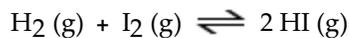


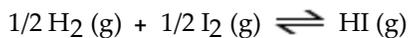
## Chapter 15

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

- 1) The value of  $K_{\text{eq}}$  for the equilibrium 1) \_\_\_\_\_

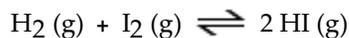


is 794 at 25 °C. What is the value of  $K_{\text{eq}}$  for the equilibrium below?

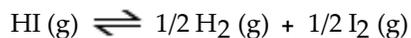


- A) 1588                      B) 0.035                      C) 28                      D) 397                      E) 0.0013

- 2) The value of  $K_{\text{eq}}$  for the equilibrium 2) \_\_\_\_\_

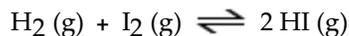


is 794 at 25 °C. At this temperature, what is the value of  $K_{\text{eq}}$  for the equilibrium below?

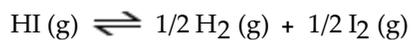


- A) 0.0013                      B) 28                      C) 0.035                      D) 397                      E) 1588

- 3) The value of  $K_{\text{eq}}$  for the equilibrium 3) \_\_\_\_\_



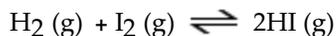
is 54.0 at 427 °C. What is the value of  $K_{\text{eq}}$  for the equilibrium below?



- A) 27  
B) 0.136  
C)  $2.92 \times 10^3$   
D) 7.35  
E)  $3.43 \times 10^{-4}$

4) Consider the following chemical reaction:

4) \_\_\_\_\_

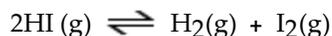


At equilibrium in a particular experiment, the concentrations of  $\text{H}_2$ ,  $\text{I}_2$ , and  $\text{HI}$  were 0.15 M, 0.033 M, and 0.55 M, respectively. The value of  $K_{\text{eq}}$  for this reaction is \_\_\_\_\_.

- A) 61                      B)  $9.0 \times 10^{-3}$                       C) 23                      D) 111                      E) 6.1

5) A reaction vessel is charged with hydrogen iodide, which partially decomposes to molecular hydrogen and iodine:

5) \_\_\_\_\_

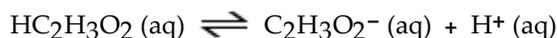


When the system comes to equilibrium at 425 °C,  $P_{\text{HI}} = 0.708$  atm, and  $P_{\text{H}_2} = P_{\text{I}_2} = 0.0960$  atm. The value of  $K_{\text{p}}$  at this temperature is \_\_\_\_\_.

- A)  $6.80 \times 10^{-2}$   
B)  $1.84 \times 10^{-2}$   
C)  $K_{\text{p}}$  cannot be calculated for this gas reaction when the volume of the reaction vessel is not given.  
D)  $1.30 \times 10^{-2}$   
E) 54.3

6) Acetic acid is a weak acid that dissociates into the acetate ion and a proton in aqueous solution:

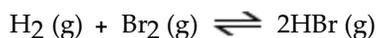
6) \_\_\_\_\_



At equilibrium at 25 °C a 0.100 M solution of acetic acid has the following concentrations:  $[\text{HC}_2\text{H}_3\text{O}_2] = 0.0990$  M,  $[\text{C}_2\text{H}_3\text{O}_2^-] = 1.33 \times 10^{-3}$  M, and  $[\text{H}^+] = 1.33 \times 10^{-3}$  M. The equilibrium constant,  $K_{\text{eq}}$  for the ionization of acetic acid at 25 °C is \_\_\_\_\_.

- A)  $5.71 \times 10^4$   
B)  $1.79 \times 10^{-5}$   
C)  $1.75 \times 10^{-7}$   
D) 0.100  
E)  $5.71 \times 10^6$

- 7) At elevated temperatures, molecular hydrogen and molecular bromine react to partially form hydrogen bromide: 7) \_\_\_\_\_



A mixture of 0.682 mol of  $\text{H}_2$  and 0.440 mol of  $\text{Br}_2$  is combined in a reaction vessel with a volume of 2.00 L. At equilibrium at 700 K, there are 0.566 mol of  $\text{H}_2$  present. At equilibrium, there are \_\_\_\_\_ mol of  $\text{Br}_2$  present in the reaction vessel.

