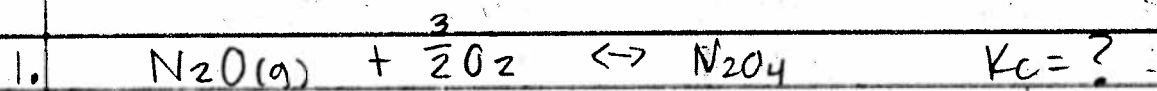
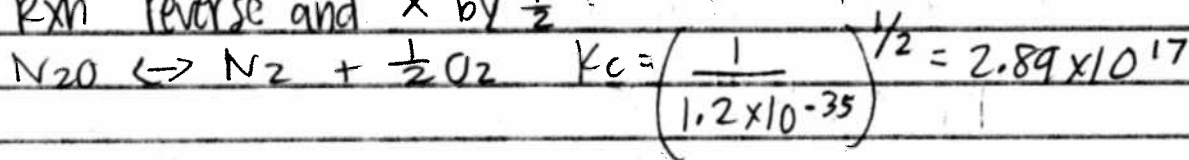


①

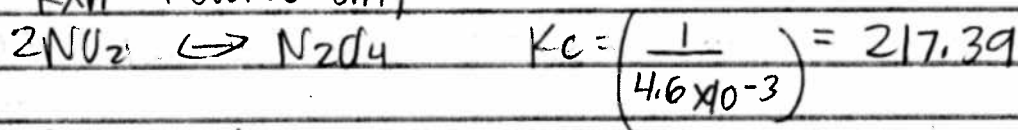
# GE 4



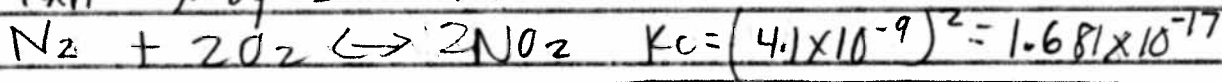
1st rxn reverse and x by 1/2



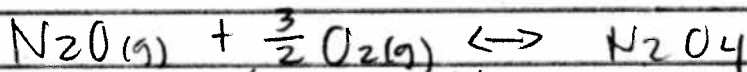
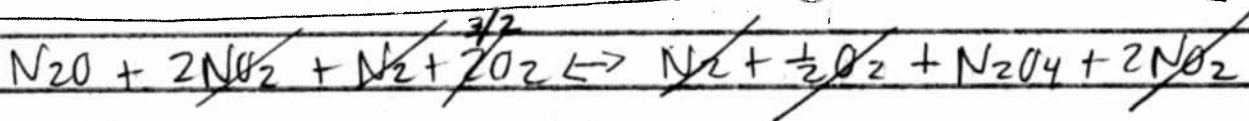
2nd rxn reverse only



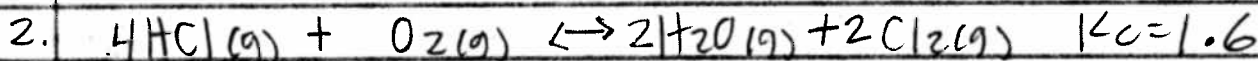
3rd rxn x by 2



+



$K_c = (2.89 \times 10^{17})(217.39)(1.681 \times 10^{-17}) = \boxed{1056}$



a. 0.20 M      0.20 M      0.20 M      0

$Q = \frac{(0.20 M)^2 (0 M)^2}{(0.20 M)^4 (0.20 M)}$

$Q = 0 > K_c$

Since no  $Cl_2$ , rxn shift right to reach  $\rightleftharpoons$

b. 1.20 mol      0.60 mol      1.40 mol      0.80 mol       $V = 4.0 L$

4.0 L      4.0 L      4.0 L      4.0 L

= .30 M      = .15 M      = .35 M      = .20 M

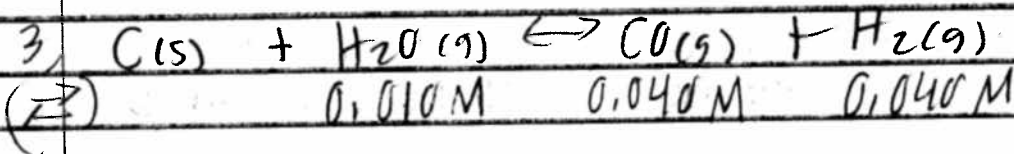
$Q = (.35 M)^2 (.20 M)^2 = 4.0 > K_c$

$(.30 M)^4 (.15 M)$

Shift Left to reach  $\rightleftharpoons$

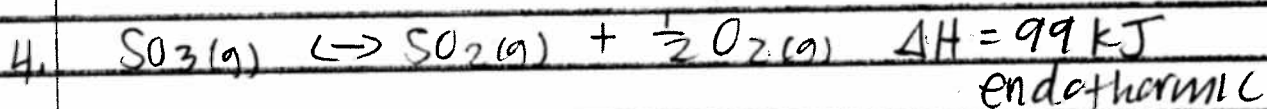
GE 4

$T = 900^\circ\text{C} = 1173\text{K}$  (2)

