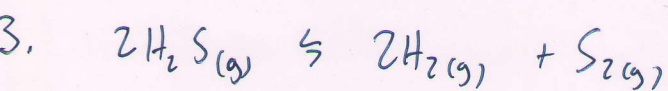
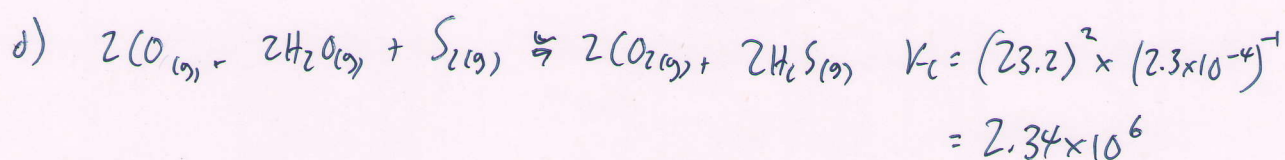
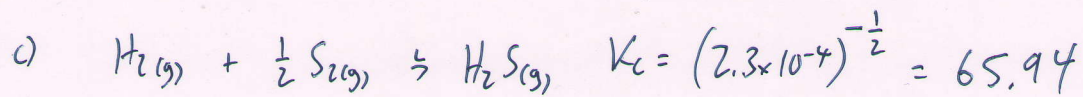
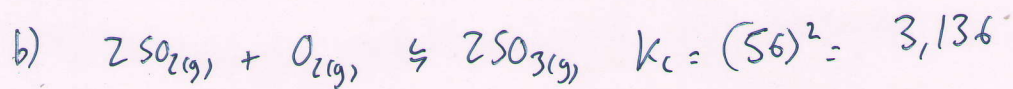
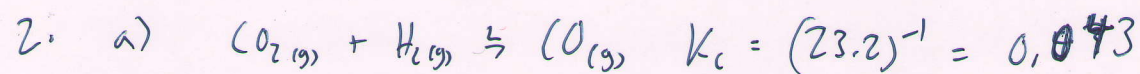


Equilibrium Quiz - Study Guide : Answers

1. See book.



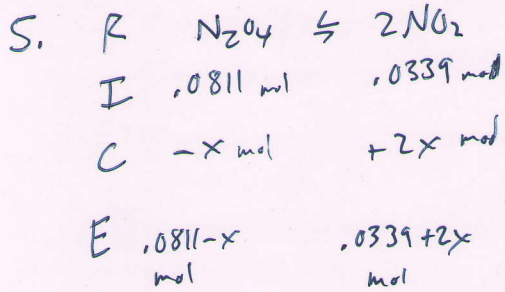
$$K_p = \frac{P_{\text{H}_2}^2 P_{\text{S}_2}}{P_{\text{H}_2\text{S}}^2} = \frac{\left[\frac{(0.22)(0.0821)(1405)}{3} \right]^2 \left[\frac{(0.11)(0.0821)(1405)}{3} \right]}{\left[\frac{(2.78)(0.0821)(1405)}{3} \right]^2} = 1.02$$



$$K_c = \frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]} = \frac{\left(\frac{\text{mol NO}_2}{\text{V}} \right)^2}{\left(\frac{\text{mol N}_2\text{O}_4}{\text{V}} \right)} = \frac{\cancel{7.46 \text{ g N}_2\text{O}_4} \times \cancel{1 \text{ mol N}_2\text{O}_4}}{\cancel{92 \text{ g N}_2\text{O}_4}}$$

$$= \frac{\left(1.56 \text{ g NO}_2 \times \frac{1 \text{ mol NO}_2}{46 \text{ g NO}_2} / 3 \right)^2}{\left(7.46 \text{ g N}_2\text{O}_4 \times \frac{1 \text{ mol N}_2\text{O}_4}{92 \text{ g N}_2\text{O}_4} / 3 \right)}$$

$$K_c = 4.73 \times 10^{-3}$$



$$7.176 \text{ g} \times \frac{1 \text{ mol}}{92 \text{ g}} = 0.0811 \text{ mol } N_2O_4 ; 1.56 \text{ g} \times \frac{1 \text{ mol}}{46 \text{ g}} = 0.0339 \text{ mol } NO_2$$