- A) 0.440                  B) 0.324                  C) 0.000                  D) 0.566                  E) 0.232

- 8) Dinitrogen tetroxide partially decomposes according to the following equilibrium: 8) \_\_\_\_\_



A 1.00-L flask is charged with 0.400 mol of  $\text{N}_2\text{O}_4$ . At equilibrium at 373 K, 0.0055 mol of  $\text{N}_2\text{O}_4$  remains.  $K_{\text{eq}}$  for this reaction is \_\_\_\_\_.

- A)  $2.2 \times 10^{-4}$                   B) 13                  C) 0.22                  D) 0.87                  E) 0.022

- 9) At 200 °C, the equilibrium constant ( $K_{\text{p}}$ ) for the reaction below is  $2.40 \times 10^3$ . 9) \_\_\_\_\_



A closed vessel is charged with 36.1 atm of  $\text{NO}$ . At equilibrium, the partial pressure of  $\text{O}_2$  is \_\_\_\_\_ atm.

- A) 18.1  
B)  $1.50 \times 10^{-2}$   
C) 294  
D) 6.00  
E) 35.7

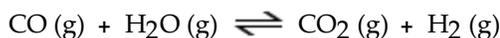
- 10) At 22 °C,  $K_{\text{p}} = 0.070$  for the equilibrium: 10) \_\_\_\_\_



A sample of solid  $\text{NH}_4\text{HS}$  is placed in a closed vessel and allowed to equilibrate. Calculate the equilibrium partial pressure (atm) of ammonia, assuming that some solid  $\text{NH}_4\text{HS}$  remains.

- A) 0.52                  B) 0.26                  C) 3.8                  D) 0.070                  E)  $4.9 \times 10^{-3}$

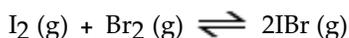
- 11) In the coal-gasification process, carbon monoxide is converted to carbon dioxide via the following reaction: 11) \_\_\_\_\_



In an experiment, 0.35 mol of CO and 0.40 mol of H<sub>2</sub>O were placed in a 1.00-L reaction vessel. At equilibrium, there were 0.19 mol of CO remaining. K<sub>eq</sub> at the temperature of the experiment is \_\_\_\_\_.

- A) 5.47                      B) 1.0                      C) 1.78                      D) 0.75                      E) 0.56

- 12) A sealed 1.0 L flask is charged with 0.500 mol of I<sub>2</sub> and 0.500 mol of Br<sub>2</sub>. An equilibrium reaction ensues: 12) \_\_\_\_\_



When the container contents achieve equilibrium, the flask contains 0.84 mol of IBr. The value of K<sub>eq</sub> is \_\_\_\_\_.

- A) 4.0                      B) 110                      C) 11                      D) 2.8                      E) 6.1

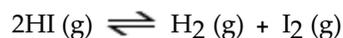
- 13) The equilibrium constant (K<sub>p</sub>) for the interconversion of PCl<sub>5</sub> and PCl<sub>3</sub> is 0.0121: 13) \_\_\_\_\_



A vessel is charged with PCl<sub>5</sub>, giving an initial pressure of 0.123 atm. At equilibrium, the partial pressure of PCl<sub>3</sub> is \_\_\_\_\_ atm.

- A) 0.123                      B) 0.045                      C) 0.090                      D) 0.078                      E) 0.033

- 14) K<sub>p</sub> = 0.0198 at 721 K for the reaction 14) \_\_\_\_\_



In a particular experiment, the partial pressures of H<sub>2</sub> and I<sub>2</sub> at equilibrium are 0.710 and 0.888 atm, respectively. The partial pressure of HI is \_\_\_\_\_ atm.

