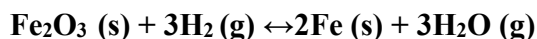


Test bank chapter (14)

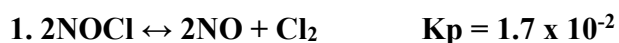
Choose the most correct answer

1. Which is the correct equilibrium constant expression for the following reaction?



- a) $K_c = [\text{Fe}_2\text{O}_3] [\text{H}_2]^3 / [\text{Fe}]^2 [\text{H}_2\text{O}]^3$
- b) $K_c = [\text{H}_2] / [\text{H}_2\text{O}]$
- c) $K_c = [\text{H}_2\text{O}]^3 / [\text{H}_2]^3$
- d) $K_c = [\text{Fe}]^2 [\text{H}_2\text{O}]^3 / [\text{Fe}_2\text{O}_3] [\text{H}_2]^3$

2. The following reactions occur at 500 K. Arrange them in order of increasing tendency to proceed to completion (least \rightarrow greatest tendency).



- a) $2 < 1 < 3$
- b) $1 < 2 < 3$
- c) $2 < 3 < 1$
- d) $3 < 2 < 1$

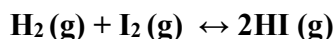
3. Calculate K_p for the below reaction if K_c at for this reaction is 2.1×10^{-2} at 400°C .



- a) 0.689
- b) 0.115
- c) 0.137
- d) 1.2

Chemical Equilibrium

4. For the following reaction:



$K_c = 50.2$ at $445\text{ }^\circ\text{C}$. If $[\text{H}_2] = [\text{I}_2] = [\text{HI}] = 1.75 \times 10^{-3}\text{M}$ at $445\text{ }^\circ\text{C}$, which one of these statements is true?

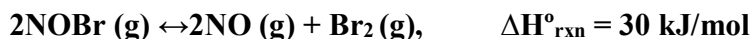
- a) The system is not at equilibrium; thus, no concentration changes will occur.
- b) The concentrations of HI and I_2 will increase as the system approaches equilibrium.
- c) The concentration of HI will increase as the system approaches equilibrium.
- d) The concentrations of H_2 and HI will decrease as the system moves toward equilibrium.

5. For the below reaction at equilibrium, which choice gives a change that will shift the position of equilibrium to favor formation of more products?



- a) Increase the total pressure by decreasing the volume.
- b) Add more NO.
- c) Remove Br_2 .
- d) Lower the temperature.

6 - For the following reaction at equilibrium in a reaction vessel, which one of these changes would cause the Br_2 concentration to decrease?



- a) Increase the temperature.
- b) Remove some NO.
- c) Add more NOBr.
- d) Compress the gas mixture into a smaller volume.

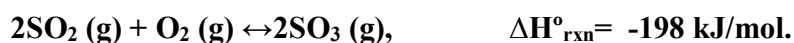
7. For the below reaction at equilibrium, if we increase the reaction temperature, the equilibrium will:



- a) shift to the right.
- b) shift to the left.
- c) not shift.
- d) The question cannot be answered because the equilibrium constant is not given.

Chemical Equilibrium

8. For the equilibrium reaction:



Which one of these factors would cause the equilibrium constant to increase?

- a) Decrease the temperature.
- b) Increase the temperature.
- c) Add SO_2 gas.
- d) Remove O_2 gas.

9. The reaction below is endothermic. If the temperature is increased,

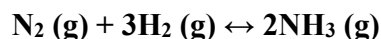


- a) more SO_3 will be produced.
- b) K_c will increase.
- c) K_c will decrease.
- d) no change will occur in K_c .

10. If a catalyst is added to a chemical reaction, the equilibrium yield of a product will be, and the time taken to come to equilibrium will bethan before.

- a) higher; less
- b) lower; the same
- c) higher; the same
- d) the same; less

11- For the reaction:



$K_c = 0.0600$ at a certain temperature. In an equilibrium mixture of the three gases, $[\text{NH}_3] = 0.242 \text{ M}$ and $[\text{H}_2] = 1.03 \text{ M}$. What is the concentration of N_2 in this system?