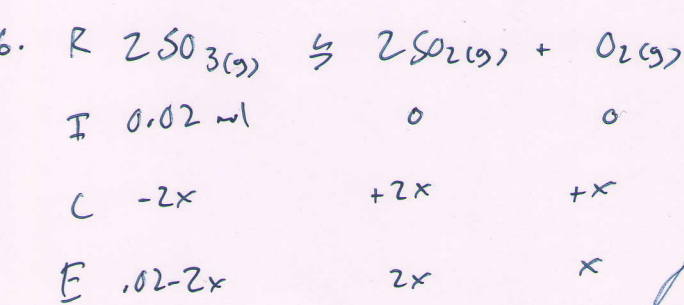
$$K_c = \frac{\left(\frac{.0339+2x}{10}\right)^2}{\left(\frac{.0811-x}{10}\right)} = 4.73 \times 10^{-3}$$

$$x = 0.0117$$

$$\text{mol } N_2O_4 = .0811 - (.0117) = 0.0694 \text{ mol } N_2O_4 \times \frac{92 \text{ g } N_2O_4}{1 \text{ mol } N_2O_4} = 6.38 \text{ g } N_2O_4$$

$$\text{mol } NO_2 = .0339 + 2(.0117) = 0.0573 \text{ mol } NO_2 \times \frac{46 \text{ g } NO_2}{1 \text{ mol } NO_2} = 2.64 \text{ g } NO_2$$

This makes sense, since the equilibrium should shift ~~left~~ right w/ an increase in volume.

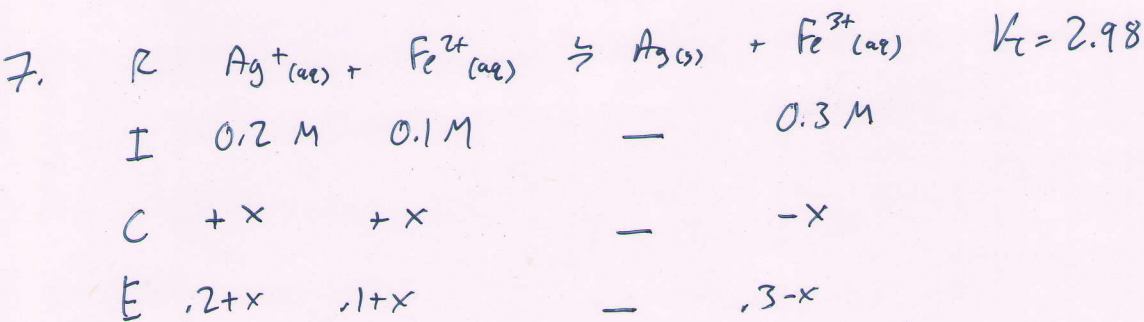


$$K_c = \frac{\left(\frac{2x}{1.52}\right)^2 \left(\frac{x}{1.52}\right)}{\left(\frac{.02-2x}{1.52}\right)} = ?$$

$$K_c = 2.97 \times 10^{-6}$$

$$0.02 - 2x = 0.0142$$

$$x = 0.0029$$



$$K_c = \frac{(.3-x)}{(.2+x)(.1+x)} = 2.98 \Rightarrow x = 0.108$$

$$[Ag^+]_{eq} = .2 + .108 = 0.308 \text{ M}$$

$$[Fe^{2+}]_{eq} = .1 + .108 = 0.208 \text{ M}$$

$$[Fe^{3+}]_{eq} = .3 - .108 = 0.192 \text{ M}$$