- A) 0.125                      B) 7.87                      C) 5.64                      D) 1.98                      E) 0.389

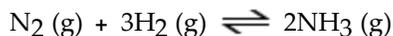
- 15) At equilibrium, \_\_\_\_\_ 15) \_\_\_\_\_

- A) all chemical reactions have ceased  
B) the rate constants of the forward and reverse reactions are equal  
C) the rates of the forward and reverse reactions are equal  
D) the value of the equilibrium constant is 1  
E) the limiting reagent has been consumed

- 16) What role did Karl Bosch play in development of the Haber-Bosch process? 16) \_\_\_\_\_
- A) Haber was working in his lab with his instructor at the time he worked out the process.
  - B) He originally isolated ammonia from camel dung and found a method for purifying it.
  - C) He developed the equipment necessary for industrial production of ammonia.
  - D) He was the German industrialist who financed the research done by Haber.
  - E) He discovered the reaction conditions necessary for formation of ammonia.
- 17) In what year was Fritz Haber awarded the Nobel Prize in chemistry for his development of a process for synthesizing ammonia directly from nitrogen and hydrogen? 17) \_\_\_\_\_
- A) 1954                      B) 1912                      C) 1933                      D) 1900                      E) 1918
- 18) Which one of the following is true concerning the Haber process? 18) \_\_\_\_\_
- A) It is another way of stating LeChatelier's principle.
  - B) It is an industrial synthesis of sodium chloride that was discovered by Karl Haber.
  - C) It is a process for the synthesis of elemental chlorine.
  - D) It is a process used for the synthesis of ammonia.
  - E) It is a process used for shifting equilibrium positions to the right for more economical chemical synthesis of a variety of substances.
- 19) Which one of the following will change the value of an equilibrium constant? 19) \_\_\_\_\_
- A) adding other substances that do not react with any of the species involved in the equilibrium
  - B) varying the initial concentrations of products
  - C) changing temperature
  - D) varying the initial concentrations of reactants
  - E) changing the volume of the reaction vessel
- 20) The equilibrium-constant expression depends on the \_\_\_\_\_ of the reaction. 20) \_\_\_\_\_
- A) the quantities of reactants and products initially present
  - B) stoichiometry and mechanism
  - C) mechanism
  - D) stoichiometry
  - E) temperature
- 21) The relationship between the rate constants for the forward and reverse reactions and the equilibrium constant for the process is  $K_{eq} =$  \_\_\_\_\_. 21) \_\_\_\_\_
- A)  $k_f/k_r$                       B)  $k_f k_r$                       C)  $k_f - k_r$                       D)  $k_f + k_r$                       E)  $k_r/k_f$

22) The equilibrium constant for the gas phase reaction

22) \_\_\_\_\_



is  $K_{\text{eq}} = 4.34 \times 10^{-3}$  at 300 °C. At equilibrium, \_\_\_\_\_.

- A) roughly equal amounts of products and reactants are present
- B) products predominate
- C) reactants predominate
- D) only reactants are present
- E) only products are present

23) The equilibrium constant for the gas phase reaction

23) \_\_\_\_\_

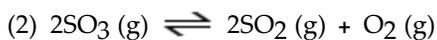
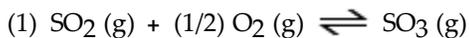


is  $K_{\text{eq}} = 230$  at 300 °C. At equilibrium, \_\_\_\_\_.

- A) reactants predominate
- B) products predominate
- C) only products are present
- D) roughly equal amounts of products and reactants are present
- E) only reactants are present

24) The equilibrium constant for reaction 1 is K. The equilibrium constant for reaction 2 is \_\_\_\_\_.

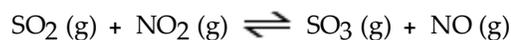
24) \_\_\_\_\_



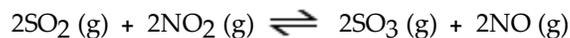
- A) 2K                      B)  $1/K^2$                       C)  $K^2$                       D)  $-K^2$                       E)  $1/2K$

25) The value of  $K_{\text{eq}}$  for the following reaction is 0.25:

25) \_\_\_\_\_



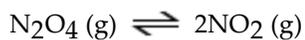
The value of  $K_{\text{eq}}$  at the same temperature for the reaction below is \_\_\_\_\_.



- A) 0.12                      B) 0.25                      C) 0.062                      D) 0.50                      E) 16

26) Which of the following expressions is the correct equilibrium-constant expression for the equilibrium between dinitrogen tetroxide and nitrogen dioxide?

26) \_\_\_\_\_



A)  $[\text{NO}_2][\text{N}_2\text{O}_4]$

B)  $\frac{[\text{NO}_2]}{[\text{N}_2\text{O}_4]}$

C)  $[\text{NO}_2]^2[\text{N}_2\text{O}_4]$

D)  $\frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]}$

E)  $\frac{[\text{NO}_2]}{[\text{N}_2\text{O}_4]^2}$

27) The equilibrium expression for  $K_p$  for the reaction below is \_\_\_\_\_.

