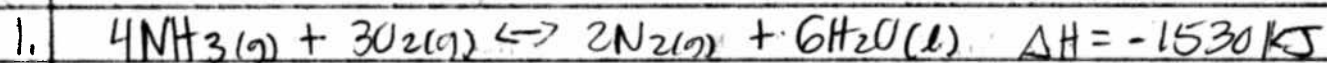
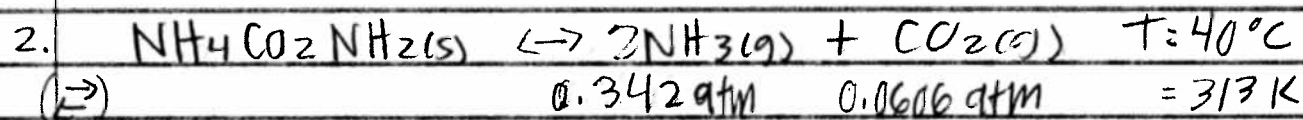
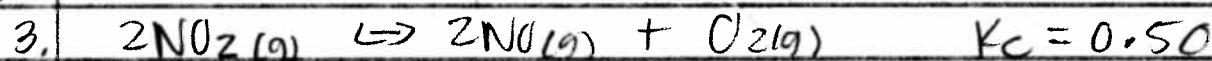


GE 3

①

a. remove O_2 = shift leftb. add N_2 = shift leftc. add H_2O = NO shift b/c H_2O is liquidd. \uparrow container = \uparrow volume = favors more moles of gas
= shift left (7 moles gas on R vs. 2 moles gas P)e. \uparrow T on exothermic rxn = add heat to P side
= shift left

$$K_p = (P_{\text{NH}_3})^2 (P_{\text{CO}_2}) = (0.342 \text{ atm})^2 (0.0606 \text{ atm}) = \boxed{0.00709}$$



$$a. \quad Q = \frac{[\text{NO}]^2 [\text{O}_2]}{[\text{NO}_2]^2} = \frac{(0.1 \text{ M})^2 (0.1 \text{ M})}{(0.1 \text{ M})^2} = 0.1$$

$Q < K_c$ Shift Right

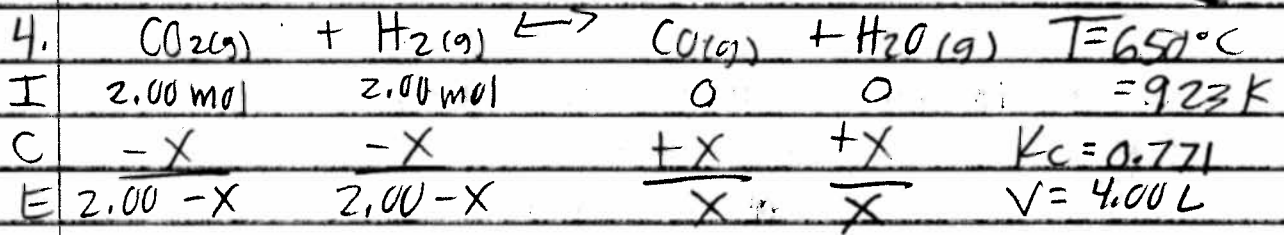
$$b. \quad Q = \frac{(0 \text{ M})^2 (0.168 \text{ mol} / 14.5 \text{ L})}{(1.23 \text{ mol} / 14.5 \text{ L})^2} = 0$$

$Q < K_c$ Shift Right

$$c. \quad Q = \frac{(0.4 \text{ mol} / 10 \text{ L})^2 (0.10 \text{ mol} / 10 \text{ L})}{(2.0 \text{ mol} / 10 \text{ L})^2} = 4.0 \times 10^{-4}$$

$Q < K_c$ Shift Right

GE 3



$$K_c = 0.771 = \left(\frac{X}{4.0\text{L}}\right) \left(\frac{X}{4.0\text{L}}\right) = \left(\frac{X}{4.0\text{L}}\right)^2$$

$$\left(\frac{2.00 - X}{4.0\text{L}}\right) \left(\frac{2.00 - X}{4.0\text{L}}\right) = \left(\frac{2.00 - X}{4.0\text{L}}\right)^2$$

$$\sqrt{0.771} = \frac{\left(\frac{X}{4.0\text{L}}\right)^2}{\left(\frac{2.00 - X}{4.0\text{L}}\right)^2}$$

$$0.878 = \frac{X}{2.00 - X}$$

$$0.878(2.00 - X) = X$$

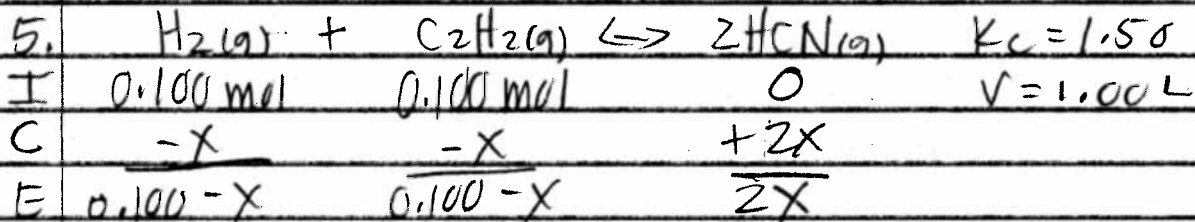
$$1.76 - 0.878X = X$$

$$1.76 = 1.878X$$

$$X = 0.935 \text{ mol}$$

$$[\text{CO}_2] = [\text{H}_2] = \frac{2.00 - 0.935 \text{ mol}}{4.0\text{L}} = 0.266 \text{ M}$$

$$[\text{CO}] = [\text{H}_2\text{O}] = \frac{0.935 \text{ mol}}{4.0\text{L}} = 0.234 \text{ M}$$



$$K_c = 1.50 = \frac{(2X)^2}{(1.00\text{L})^2} = \frac{\left(\frac{2X}{1.00\text{L}}\right)^2}{\left(\frac{0.100 - X}{1.00\text{L}}\right)^2}$$

$$1.22 = 2X$$

$$0.122 = 3.22X$$

$$X = 0.0379$$

$$[\text{H}_2] = [\text{C}_2\text{H}_2] = \frac{0.100 - 0.0379 \text{ mol}}{1.0\text{L}} = 0.0621 \text{ M}$$

$$[\text{HCN}] = \frac{2(0.0379)}{1.0\text{L}} = 0.0758 \text{ M}$$