

(6) 3. Describe how you would prepare 250.00 mLs of an aqueous solution of NaOH which is 0.200 M. (Include any safety information which would be important to the person preparing the solution.)

(6) 3. Describe how you would prepare 250.00 mLs of an aqueous solution of Na<sub>2</sub>SO<sub>4</sub> which is 0.650 M. (Include any safety information which would be important to the person preparing the solution.)

(8) 7. The reaction



was studied at 760 °C. 0.200 mol of PCl<sub>5</sub> are placed in a 1.00 liter container and allowed to decompose. After equilibrium was established the concentration of PCl<sub>3</sub> was found to be 0.195 M. Calculate the equilibrium constant for the reaction at this temperature.

- (12) 6. At 1100 K 1.00 mol of SO<sub>2</sub> and 2.00 moles of O<sub>2</sub> are introduced into a 1.00 liter container and allowed to react according to the reaction,



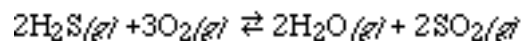
At equilibrium the concentration of SO<sub>2</sub> is 0.188 M. Calculate K<sub>c</sub> for the reaction.

- (11) 4. At 200 °C, 0.500 mol of H<sub>2</sub>, 0.500 mol of N<sub>2</sub> and 0.500 mol of NH<sub>3</sub> are introduced into a 1.00 liter container and allowed to react according to the equation,



At equilibrium the concentration of NH<sub>3</sub> is 0.384 M. Calculate K<sub>c</sub> for the reaction.

(8) 7. The reaction



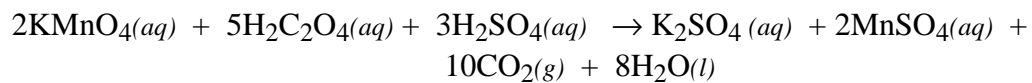
has a  $\Delta H = -1036$  kJ (exothermic). Given the reaction is at equilibrium, predict the direction (L  $\rightarrow$  R, R  $\rightarrow$  L, or no change) the reaction will shift when disrupted by each of the following;

- i) the amount of  $\text{H}_2\text{O}$  is increased
- ii) the temperature of the reaction is increased
- iii) the volume of the container is decreased
- iv) the amount of  $\text{H}_2\text{S}$  is decreased

(8) 4a. Calculate the solubility of  $\text{PbI}_2$  in pure water at  $25^\circ\text{C}$ . ( $K_{\text{sp}} = 8.4 \times 10^{-9}$ )

(8) 2. Another handbook lists the solubility of  $\text{Cd}(\text{OH})_2$  in water as  $\frac{0.00026 \text{ g}}{100 \text{ mL}}$ .  
a) Calculate  $K_{\text{sp}}$  for  $\text{Cd}(\text{OH})_2$ .

- (10) 5. Calculate the mass of oxalic acid that reacts with 0.680 mLs of  $2.44 \times 10^{-3}$  M  $\text{KMnO}_4$  in excess sulfuric acid. The equation which describes the reaction between oxalic acid, potassium permanganate and sulfuric acid is,



- (10) 5. Calculate the volume of 1.50 M HCl that will completely react with 32.0 grams of  $\text{CaCO}_3$ . The equation which describes the reaction is,