27) \_\_\_\_\_



A)  $\frac{2P_{\text{O}_3}}{3P_{\text{O}_2}}$

B)  $\frac{P_{\text{O}_2}^3}{P_{\text{O}_3}^2}$

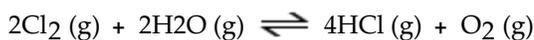
C)  $\frac{P_{\text{O}_3}^2}{P_{\text{O}_2}^2}$

D)  $\frac{3P_{\text{O}_3}}{2P_{\text{O}_2}}$

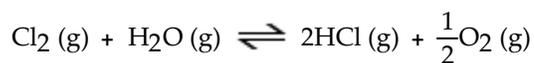
E)  $\frac{3P_{\text{O}_2}}{2P_{\text{O}_3}}$

28) The  $K_{\text{eq}}$  for the equilibrium below is  $7.52 \times 10^{-2}$  at  $480^\circ\text{C}$ .

28) \_\_\_\_\_



What is the value of  $K_{\text{eq}}$  at this temperature for the following reaction?



A)  $5.66 \times 10^{-3}$

B) 0.274

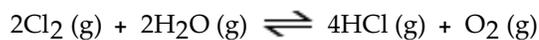
C) 0.0752

D) 0.0376

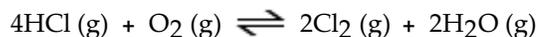
E) 0.150

29) The  $K_{eq}$  for the equilibrium below is  $7.52 \times 10^{-2}$  at  $480^\circ\text{C}$ .

29) \_\_\_\_\_



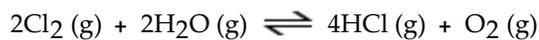
What is the value of  $K_{eq}$  at this temperature for the following reaction?



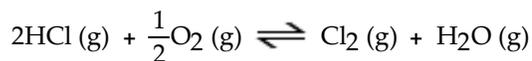
- A)  $5.66 \times 10^{-3}$
- B) 0.0752
- C) -0.0752
- D) 13.3
- E) 0.150

30) The  $K_{eq}$  for the equilibrium below is  $7.52 \times 10^{-2}$  at  $480^\circ\text{C}$ .

30) \_\_\_\_\_



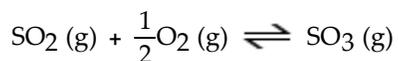
What is the value of  $K_{eq}$  at this temperature for the following reaction?



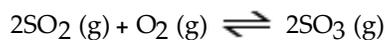
- A) 0.274
- B) 3.65
- C) -0.0376
- D)  $5.66 \times 10^{-3}$
- E) 13.3

31) The  $K_{eq}$  for the equilibrium below is 0.112 at  $700^\circ\text{C}$ .

31) \_\_\_\_\_



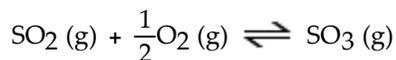
What is the value of  $K_{eq}$  at this temperature for the following reaction?



- A) 0.112
- B) 0.0125
- C) 0.0560
- D) 0.335
- E) 0.224

32) The  $K_{eq}$  for the equilibrium below is 0.112 at 700 °C.

32) \_\_\_\_\_



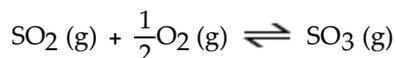
What is the value of  $K_{eq}$  at this temperature for the following reaction?



- A) 0.112                  B) -0.112                  C) 0.0125                  D) 0.224                  E) 8.93

33) The  $K_{eq}$  for the equilibrium below is 0.112 at 700 °C.

33) \_\_\_\_\_



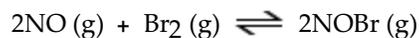
What is the value of  $K_{eq}$  at this temperature for the following reaction?



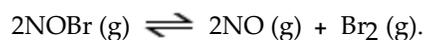
- A) 4.46                  B) 8.93                  C) 79.7                  D) 2.99                  E) 17.86

34) At 1000 K, the equilibrium constant for the reaction

34) \_\_\_\_\_



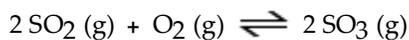
is  $K_p = 0.013$ . Calculate  $K_p$  for the reverse reaction,



- A) 0.013                  B) 0.99                  C) 77                  D) 1.1                  E)  $1.6 \times 10^{-4}$

35) Consider the following equilibrium.

