LE CHATELIER'S PRINCIPLE

Name _____

Le Chatelier's Principle states that when a system at equilibrium is subjected to a stress, the system will shift its equilibrium point in order to relieve the stress.

Complete the following chart by writing left, right or none for equilibrium shift, and decreases, increases or remains the same for the concentrations of reactants and products, and for the value of K.

$$N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g) + 22.0 \text{ kcal}$$

Stress	Equilibrium Shift	$[N_2]$	$[H_2]$	$[NH_3]$	K
1. Add N_2	right	———	decreases	increases	remains the same
2. Add H_2			———		
3. Add NH_3				———	
4. Remove N_2		———			
5. Remove H_2			———		
6. Remove NH_3				———	
7. Increase Temperature					
8. Decrease Temperature					
9. Increase Pressure					
10. Decrease Pressure					

LE CHATELIER'S PRINCIPLE CONTINUED

Name _____

$12.6\ kcal + H_2(g) + I_2(g) \leftrightarrow 2HI(g)$

Stress	Equilibrium Shift	$[H_2]$	$[I_2]$	[HI]	K
1. Add H_2	right	———	decreases	increases	remains the same
2. Add I_2			———		
3. Add HI				———	
4. Remove H_2		———			
5. Remove I_2			———		
6. Remove HI				———	
7. Increase Temperature					
8. Decrease Temperature					
9. Increase Pressure					
10. Decrease Pressure					

$NaOH(s) \leftrightarrow Na^+(aq) + OH^-(aq) + 10.6\ kcal$

(Remember that pure solids and liquids do not affect equilibrium values.)

Stress	Equilibrium Shift	Amount NaOH(s)	$[Na^+]$	$[OH^-]$	K
1. Add NaOH(s)		———			
2. Add NaCl (Adds Na^+)			———		
3. Add KOH (Adds OH^-)				———	
4. Add H^+ (Removes OH^-)				———	
5. Increase Temperature					
6. Decrease Temperature					
7. Increase Pressure					
8. Decrease Pressure					

LE CHATELIER'S PRINCIPLE

Name Key

Le Chatelier's Principle states that when a system at equilibrium is subjected to a stress, the system will shift its equilibrium point in order to relieve the stress.

Complete the following chart by writing left, right or none for equilibrium shift, and decreases, increases or remains the same for the concentrations of reactants and products, and for the value of K.

$N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g) + 22.0\ kcal$ (4 mol / 2 mol) exothermic

Stress	Equilibrium Shift	$[N_2]$	$[H_2]$	$[NH_3]$	K
1. Add N_2	right	——	decreases	increases	remains the same
2. Add H_2	right	decreases	——	increases	same
3. Add NH_3	left	increases	increases	——	same
4. Remove N_2	left	——	increases	decreases	same
5. Remove H_2	left	increases	——	decreases	same
6. Remove NH_3	right	decreases	decreases	——	same
7. Increase Temperature	left	inc.	inc.	dec.	dec.
8. Decrease Temperature	right	dec.	dec.	inc.	inc.
9. Increase Pressure	right	dec.	dec.	inc.	same
10. Decrease Pressure	left	inc.	inc.	dec.	same

Front in Class

LE CHATELIER'S PRINCIPLE CONTINUED

Name _____

2mol 2mol Endothermic

$12.6\ kcal + H_2(g) + I_2(g) \leftrightarrow 2HI(g)$

Stress	Equilibrium Shift	$[H_2]$	$[I_2]$	[HI]	K
1. Add H_2	right	——	decreases	increases	remains the same
2. Add I_2	R	dec.	——	inc.	Same
3. Add HI	L	inc.	inc.	——	Same
4. Remove H_2	L	——	inc.	dec.	Same
5. Remove I_2	L	inc.	——	dec.	Same
6. Remove HI	R	dec.	dec.	——	Same
7. Increase Temperature	R	dec.	dec.	inc.	inc.
8. Decrease Temperature	L	inc.	inc.	dec.	dec.
9. Increase Pressure	None	Same →			
10. Decrease Pressure	None	same →			

more exothermic

more endothermic

$NaOH(s) \leftrightarrow Na^+(aq) + OH^-(aq) + 10.6\ kcal$ (Remember that pure solids and liquids do not affect equilibrium values.) Exothermic

Stress	Equilibrium Shift	Amount NaOH(s)	$[Na^+]$	$[OH^-]$	K
1. Add NaOH(s)	none	——	Same	Same	Same
2. Add NaCl (Adds Na^+)	left	Inc.	——	dec.	Same
3. Add KOH (Adds OH^-)	L	inc.	dec.	——	Same
4. Add H^+ (Removes OH^-)	R	dec.	inc.	——	Same
5. Increase Temperature	L	inc.	dec.	dec.	dec.
6. Decrease Temperature	R	dec.	inc.	inc.	inc.
7. Increase Pressure	none	Same →			
8. Decrease Pressure	none	Same →			

more endo
more exo

Back is Hmwk