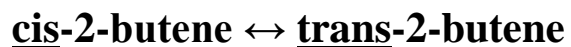


CHM 2046 Worksheet 2

1. The two main **Equilibrium Problems Types**:

- Given one equation ($K = \frac{[P]}{[R]}$) solve this for any one unknown.
- Given one equation, solve this for more than one unknown.

2. For the reaction indicated below, initially $P_{\text{cis}} = 1.00$ atm and $P_{\text{trans}} = 0$ atm. What should be the partial pressures of each after the system reaches equilibrium?



$K_p = 3.4$

$P_{\text{cis}} =$ _____

$P_{\text{trans}} =$ _____

Note: The clue as to the problem type is in the wording:

3. For the reaction shown (at $T = 2000\text{ }^{\circ}\text{C}$) initially:

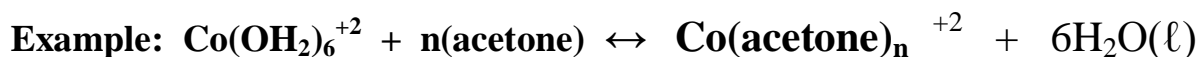
$$P_{\text{N}_2} = P_{\text{O}_2} = 1.00\text{ atm} \quad \text{and} \quad P_{\text{NO}} = 0\text{ atm}$$

Find all partial pressures after the system reacts to equilibrium.



$$P_{\text{N}_2} = P_{\text{O}_2} = \underline{\hspace{2cm}} \quad P_{\text{NO}} = \underline{\hspace{2cm}}$$

4. **Predicting Equilibrium Shifts (when conditions change).**



Add acetone, the reaction shifts _____

Add water, the reaction shifts _____

Reasoning: Think about the reaction rates, or use:

Le Chatelier's Principle:

Concentration changes:

Changing n:

Changing V:

Changing T:

5. Equilibrium Shift Problems. For each reaction, how will the change cause the equilibrium to shift? What will be the overall effect on the [...] and in values?

Equation for Reaction	Change Applied	Shift (R, L, or None)	Effects (I, D, or Same)
(Example) $A(g) \leftrightarrow B(g)$	add A	R	$[A] = I$ $[B] = I$
$Fe^{+3}(aq) + SCN^{-}(aq) \leftrightarrow Fe(SCN)^{+2}(aq)$	add Fe^{+3}	___	$[Fe^{+3}] = \underline{\hspace{2cm}}$ $[SCN^{-}] = \underline{\hspace{2cm}}$ $[Fe(SCN)^{+2}] = \underline{\hspace{2cm}}$
$2 ICl(g) \leftrightarrow I_2(g) + Cl_2(g)$	add $I_2(g)$	___	$[ICl] = \underline{\hspace{2cm}}$ $[I_2] = \underline{\hspace{2cm}}$ $[Cl_2] = \underline{\hspace{2cm}}$
$2 ICl(g) \leftrightarrow I_2(s) + Cl_2(g)$	add $I_2(g)$	___	$[ICl] = \underline{\hspace{2cm}}$ $[I_2] = \underline{\hspace{2cm}}$ $[Cl_2] = \underline{\hspace{2cm}}$
$CaCO_3(s) \leftrightarrow CaO(s) + CO_2(g)$	add $CaCO_3$	___	$[CaO] = \underline{\hspace{2cm}}$ $[CO_2] = \underline{\hspace{2cm}}$