35) \_\_\_\_\_



The equilibrium cannot be established when \_\_\_\_\_ is/are placed in a 1.0-L container.

- A) 0.75 mol  $\text{SO}_2 (\text{g})$   
B) 0.25 mol of  $\text{SO}_2 (\text{g})$  and 0.25 mol of  $\text{SO}_3 (\text{g})$   
C) 1.0 mol  $\text{SO}_3 (\text{g})$   
D) 0.50 mol  $\text{O}_2 (\text{g})$  and 0.50 mol  $\text{SO}_3 (\text{g})$   
E) 0.25 mol  $\text{SO}_2 (\text{g})$  and 0.25 mol  $\text{O}_2 (\text{g})$

36) The expression for  $K_p$  for the reaction below is \_\_\_\_\_.

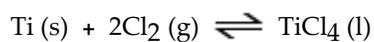
36) \_\_\_\_\_



- A)  $\frac{P_{\text{CO}_2} P_{\text{H}_2\text{O}}^2}{P_{\text{CH}_4}}$   
B)  $\frac{P_{\text{CO}_2} P_{\text{H}_2\text{O}}^2}{P_{\text{CuO}}}$   
C)  $\frac{[\text{Cu}] P_{\text{CO}_2} P_{\text{H}_2\text{O}}^2}{[\text{CuO}]^4 P_{\text{CH}_4}}$   
D)  $\frac{P_{\text{CH}_4}}{P_{\text{CO}_2} P_{\text{H}_2\text{O}}^2}$   
E)  $\frac{P_{\text{CH}_4}}{P_{\text{H}_2\text{O}}^2 P_{\text{CO}_2}}$

37) The equilibrium-constant expression for the reaction

37) \_\_\_\_\_

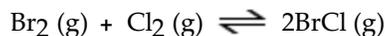


is given by

- A)  $\frac{[\text{Ti (s)}] [\text{Cl}_2 \text{(g)}]^2}{[\text{TiCl}_4 \text{(l)}]}$   
B)  $\frac{[\text{TiCl}_4 \text{(l)}]}{[\text{Ti (s)}] [\text{Cl}_2 \text{(g)}]^2}$   
C)  $\frac{[\text{TiCl}_4 \text{(l)}]}{[\text{Ti (s)}] [\text{Cl}_2 \text{(g)}]}$   
D)  $\frac{[\text{TiCl}_4 \text{(l)}]}{[\text{Cl}_2 \text{(g)}]^2}$   
E)  $[\text{Cl}_2 \text{(g)}]^{-2}$

38) At 400 K, the equilibrium constant for the reaction

38) \_\_\_\_\_



is  $K_p = 7.0$ . A closed vessel at 400 K is charged with 1.00 atm of  $\text{Br}_2(\text{g})$ , 1.00 atm of  $\text{Cl}_2(\text{g})$ , and 2.00 atm of  $\text{BrCl}(\text{g})$ . Use  $Q$  to determine which of the statements below is true.

- A) The equilibrium partial pressure of  $\text{Br}_2$  will be greater than 1.00 atm.
- B) At equilibrium, the total pressure in the vessel will be less than the initial total pressure.
- C) The reaction will go to completion since there are equal amounts of  $\text{Br}_2$  and  $\text{Cl}_2$ .
- D) The equilibrium partial pressure of  $\text{BrCl}(\text{g})$  will be greater than 2.00 atm.
- E) The equilibrium partial pressures of  $\text{Br}_2$ ,  $\text{Cl}_2$ , and  $\text{BrCl}$  will be the same as the initial values.

39) How does the reaction quotient of a reaction ( $Q$ ) differ from the equilibrium constant ( $K_{\text{eq}}$ ) of the same reaction?

39) \_\_\_\_\_

- A)  $Q$  does not change with temperature.
- B)  $Q$  does not depend on the concentrations or partial pressures of reaction components.
- C)  $K$  does not depend on the concentrations or partial pressures of reaction components.
- D)  $K_{\text{eq}}$  does not change with temperature, whereas  $Q$  is temperature dependent.
- E)  $Q$  is the same as  $K_{\text{eq}}$  when a reaction is at equilibrium.