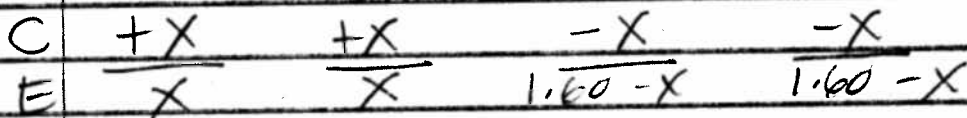
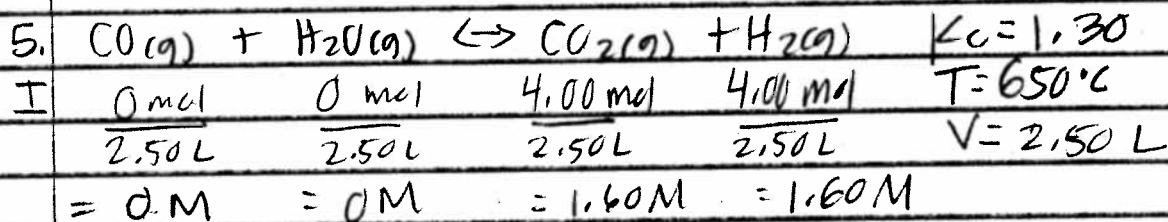


$$K_c = \frac{(0.040\text{M})(0.040\text{M})}{(0.010\text{M})} = \boxed{0.16}$$

$$K_p = 0.16 \left[ \frac{0.0821}{1173\text{K}} \right]^{2-1} = \boxed{15.4}$$



- a. add  $\text{O}_2$  = shift left (reverse)
- b.  $\downarrow$  vol = shift toward less moles gas = shift LEFT
- c.  $\uparrow$  Ar = no shift
- d.  $\downarrow$  T = remove heat = shift left (endo rxn)
- e.  $\downarrow$   $\text{SO}_2$  = shift Right



$$K_c = 1.30 = \frac{[1.60-X]^2}{X^2} \quad 1.14 = \frac{1.60-X}{X}$$

$$1.14X = 1.60 - X$$

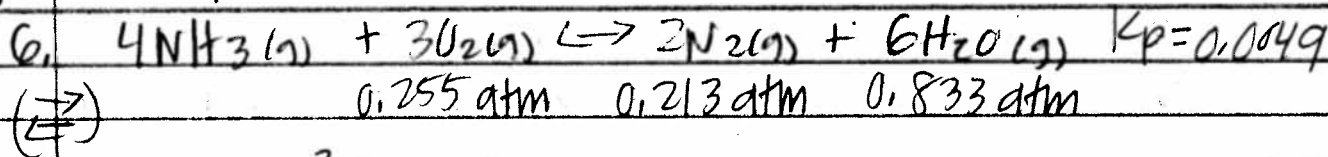
$$2.14X = 1.60$$

$$X = 0.748\text{M}$$

$$\boxed{[\text{CO}] = [\text{H}_2\text{O}] = 0.748\text{M}}$$

$$\boxed{[\text{CO}_2] = [\text{H}_2] = 1.60\text{M} - 0.748\text{M} = 0.85\text{M}}$$

# QE 4



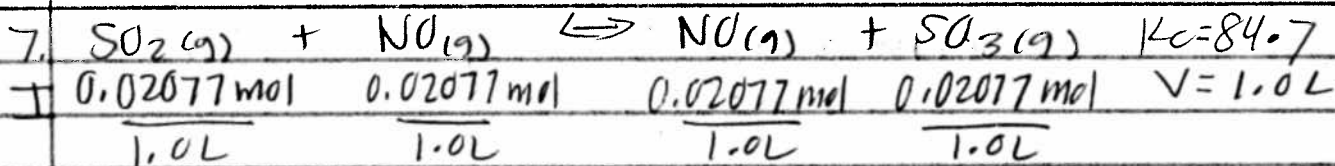
$$K_p = \frac{(P_{\text{N}_2})^2 (P_{\text{H}_2\text{O}})^6}{(P_{\text{NH}_3})^4 (P_{\text{O}_2})^3} \quad 0.0049 = \frac{(0.213 \text{ atm})^2 (0.833 \text{ atm})^6}{(P_{\text{NH}_3})^4 (0.255 \text{ atm})^3}$$

$$P_{\text{NH}_3} = 3.70 \text{ atm}$$

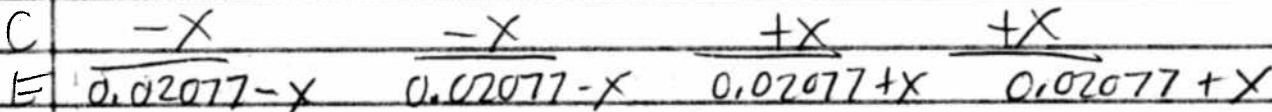
$$P_T = P_{\text{NH}_3} + P_{\text{O}_2} + P_{\text{N}_2} + P_{\text{H}_2\text{O}}$$

