Le Chatelier's Principle – Chapter 18 **Name** Key

For the following gaseous equilibrium reactions, indicate what happens to the equilibrium position (shift to the right or left) when the indicated stress or condition change occurs.
Assume all molecules are gases & remember energy is equal to heat.

1. $N_2 + 3H_2 \leftrightarrow 2NH_3 +$ energy
   a) remove NH_3 gas Shift (R) b) decrease pressure shift (L)
2. $CO_2 + H_2 +$ energy $\leftrightarrow CO + H_2O$
   a) decrease temperature shift (L) b) add a catalyst no Δ
3. $2SO_2 + O_2 \leftrightarrow 2SO_3 +$ energy
   a) increase SO_2 concentration shift (R) b) increase temperature shift (L)
4. $CO_2 + C +$ energy $\leftrightarrow 2CO$
   a) increase temperature shift (R) b) increase CO concentration shift (L)
5. $N_2O_4 +$ energy $\leftrightarrow 2NO_2$
   a) decrease pressure shift (R) b) remove N_2O_4 shift (L)
6. $H_2 + Cl_2 \leftrightarrow 2HCl +$ energy
   a) increase H_2 concentration shift (L) (R) b) increase pressure no Δ b/c same # moles on each side
7. $N_2 + O_2 +$ energy $\leftrightarrow 2NO$
   a) decrease O_2 concentration shift (L) b) add a catalyst no Δ

Use the following equations to complete the tables below with respect to the desired item – how does the stress effect concentration, pressure, and temperature. *Assume all molecules are gases.*

1. $N_2 + 3H_2 \leftrightarrow 2NH_3 +$ heat
2. $H_2 + I_2 \leftrightarrow 2HI +$ heat
3. $2NO + O_2 \leftrightarrow 2NO_2 +$ heat

Concentration *What are the resulting concentrations?*

			RESULTS	
Equation	**Stress**	**Shift, *Left or Right*?**	**Increase**	**Decrease**
1	**increase N_2**	(R)	$[NH_3]$, heat	$[N_2]$, $[H_2]$
2	**decrease H_2**	(L)	$[H_2]$, $[I_2]$	$[HI]$, heat
3	**increase O_2** **decrease NO_2**	(R)	$[NO_2]$, heat	$[NO]$, $[O_2]$

Pressure

			RESULTS	
Equation	**Stress**	**Shift, *Left or Right*?**	**Increase**	**Decrease**
1	**increase**	(R)	$[NH_3]$, heat	$[N_2]$, $[H_2]$
	decrease	(L)		
2	**increase or decrease**	no Δ	no Δ	no Δ
3	**increase**	(R)	$[NO_2]$, heat	$[NO]$, $[O_2]$
	decrease	(L)		

Temperature

			RESULTS	
Equation	**Stress**	**Shift, *Left or Right*?**	**Increase**	**Decrease**
1	**increase**	(L)	$[N_2]$, $[H_2]$	$[NH_3]$, heat
	decrease	(R)		
2	**increase**	(L)	$[H_2]$, $[I_2]$	$[HI]$, heat
	decrease	(R)		
3	**increase**	(L)	$[NO]$, $[O_2]$	$[NO_2]$, heat
	decrease	(R)		