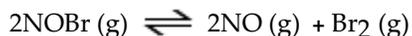
40) How is the reaction quotient used to determine whether a system is at equilibrium?

40) \_\_\_\_\_

- A) At equilibrium, the reaction quotient is undefined.
- B) The reaction is at equilibrium when  $Q = K_{\text{eq}}$ .
- C) The reaction is at equilibrium when  $Q > K_{\text{eq}}$ .
- D) The reaction is at equilibrium when  $Q < K_{\text{eq}}$ .
- E) The reaction quotient must be satisfied for equilibrium to be achieved.

41) Nitrosyl bromide decomposes according to the following equation.

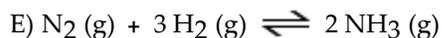
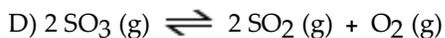
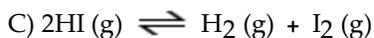
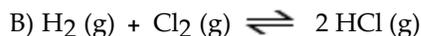
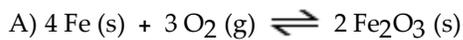
41) \_\_\_\_\_



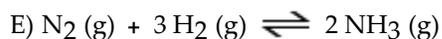
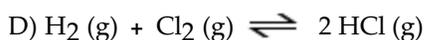
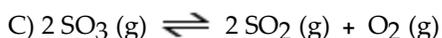
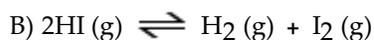
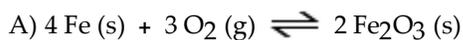
A sample of  $\text{NOBr}$  (0.64 mol) was placed in a 1.00-L flask containing no  $\text{NO}$  or  $\text{Br}_2$ . At equilibrium the flask contained 0.46 mol of  $\text{NOBr}$ . How many moles of  $\text{NO}$  and  $\text{Br}_2$ , respectively, are in the flask at equilibrium?

- A) 0.18, 0.18      B) 0.18, 0.090      C) 0.46, 0.46      D) 0.46, 0.23      E) 0.18, 0.360

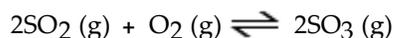
42) Of the following equilibria, only \_\_\_\_\_ will shift to the left in response to a decrease in volume. 42) \_\_\_\_\_



43) Of the following equilibria, only \_\_\_\_\_ will shift to the left in response to a decrease in volume. 43) \_\_\_\_\_



44) The reaction below is exothermic: 44) \_\_\_\_\_



Le Chatelier's Principle predicts that \_\_\_\_\_ will result in an increase in the number of moles of  $\text{SO}_3 \text{(g)}$  in the reaction container.

A) increasing the pressure

B) increasing the volume of the container

C) removing some oxygen

D) decreasing the pressure

E) increasing the temperature

45) For the endothermic reaction

45) \_\_\_\_\_



Le Chatelier's principle predicts that \_\_\_\_\_ will result in an increase in the number of moles of  $\text{CO}_2$ .

- A) decreasing the temperature
- B) removing some of the  $\text{CaCO}_3(\text{s})$
- C) increasing the pressure
- D) increasing the temperature
- E) adding more  $\text{CaCO}_3(\text{s})$

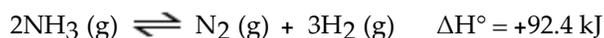
46) In which of the following reactions would increasing pressure at constant temperature not change the concentrations of reactants and products, based on Le Chatelier's principle?

46) \_\_\_\_\_

- A)  $2\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{N}_2\text{O}(\text{g})$
- B)  $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$
- C)  $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$
- D)  $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$
- E)  $\text{N}_2(\text{g}) + 2\text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$

47) Consider the following reaction at equilibrium:

47) \_\_\_\_\_



Le Chatelier's principle predicts that adding  $\text{N}_2(\text{g})$  to the system at equilibrium will result in \_\_\_\_\_.

