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 $K_c = \frac{[C]^2}{[A]^2[B]}$ $\quad 8.0 = \frac{(c)^2}{(.05M)^2(.05M)}$ $\quad c^2 = .001$ $\quad \boxed{C = .032\ M}$

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

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

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

③ $K_c = \frac{[NO]^2}{[N_2][O_2]}$ $\quad 1.2 \cdot 10^{-4} = \frac{[NO]^2}{(.166M)(.145M)}$ $\quad \boxed{[NO] = .0017\ M}$

④ a) $4NH_3 + 3O_2 \rightarrow 6H_2O + 2N_2$

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

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

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

Part 2

⑤ $Q = \frac{[CO_2]}{[CO]^2} = \frac{(3.6 \cdot 10^{-17} M)}{(.034)^2} = 3.1 \cdot 10^{-14}$

$Q > K_c$ so Rxn not at equilibrium

Rxn will proceed towards Reactants

(6) $Q = \frac{[NO_2]^2}{[N_2O_4]} = \frac{(.2M)^2}{(2.0M)} = .02$

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

(7) $Q = \frac{[H_2O]^3}{[H_2]^3} = \frac{(.37M)^3}{(.45M)^3} = .56$

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

(8) $\frac{.35 mol\ SO_2}{2.00} = .17M\ SO_2$ $\frac{.70 mol\ O_2}{2.00L} = .35M\ O_2$

$\frac{1.40 mol\ SO_3}{2.00L} = .700M\ SO_3$ $K_c = \frac{[SO_3]^2}{[SO_2]^2[O_2]} = \frac{(.700M)^2}{(.17M)^2(.35M)} = 48$

(9) $K_c = \frac{[BrF_3]^2}{[Br_2][F_2]^3}$ $45.6 = \frac{(.199M)^2}{[Br_2](.124M)^3}$

$[Br_2] = .455M$

(10) $K_c = \frac{[N_2O_4]^2}{[N_2O]^2[O_2]^3} = \frac{(.0171M)^2}{(.0155M)^2(.0169M)^3} = 2.52 \cdot 10^5$

(11) $Q = \frac{[I_2][Cl_2]}{[ICl]^2} = \frac{(2.0M)(1.2M)}{(2.5M)^2} = .384$

$Q > K_c$ Rxn not at equilib

will proceed toward reactants