Name : _____ Date : _____

Worksheet on Le Chatelier's Principle

1. For the reaction

$$PCl_3\ (g) + Cl_2\ (g) \rightleftharpoons PCl_5\ (g)$$

Predict the effect on the position of equilibrium that results from :

Stress	Shift	Stress	Shift
Decreasing the volume		Addition of Ne, an inert gas	
Removing some PCl_5		Increasing the temperature	
Injecting more Cl_2 gas		Increasing the volume of the container	

2. Predict the effect of decreasing the temperature on the position of the following equilibria.

(a) $H_2\ (g) + Cl_2\ (g) \rightleftharpoons 2\ HCl\ (g) + 49.7\ kJ$

(b) $2\ NH_3\ (g) \rightleftharpoons N_2\ (g) + 3\ H_2\ (g)$ $\Delta H = 37.2\ kJ$

(c) $CO\ (g) + H_2O\ (g) \rightleftharpoons CO_2\ (g) + H_2\ (g)$ $\Delta H = -27.6\ kJ$

3. Which system at equilibrium will be least affected by a change in pressure ?

(A) $3\ H_2\ (g) + N_2\ (g) \rightleftharpoons 2\ NH_3\ (g)$

(B) $2\ S\ (s) + 3\ O_2\ (g) \rightleftharpoons 2\ SO_3\ (g)$

(C) $AgCl\ (s) \rightleftharpoons Ag^+\ (aq) + Cl^-\ (aq)$

(D) $2\ HgO\ (s) \rightleftharpoons 2\ Hg\ (l) + O_2\ (g)$

Ans: _____

4. Predict the effect of decreasing the container volume for each equilibrium.

(a) $2\ H_2O\ (g) + N_2\ (g) \rightleftharpoons 2\ H_2\ (g) + 2\ NO\ (g)$

(b) $SiO_2\ (s) + 4\ HF\ (g) \rightleftharpoons SiF_4\ (g) + 2\ H_2O\ (g)$

(c) $CO\ (g) + H_2\ (g) \rightleftharpoons C\ (s) + H_2O\ (g)$

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1. For the reaction

$$PCl_3\ (g) + Cl_2\ (g) \rightleftharpoons PCl_5\ (g)$$

Predict the effect on the position of equilibrium that results from :

Stress	Shift	Stress	Shift
Decreasing the volume	Right	Addition of Ne, an inert gas	None
Removing some PCl_5	Right	Increasing the temperature	Left
Injecting more Cl_2 gas	Right	Increasing the volume of the container	Left

2. Predict the effect of decreasing the temperature on the position of the following equilibria.

(a) $H_2\ (g) + Cl_2\ (g) \rightleftharpoons 2\ HCl\ (g) + 49.7\ kJ$

Equilibrium will shift to favor products.

(b) $2\ NH_3\ (g) \rightleftharpoons N_2\ (g) + 3\ H_2\ (g)$ $\Delta H = 37.2\ kJ$

Equilibrium will shift to favor reactants.

(c) $CO\ (g) + H_2O\ (g) \rightleftharpoons CO_2\ (g) + H_2\ (g)$ $\Delta H = -27.6\ kJ$

Equilibrium will shift to favor products.

3. Which system at equilibrium will be least affected by a change in pressure ?

(A) $3\ H_2\ (g) + N_2\ (g) \rightleftharpoons 2\ NH_3\ (g)$

(B) $2\ S\ (s) + 3\ O_2\ (g) \rightleftharpoons 2\ SO_3\ (g)$

(C) $AgCl\ (s) \rightleftharpoons Ag^+\ (aq) + Cl^-\ (aq)$

(D) $2\ HgO\ (s) \rightleftharpoons 2\ Hg\ (l) + O_2\ (g)$

Ans: C

4. Predict the effect of decreasing the container volume for each equilibrium.

(a) $2\ H_2O\ (g) + N_2\ (g) \rightleftharpoons 2\ H_2\ (g) + 2\ NO\ (g)$

Shifts left to produce fewer number of gas molecules.

(b) $SiO_2\ (s) + 4\ HF\ (g) \rightleftharpoons SiF_4\ (g) + 2\ H_2O\ (g)$

Shifts right to produce fewer number of moles of gas.

(c) $CO\ (g) + H_2\ (g) \rightleftharpoons C\ (s) + H_2O\ (g)$

Shifts right to produce fewer number of moles of gas.