- A) a decrease in the concentration of  $\text{H}_2(\text{g})$
- B) a lower partial pressure of  $\text{N}_2$
- C) a decrease in the concentration of  $\text{NH}_3(\text{g})$
- D) removal of all of the  $\text{H}_2(\text{g})$
- E) an increase in the value of the equilibrium constant

48) Consider the following reaction at equilibrium:

48) \_\_\_\_\_

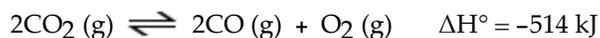


Le Chatelier's principle predicts that the moles of  $\text{H}_2$  in the reaction container will increase with \_\_\_\_\_

- A) some removal of  $\text{NH}_3$  from the reaction vessel (V and T constant)
- B) an increase in total pressure by the addition of helium gas (V and T constant)
- C) addition of some  $\text{N}_2$  to the reaction vessel (V and T constant)
- D) a decrease in the total volume of the reaction vessel (T constant)
- E) a decrease in the total pressure (T constant)

49) Consider the following reaction at equilibrium:

49) \_\_\_\_\_

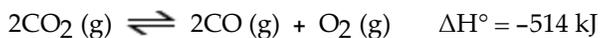


Le Chatelier's principle predicts that adding  $\text{O}_2(\text{g})$  to the reaction container will \_\_\_\_\_.

- A) decrease the partial pressure of  $\text{CO}_2(\text{g})$  at equilibrium
- B) increase the value of the equilibrium constant
- C) increase the partial pressure of  $\text{CO}_2(\text{g})$  at equilibrium
- D) increase the partial pressure of  $\text{CO}(\text{g})$  at equilibrium
- E) decrease the value of the equilibrium constant

50) Consider the following reaction at equilibrium:

50) \_\_\_\_\_

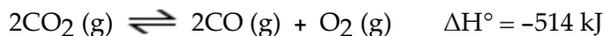


Le Chatelier's principle predicts that an increase in temperature will \_\_\_\_\_.

- A) increase the partial pressure of  $\text{CO}$
- B) decrease the value of the equilibrium constant
- C) decrease the partial pressure of  $\text{CO}_2(\text{g})$
- D) increase the value of the equilibrium constant
- E) increase the partial pressure of  $\text{O}_2(\text{g})$

51) Consider the following reaction at equilibrium.

51) \_\_\_\_\_

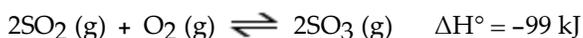


Le Chatelier's principle predicts that the equilibrium partial pressure of CO (g) can be maximized by carrying out the reaction \_\_\_\_\_.

- A) at high temperature and high pressure
- B) at high temperature and low pressure
- C) at low temperature and low pressure
- D) at low temperature and high pressure
- E) in the presence of solid carbon

52) Consider the following reaction at equilibrium:

52) \_\_\_\_\_



Le Chatelier's principle predicts that an increase in temperature will result in \_\_\_\_\_.

- A) a decrease in the partial pressure of SO<sub>2</sub>
- B) a decrease in the partial pressure of SO<sub>3</sub>
- C) an increase in K<sub>eq</sub>
- D) the partial pressure of O<sub>2</sub> will decrease
- E) no changes in equilibrium partial pressures

53) The effect of a catalyst on an equilibrium is to \_\_\_\_\_.

53) \_\_\_\_\_

- A) slow the reverse reaction only
- B) shift the equilibrium to the right
- C) increase the equilibrium constant so that products are favored
- D) increase the rate of the forward reaction only
- E) increase the rate at which equilibrium is achieved without changing the composition of the equilibrium mixture

## Answer Key

### Testname: CHAPTER 15 PRACTICE QUESTIONS

- 1) C
- 2) C
- 3) B
- 4) A
- 5) B
- 6) B
- 7) B
- 8) D
- 9) A
- 10) B
- 11) E
- 12) B
- 13) E
- 14) C
- 15) C
- 16) C
- 17) E
- 18) D
- 19) C
- 20) D
- 21) A
- 22) C
- 23) B
- 24) B
- 25) C
- 26) D
- 27) B
- 28) B
- 29) D
- 30) B
- 31) B
- 32) E
- 33) C
- 34) C
- 35) A
- 36) A
- 37) E
- 38) D
- 39) E
- 40) B
- 41) B
- 42) D
- 43) C
- 44) A
- 45) D
- 46) C
- 47) A
- 48) E
- 49) C
- 50) B

Answer Key

Testname: CHAPTER 15 PRACTICE QUESTIONS

51) C

52) B

53) E