$$P_T = 3.70 \text{ atm} + 0.255 \text{ atm} + 0.213 \text{ atm} + 0.833 \text{ atm}$$

$$P_T = 5.00 \text{ atm}$$



$$= 0.02077 \text{ M} \quad = 0.02077 \text{ M} \quad = 0.02077 \text{ M} \quad = 0.02077 \text{ M}$$



$$K_c = 84.7 = \frac{(0.02077 + X)^2}{(0.02077 - X)^2}$$

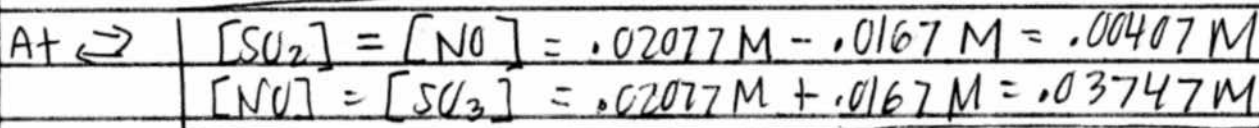
$$9.20 = \frac{0.02077 + X}{0.02077 - X}$$

$$.191 - 9.20X = .02077 + X$$

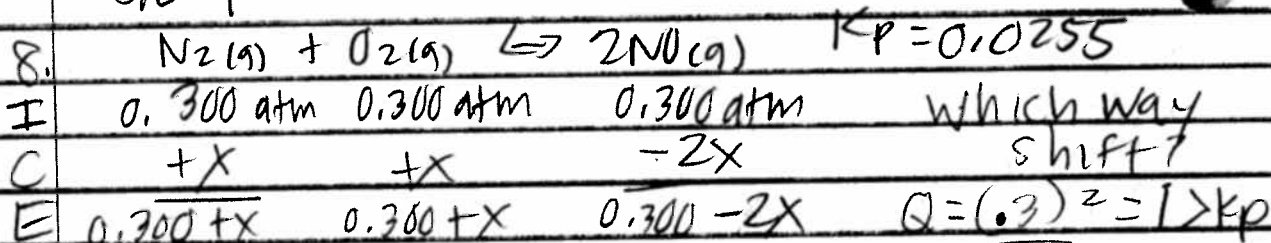
$$.17023 = 10.20X$$

$$X = .0167 \text{ M}$$

$Q = \frac{(0.02077)^2}{(0.02077)^2} = 1$   
 $Q < K_c$   
 $\therefore$  MUST SHIFT RT  
 (+X on P side)



GE 4



$$K_p = \sqrt{0.0255} = \frac{(.300 - 2x)^2}{\sqrt{(.300 + x)(.300 + x)}}$$

shift left

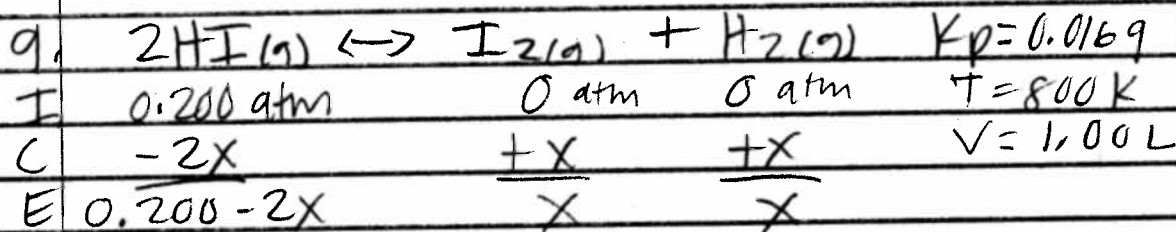
$$.160 = \frac{.300 - 2x}{.300 + x}$$

$$.048 + .160x = .300 - 2x$$

$$2.160x = .252$$

$$x = .1167 \text{ atm}$$

$P_{NO} = .300 - 2(.1167)$ $= .0666 \text{ atm}$ $P_{N_2} = P_{O_2} = .300 + .1167$ $= .4167 \text{ atm}$
--



a.  $n_{HI} = \frac{PV}{RT} = \frac{(0.200 \text{ atm})(1.00 \text{ L})}{(0.0821 \frac{\text{L atm}}{\text{mol K}})(800 \text{ K})} = .00305 \text{ mol HI}$

b.  $K_p = \sqrt{0.0169} = \frac{x^2}{\sqrt{(0.200 - 2x)^2}}$   $.13 = \frac{x}{.200 - 2x}$

$$.026 - .26x = x$$

$$x = .0206$$

$P_{I_2} = P_{H_2} = .0206 \text{ atm}$
---

c.  $P_T = P_{HI} + P_{I_2} + P_{H_2} = 0.200 - 2(.0206) + .0206 + .0206$

$P_T = .200 \text{ atm}$
--------------------------

d.  $n_T = \frac{P_T V}{RT} = \frac{(0.200 \text{ atm})(1.0 \text{ L})}{(0.0821 \frac{\text{L atm}}{\text{mol K}})(800 \text{ K})} = .00305 \text{ mol}$