Name _____ **Homework.**

___ 1) Given the equilibrium reaction in a closed system: $H_2(g) + I_2(g) + \text{heat} \leftrightarrow 2\ HI(g)$
What will be the result of an increase in temperature?

1) The equilibrium will shift to the left and $[H_2]$ will increase.
2) The equilibrium will shift to the left and $[H_2]$ will decrease.
3) The equilibrium will shift to the right and [HI] will increase.
4) The equilibrium will shift to the right and [HI] will decrease.

___ 2) Given the equation representing a reaction at equilibrium:
$N_2(g) + 3\ H_2(g) \leftrightarrow 2\ HN_3(g) + \text{energy}$
Which change causes the equilibrium to shift to the right?

1) decreasing the concentration of $H_2(g)$
2) decreasing the pressure
3) increasing the concentration of $N_2(g)$
4) increasing the temperature

___ 3) Given the system at equilibrium:
$2\ POCl_3(g) + \text{energy} \rightleftharpoons 2\ PCl_3(g) + O_2(g)$
Which changes occur when $O_2(g)$ is added to this system?

1) The equilibrium shifts to the right and the concentration of $PCl_3(g)$ increases.
2) The equilibrium shifts to the right and the concentration of $PCl_3(g)$ decreases.
3) The equilibrium shifts to the left and the concentration of $PCl_3(g)$ increases.
4) The equilibrium shifts to the left and the concentration of $PCl_3(g)$ decreases.

___ 4) Given the reaction at equilibrium:
$4\ HCl(g) + O_2(g) \leftrightarrow 2\ Cl_2(g) + 2\ H_2O(g)$
If the pressure on the system is increased, the concentration of $Cl_2(g)$ will

1) decrease
2) increase
3) remain the same

___ 5) Ammonia is produced commercially by the Haber reaction:
$N_2(g) + 3\ H_2(g) \leftrightarrow 2\ NH_3(g) + \text{heat}$
The formation of ammonia is favored by

1) an increase in pressure
2) a decrease in pressure
3) removal of $N_2(g)$
4) removal of $H_2(g)$

___ 6) The addition of a catalyst to a system at equilibrium will increase the rate of

1) the forward reaction, only
2) the reverse reaction, only
3) both the forward and reverse reactions
4) neither the forward nor reverse reaction

___ 7) Given the Haber reaction at equilibrium:

$N_2(g) + 3\ H_2(g) \leftrightarrow 2\ NH_3(g) + \text{heat}$

Which stress on the system will shift the reaction towards the reactants?

1) increasing the concentration of $N_2(g)$
2) increasing the pressure on the system
3) decreasing the concentration of $H_2(g)$
4) decreasing the temperature on the system

___ 8) Given the equation representing a system at equilibrium:

$N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g) + \text{energy}$

Which changes occur when the temperature of this system is *decreased*?

1) The concentration of $H_2(g)$ increases and the concentration of $N_2(g)$ increases.
2) The concentration of $H_2(g)$ decreases and the concentration of $N_2(g)$ increases.
3) The concentration of $H_2(g)$ decreases and the concentration of $NH_3(g)$ decreases.
4) The concentration of $H_2(g)$ decreases and the concentration of $NH_3(g)$ increases.

9) Given the equilibrium reaction in a closed system:

$H_2(g) + I_2(g) + \text{heat} \leftrightarrow 2\ HI(g)$

What will be the result of an increase in temperature?

1) The equilibrium will shift to the left and $[H_2]$ will increase.
2) The equilibrium will shift to the left and $[H_2]$ will decrease.
3) The equilibrium will shift to the right and [HI] will increase.
4) The equilibrium will shift to the right and [HI] will decrease.

10) For a reaction system at equilibrium, LeChatelier's principle can be used to predict the

1) activation energy for the system
2) type of bonds in the reactants
3) effect of a stress on the system
4) polarity of the product molecules

11) Given the system at equilibrium:

$H_2(g) + F_2(g) \leftrightarrow 2\ HF(g) + \text{heat}$

Which change will *not* shift the point of equilibrium?

1) changing the pressure
2) changing the temperature
3) changing the concentration of $H_2(g)$
4) changing the concentration of HF(g)

12) Given the closed system at equilibrium:

$CO_2(g) \leftrightarrow CO_2(aq)$

As the pressure on the system increases, the solubility of the $CO_2(g)$

1) decreases
2) increases
3) remains the same

13) Which system at equilibrium will be *least* affected by a change in pressure?

1) $3\ H_2(g) + N_2(g) \leftrightarrow 2\ NH_3(g)$
2) $2\ S(s) + 3\ O_2(g) \leftrightarrow 2\ SO_3(g)$
3) $AgCl(s) \leftrightarrow Ag^+(aq) + Cl^-(aq)$
4) $2\ HgO(s) \leftrightarrow 2\ Hg(\ell) + O_2(g)$

14) Given the reaction at equilibrium:

$AgI(s) \leftrightarrow Ag^+(aq) + I^-(aq)$

What happens as KI(s) is added to the solution?

1) The reaction shifts forwards and the concentration of AgI(aq) decreases .
2) The reaction shifts reverse and the concentration of AgI(aq) increases
3) The reaction shifts forwards and the concentration of $Ag^+(aq)$ increases
4) The reaction shifts reverse and the concentration of $Ag^+(aq)$ increases

15) Given the reaction at equilibrium:

$BaCrO_4(s) \leftrightarrow Ba^{2+}(aq) + CrO_4^{2-}(aq)$

Which substance, when added to the mixture will cause an increase in the amount of $BaCrO_4(s)$?

1) K_2CO_3
2) $CaCO_3$
3) $BaCl_2$
4) $CaCl_2$