Equilibrium Practice Quiz
Le Chatelier's Principle

1) Consider the following reaction:

$2SO_{2(g)} + O_{2(g)} \rightleftarrows 2SO_{3(g)}$ $\Delta H = -197$ kJ/mol

Which of the following will not shift the equilibrium to the right?

A) Adding more O_2
B) Adding a catalyst
C) Increasing the pressure
D) Lowing the temperature

2) Consider the following equilibrium system:

$CaCO_{3(s)} \rightleftarrows CaO_{(s)} + CO_{2(g)}$

Which one of the following changes would cause the above system to shift left?

A) Add more CaO
B)Remove $CaCO_3$
C) Decrease volume
D) Increase surface area of CaO

3) Consider the following equilibrium:

$SO_2Cl_{2(g)}$ + energy $\rightleftarrows$ $SO_{2(g)} + Cl_{2(g)}$

When the temperature is decreased, the equilibrium shifts

A) Left and [SO_2Cl_2] increases
B) Left and [SO_2Cl_2] decreases
C) Right and [SO_2Cl_2] increases
D) Right and [SO_2Cl_2] increases

4) Consider the following equilibrium:

$2SO_{3(g)} \rightleftarrows 2SO_{2(g)} + O_{2(g)}$

The volume of the system is decreased at a constant temperature. A new state of equilibrium is established by a shift of the original equilibrium to the

A) Left and [SO_3] increases
B) Right and [SO_3] decreases
C) Left and [SO_3] remains unchanged
D) Right and [SO_3] remains unchanged

5) Consider the following equilibrium system:

$CO_{2(g)} + H_{2(g)} \rightleftarrows CO_{(g)} + H_2O_{(g)}$

Which of the following, when added to the system above, would result in a net decrease in [H_2O]?

A) CO_2
B) H_2
C) CO
D) H_2

6) Consider the following equilibrium:

$C_{(s)} + 2H_{2(g)} \rightleftarrows CH_{4(g)} + 74$ kJ

When a small amount of solid C is added to the system

A) [H_2] decreases
B) [CH_4] increases
C) The temperature increases
D) All concentrations remain constant

7) Consider the following equilibrium:

$2NO_{(g)} + Cl_{2(g)} \rightleftarrows 2NOCl_{(g)}$

At constant temperature and volume, Cl_2 is added to the above equilibrium system. As equilibrium re-establishes,

A) [NOCl] will decrease
B) The temperature increases
C) [NO] will increase
D) [NOCl] will increase

8) Consider the following equilibrium:

$Cl_2O_{7(g)} + 8H_{2(g)} \rightleftarrows 2HCl_{(g)} + 7H_2O_{(g)}$

Which of the following would increase the number of moles of HCl?

A) Increase [H_2O]
B) Increase [Cl_2O_7]
C) Increase total pressure
D) Increase volume of the system

9) Consider the following equilibrium:

$2HI_{(g)} \rightleftarrows H_{2(g)} + I_{2(g)}$ $\Delta H = -68$kJ

Which of the following would cause the equilibrium to shift right?

A) Increasing the volume
B) Decreasing the volume
C) Increasing the temperature
D) Decreasing the temperature

10) A 1.00 L flask contains a gaseous equilibrium system. The addition of reactants to this flask results in a

A) Shift to the left and decrease in the of products
B) Shift to the left and increase in the of products
C) Shift to the right and decrease in the of products
D) Shift to the right and increase in the of products

11) An equilibrium system shifts left when the

A) Rate of the forward reaction is equal to the rate of the reverse reaction
B) Rate of the forward reaction is less than the rate of the reverse reaction
C) Rate of the forward reaction is greater than the rate of the reverse reaction
A) Rate of the forward reaction and the rate of the reverse reaction are constant

12) Consider the following equilibrium:

$2SO_{2(g)} + O_{2(g)} \rightleftarrows 2SO_{3(g)}$ $\Delta H = -198$ kJ

There will be no shift in the equilibrium when

A) More O_2 is added
B) Catalyst is added
C) The volume is increased
D) The temperature is increased

13) Consider the following equilibrium:

$N_2O_{4(g)}$ + 58 kJ ⇄ $2NO_{2(g)}$

The equilibrium shifts right when

A) NO_2 is added
B) N_2O_4 is removed
C) The temperature is decreased
D) The volume of the system is increased

14) Consider the following equilibrium:

$2SO_{2(g)} + O_{2(g)}$ ⇄ $2SO_{3(g)}$

Which of the following will shift the equilibrium to the right?

