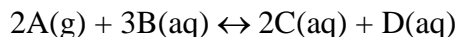


Problem Set #2

Due 2/24/11

1. Find the value for the equilibrium constant for the reaction:



where at equilibrium:

$$A = 1.25 \text{ atm}$$

$$B = 11.7 \text{ mol/L}$$

$$C = 0.862 \text{ mol/mL}$$

$$D = 3.21 \text{ mol/L}$$

2. Your company has just developed a new drug (X). In order to package the drug in tablet form, you must first precipitate the drug using Y:



What concentration of Y must be added to 50.0 liters of a 0.930 M solution of X in order to cause precipitation of XY to begin?

3. a. Calculate the concentration of  $F^{-1}$  when a saturating amount of  $BaF_2$  is dissolved in  $H_2O$ .

b. What concentration of  $BaCl_2$  should be added to a saturated  $BaF_2$  solution in order to give a final concentration of  $F^{-1}$  of  $6.8 \times 10^{-4} \text{ M}$ ?

4. a. Taking activity coefficients and ionic strength into consideration, and using successive approximations, calculate the solubility of  $PbSO_4$  in pure water.

b. Taking activity coefficients and ionic strength into consideration, and using successive approximations, calculate the solubility of  $PbSO_4$  in 0.150 M  $NaCl$ .

5. Using activity coefficients, calculate the concentration of  $Hg_2^{+2}$  in saturated solutions of  $Hg_2Br_2$  in:

a. 0.00100 M  $KNO_3$

b. 0.0100 M  $KNO_3$

c. 0.100 M  $KNO_3$

6. Harris Chapter 7, Problem 3

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Suggested/Review Problems:

1. Harris Chapter 6, Problem 14
2. Harris Chapter 7, Problem 6
3. Harris Chapter 7, Problem 10
4. Harris Chapter 7, Problem 19
5. Harris Chapter 7, Problem 21