

Wkst 7a

Part 1

① a) $K_c = \frac{[NO]^4 [H_2O]^6}{[NH_3]^4 [O_2]^5}$

b) $K_c = \frac{[CO][Cl_2]}{[COCl_2]}$

c) $K_c = \frac{[H_2][CO_2]}{[H_2O][CO]}$

d) $K_c = \frac{[NO_2]^2}{[N_2O_4]}$

② $K_c = \frac{[C]^2}{[A]^2 [B]}$

$8.0 = \frac{(c)^2}{(.05M)^2 (.05M)}$

$c^2 = .001$

$c = .032 M$

$[A] = [B] = \frac{(.50 mol)}{10.0L} = .05M$

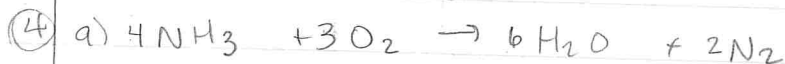
$[C]^2 = K_c [A]^2 [B]$

$[C] = \sqrt{K_c [A]^2 [B]}$

③ $K_c = \frac{[NO]^2}{[N_2][O_2]}$

$1.2 \cdot 10^{-4} = \frac{[NO]^2}{(.106M)(.145M)}$

$[NO] = .0017 M$



b) $K_c = \frac{[H_2O]^6 [N_2]^2}{[NH_3]^4 [O_2]^3}$

c) $K_c = \frac{(1.0M)^6 (1.0M)^2}{(1.0M)^4 (1.0M)^3} = 1.0$

d) $K_c = \frac{(4.0M)^6 (2.0M)^2}{(3.0M)^4 (2.0M)^3} = 25$

Part 2

⑤ $Q = \frac{[CO_2]}{[CO]^2} = \frac{(3.6 \cdot 10^{-17} M)}{(1.034)^2} = 3.1 \cdot 10^{-14}$

$Q < K_c$ so rxn not at equilibrium

Rxn will proceed towards reactants

$$\textcircled{6} \quad Q = \frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]} = \frac{(0.2\text{M})^2}{(2.0\text{M})} = 0.02$$

$Q < K_c$ Reaction will shift towards products, shift right

$$\textcircled{7} \quad Q = \frac{[\text{H}_2\text{O}]^3}{[\text{H}_2]^3} = \frac{(0.37\text{M})^3}{(1.45\text{M})^3} = 0.56$$

$Q > K_c$ rxn will proceed towards reactants, shift left

$$\textcircled{8} \quad \frac{0.35 \text{ mol SO}_2}{2.00} = 0.17\text{M SO}_2 \quad \frac{0.70 \text{ mol O}_2}{2.00\text{L}} = 0.35\text{M O}_2$$

$$\frac{1.40 \text{ mol SO}_3}{2.00\text{L}} = 0.70\text{M SO}_3 \quad K_c = \frac{[\text{SO}_3]^2}{[\text{SO}_2]^2 [\text{O}_2]} = \frac{(0.70\text{M})^2}{(0.17\text{M})^2 (0.35\text{M})} = 48$$

$$\textcircled{9} \quad K_c = \frac{[\text{BrF}_3]^2}{[\text{Br}_2][\text{F}_2]^3} \quad 45.6 = \frac{(0.199\text{M})^2}{[\text{Br}_2](0.124\text{M})^3}$$

$$[\text{Br}_2] = 0.455\text{M}$$

$$\textcircled{10} \quad K_c = \frac{[\text{N}_2\text{O}_4]^2}{[\text{N}_2\text{O}]^2 [\text{O}_2]^3} = \frac{(0.0171\text{M})^2}{(0.0155\text{M})^2 (0.0169\text{M})^3} = 2.52 \cdot 10^5$$

$$\textcircled{11} \quad Q = \frac{[\text{I}_2][\text{Cl}_2]}{[\text{ICl}]^2} = \frac{(2.0\text{M})(1.2\text{M})}{(2.5\text{M})^2} = 0.384$$

$Q > K_c$ rxn not at equilib
will proceed toward reactants