Chemistry 146 – Van Bramer
Spring Problem Set – Week 7

1. Several years ago, two garbage workers in New York City were exposed to hydrofluoric acid. This acid is usually sold in 500.0 milliliter Teflon bottles (It can not be stored in glass because it will dissolve the bottle!). It has a boiling point of 19.54 °C and a density of 0.991 g cm^{-3}. Hydrofluoric acid causes extremely severe chemical burns and is capable of dissolving bone. This is the acid used in the TV show Breaking Bad.
    a. Write a balanced chemical equation that describes what happens when hydrofluoric acid is added to water.
    b. Write the equilibrium expression for this balanced chemical equation
    c. If the entire contents of this bottle is mixed into a 55 gallon barrel of water. What is the equilibrium concentration of HF, H_3O^{1+}, F^{1-}, and OH^{1-}? Clearly show your work and identify any assumptions that you make.

2. A solution is prepared by diluting 2.50 g of potassium fluoride to 250.0 mL with deionized water. Calculate the concentration of all the ions present in this solution at equilibrium. Clearly identify any assumptions that you make while solving this problem.

3. A solution is prepared by diluting 2.50 g of potassium chloride to 250.0 mL with deionized water. Calculate the concentration of all the ions present in this solution at equilibrium. Clearly identify any assumptions that you make while solving this problem.

4. A solution is prepared by adding 2.50 g of hydrochloric acid to 250.0 mL with deionized water. Calculate the concentration of all the ions present in this solution at equilibrium. Clearly identify any assumptions that you make while solving this problem.