- a) 3.9 M
- b) 0.003 M
- c) 0.89 M
- d) 1.12 M

Chemical Equilibrium

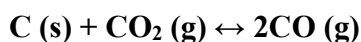
12. Consider the reaction,



If an equilibrium mixture of these three substances is compressed, equilibrium will, because

- a) shift to the right; higher pressure favors fewer moles of gas
- b) shift to the right; higher pressure favors more moles of gas
- c) shift to the left; higher pressure favors fewer moles of gas
- d) shift to the left; higher pressure favors more moles of gas

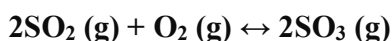
13- Consider the equilibrium system:



If more C(s) is added, the equilibrium will,; if CO is removed the equilibrium will

- a) shift to the left; shift to the left
- b) shift to the right; shift to the left
- c) be unchanged; shift to the right
- d) be unchanged; shift to the left

14. Consider the exothermic reaction at equilibrium:



If the system is cooled, the equilibrium will, because

- a) shift to the left; decreased temperature favors an exothermic reaction
- b) shift to the right; decreased temperature favors an exothermic reaction
- c) shift to the right; decreased temperature favors an endothermic reaction
- d) shift to the left; decreased temperature favors an endothermic reaction

15. A large value of the equilibrium constant indicates that when the reaction reaches equilibrium, mostly _____ will be present.

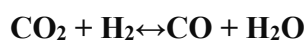
- a) reactants
- b) products
- c) catalysts
- d) shrapnel

Chemical Equilibrium

16. When equilibrium is achieved?

- a) $Q > K$
- b) $Q < K$
- c) $Q = K$
- d) $Q^2 = K$

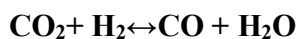
17. for the following reaction:



If all species are gases and H_2 is added, the amount of CO present at equilibrium will:

- a) increase.
- b) decrease.
- c) remain unchanged.
- d) disappear.

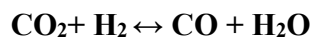
18. For the reaction:



If all species are gases and H_2O is added, the amount of CO present at equilibrium will:

- a) increase.
- b) decrease.
- c) remain unchanged.
- d) disappear.

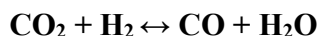
19. For the reaction:



If the reaction is endothermic and the temperature is raised, the amount of CO present will:

- a) increase.
- b) decrease.
- c) remain unchanged.
- d) disappear.

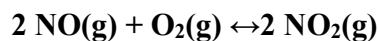
20. For the reaction:



If all species are gases and the container is compressed, the amount of CO present will:

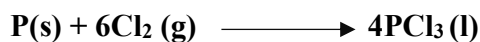
- a) increase.
- b) decrease.
- c) remain unchanged.
- d) disappear.

21. What is K_p in terms of K_c for the following reaction?



- a) $K_p = K_c RT$
- b) $K_p = K_c / RT$
- c) $K_p = K_c R/T$
- d) $K_p = K_c / (RT)^2$

22. What is the correct equilibrium constant expression for the reaction:



a.
$$\frac{[\text{PCl}_3]^4}{[\text{P}_4][\text{Cl}_2]^6}$$

c.
$$\frac{[\text{PCl}_3]^4}{[\text{Cl}_2]^6}$$

b.
$$\frac{1}{[\text{Cl}_2]^6}$$

d.
$$\frac{[\text{PCl}_3]^4}{[\text{P}][6\text{Cl}_3]}$$

23. The equation relating K_p and K_c is:

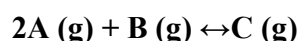
- a) $K_p = k_c (RT)^{\Delta n}$
- b) $K_p = K_c RT^{\Delta n}$
- c) $K_c = K_p RT^{\Delta n}$
- d) $K_c = K_p (RT)^{\Delta n}$

Chemical Equilibrium

24. K_p will be equal to K_c if:

- a) $\Delta n = 1$
- b) $\Delta n = 0$
- c) $\Delta n = -1$
- d) $RT = 0$

25. Consider the reversible reaction at equilibrium at 392 °C:



The partial pressures are found to be: A: 6.70 atm, B: 10.1 at, C: 3.60 atm. Evaluate K_p for this reaction.

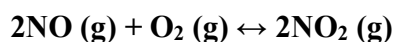
- a) 7.94×10^{-3}
- b) 0.0794
- c) 0.794
- d) 7.94

26. Which of the following will result in an equilibrium shift to the right?



- a) Increase temperature/increase volume
- b) Increase temperature/decrease volume
- c) decrease temperature/increase volume
- d) decrease temperature/decrease volume

27. Which accurately reflects the change in concentration that will occur if O_2 is added to disturb the equilibrium?



	[NO]	[O ₂]	[NO ₂]
a)	Increase	Increase	Increase
b)	Increase	Increase	Decrease
c)	Decrease	Decrease	Decrease
d)	Decrease	Increase	Increase