I. Adding more O_2
II. Adding more SO_3
III. Adding a catalyst

A) I only
B) III only
C) I and II only
D) II and III only

15) Consider the following equilibrium:

energy + $2NaClO_{3(s)}$ ⇌ $2NaCl_{(s)} + 3O_{2(g)}$

Which of the following will cause a shift to the left?

A) adding more O_2
B) adding more NaCl
C) removing some $NaClO_3$
D) increasing the temperature

16) Consider the following equilibrium:

$CO_{(g)} + 2H_{2(g)}$ ⇌ $CH_3OH_{(g)}$ + energy

Which of the factors below would decrease the concentration of CH_3OH at equilibrium?

A) an addition of CO
B) an increase in H_2
C) a decrease in the temperature
D) an increase in the temperature

17) Consider the following equilibrium:

energy + $2NaClO_{3(s)}$ ⇌ $2NaCl_{(s)} + 3O_{2(g)}$

Which of the following will cause a shift to the right?

A) adding more O_2
B) adding more NaCl
C) removing some $NaCl_{(s)}$
D) increasing the temperature

18) Consider the following equilibrium:

$2SO_{2(g)} + O_{2(g)}$ ⇄ $2SO_{3(g)}$

Which of the following will shift the equilibrium to the left?

I. Removing O_2
II. Adding more SO_3
III. Adding a catalyst

A) I only
B) III only
C) I and II only
D) II and III only

19) Consider the following equilibrium:

$N_2O_{4(g)}$ + energy ⇌ $2NO_{2(g)}$

How are N_2O_4 and NO_2 affected by the addition of He into the container at constant volume.

	N_2O_4	NO_2
A)	no change	no change
B)	no change	increases
C)	increases	decreases
D)	decreases	increases

20) Which of the following stresses will cause a shift to the reactants?

$H_{2(g)} + Br_{2(g)}$ ⇌ $2HBr_{(g)}$ + energy

A) increase $[Br_2]$
B) increase $[H_2]$
C) decrease temperature
D) increase temperature

21) Which of the following stresses will cause a shift to the products?

$H_{2(g)} + Br_{2(g)}$ ⇌ $2HBr_{(g)}$ + energy

A) decrease $[Br_2]$
B) decrease $[H_2]$
C) decrease temperature
D) increase temperature

22) Which of the following two stresses will each cause the system to shift to the left?

$2SO_{2(g)} + O_{2(g)}$ ⇄ $2SO_{3(g)}$ + energy

A) decrease temperature and decrease $[O_2]$
B) increase temperature and increase $[SO_3]$
C) increase temperature and decrease $[SO_3]$
D) decrease temperature and increase $[SO_2]$

23) **$SrCO_{3(s)}$ + 215 kJ ⇌ $SrO_{(s)} + CO_{2(g)}$**

Which of the following conditions would produce the greatest yield of $SrO_{(s)}$?

	Temperature	Pressure
A)	low	low
B)	low	high
C)	high	low
D)	high	high

24) The Haber Process is used to produce ammonia commercially according to the following equilibrium:

$N_{2(g)} + 3H_{2(g)}$ ⇌ $2NH_{3(g)}$ + energy

Which of the following conditions will produce the highest yield of ammonia?

A) increase temperature and increase pressure
B) increase temperature and decrease pressure
C) decrease temperature and increase pressure
D) decrease temperature and decrease pressure

25) Consider the following reaction:

$2SO_{2(g)} + O_{2(g)}$ ⇄ $2SO_{3(g)}$ ΔH = -197 kJ/mol

If the volume is increased what happens to equilibrium?

A) shifts to the right
B) shifts to the left
C) no shift
D) shifts in the exothermic direction