Chem 2990 **Ratio Concentrations Assignment** **Dr. Walker**

1. Consider two solutions of potassium chloride (KCl): One contains 0.0085 g per liter of water, while the other contains 600 g per liter of water. Calculate the %*(m/v)* of each solution. In which one of these two solutions will the %*(m/v)* the most similar to its %*(m/m)*? Explain your choice.

2. A 2.0 mL blood sample contains 0.0049 g of ethanol. Is this suspect legally drunk in the state of Utah? Show your calculations and value for %*(m/v)* for this blood sample.

3. Calculate the concentration of sodium chloride (NaCl) in ppm in each of the following aqueous solutions:
   a. 37.5 mg NaCl in 21.0kg of water
   b. 2,401 mg NaCl in 15.7 g of water
   c. 4.034 g NaCl in 4,000 gallons of water (1 gal = 3,785 g water)

4. What is the concentration of each of the following solutions reported in ppb?
   a. 85.3 µg $NaHSO_4$ in 336 g water
   b. 7.4 mg dioxin in 5.00 gal water
   c. 5.2 µg CCl_4 in 8.34 L water

5. Fish generally need an oxygen concentration in water of at least 5 $ppm_{(m/m)}$ to survive. Will river water that contains 7 mg O_2 per L contain sufficient oxygen to sustain fish life?

6. A typical concentration of the air pollutant sulfur dioxide (SO_2) in urban atmospheres is 0.087$ppm_{(v/v)}$. At this concentration, how many milliliters of SO_2 are present in 5.00 L of air?

7. Determine how much hydrogen sulfide (H_2S), in grams, must be present in a 375mL sample of air to give an H_2S concentration of 9.7 $ppb_{(m/v)}$.

8. A solution of water is reported to contain a preservative at a concentration of 0.000025%*(w/w)*. Report this concentration in both $ppm_{(w/w)}$ and $ppb_{(w/w)}$.

9. Suppose that 1 ppb is one second. How much time would be needed (months, years, etc.) so that one second represented one part-per-billion in this time period.