favoured

15. When food is stored in the refrigerator, it keeps longer. This is due to

- a. a decrease in the fraction of particles possessing sufficient energy to react.
- b. Introducing an alternate pathway which increases the activation energy
- c. a decrease of the surface area on which bacteria can grow.
- d. a decrease in  $\Delta H$  in the reactions which causes food to spoil.

Answers:

1. a
2. a
3. c
4. d
5. d
6. c
7. a
8. b
9. c
10. c
11. d
12. a
13. b
14. d
15. a