

# Solutions HW #1

name

1	How much $\text{NaNO}_3$ will saturate a 100. mL solution at $20^\circ\text{C}$ ?
2	How much $\text{NaNO}_3$ will saturate a 325 mL solution at $20^\circ\text{C}$ ? (show work).
3	If you cooled a 100 mL saturated $\text{KCl}_{(\text{AQ})}$ from $80^\circ\text{C}$ down to $10^\circ\text{C}$ , how many grams of solute precipitates?
4	Once this excess solute precipitates out of solution in question #3, forms a dynamic equilibrium. Define dynamic equilibrium.
5	Which solution contains more solute? 200 mL $\text{HCl}_{(\text{AQ})}$ at $30^\circ\text{C}$ , or 100 mL of $\text{KI}_{(\text{AQ})}$ at $20^\circ\text{C}$ ? Don't guess, do the math.
6	Is a 100 mL solution of ammonium chloride at $80^\circ\text{C}$ saturated if it contains 65g of solute?
7	Is a 100 mL solution of potassium nitrate at $20^\circ\text{C}$ saturated if it contains 33g of solute?
8	An unsaturated 100 mL $\text{HCl}_{(\text{AQ})}$ contains 35 g at $60^\circ\text{C}$ . How many more grams can be dissolved to saturate it?
9	How many grams of solute fall precipitate out of a 100 mL potassium chlorate solution as it cools from $70^\circ\text{C}$ to $10^\circ\text{C}$ ?

# Solutions HW #2

name

1 What is the molarity of a 100 mL saturated solution of potassium chloride at 10°C?

2 You dissolve 4.48 moles of KCl into 12.00 liters of water. What is the molarity of this solution?

3 You dissolve 7.86 moles of  $\text{KNO}_3$  into 21.0 liters of water, what is the molarity of this solution?

4 You put 1.12 grams of perfume into your bathtub to scent the water. Your tub holds a total of 158 liters of water and perfume. How many parts per million of perfume are in this water?

# SOLUTIONS HW #3

name

1 You put 50.0 grams  $\text{KClO}_3$  into water to create a 475 mL solution at  $100.0^\circ\text{C}$ . How many more grams would it take to saturate this solution?

2 A 100 mL saturated  $\text{KClO}_3(\text{AQ})$  is chilled from  $100^\circ\text{C}$  to  $80^\circ\text{C}$ . How many grams of  $\text{KClO}_3(\text{S})$  precipitates out of solution?

3 If you have a stock solution of 2.75 M  $\text{Ca}(\text{OH})_2(\text{AQ})$  how do you prepare a 1.43 M solution of 550 mL? (show FORMULA + work, label the flask)



4 If you have a stock 3.64 M  $\text{Mg}(\text{NO}_3)_2(\text{AQ})$  how do you prepare a 0.755 M solution of 305 mL? (show FORMULA + work, label the flask)



# Solutions HW #4

name

1	How many parts per million of vanadium (V) nitrate are present in a water tank of 253,800 liters containing 1.15 kg of dissolved vanadium (V) nitrate?
2	What is the concentration of $O_{2(G)}$ in parts per million, in a solution that contains 0.008 grams of $O_2$ dissolved into each 1000. grams of $H_2O_{(L)}$ ?
3	What is the concentration in PPM of $CO_{2(AQ)}$ in soda, if the soda contains 0.0035 grams $CO_2$ per can? Each can of soda contains 355 grams of soda.

4. The 3 colligative properties of water are given in this table. List the correct values for water, ESTIMATE them for a salty water solution of 2.00 M  $Ca(NO_3)_{s(AQ)}$  Round to a whole number value.

colligative properties	For pure water (Kelvin)	For a 4.75 M $Ca(NO_3)_{s(AQ)}$ (Kelvin)
boiling point		
freezing point		
vapor pressure at 20°C		

# Solutions HW #5

name \_\_\_\_\_

For water, the boiling point elevation is 0.50K per mole of particles in a liter solution the freezing point depression is 1.86K per mole of particles in a liter solution. Particles can be cations and anions, or polar molecules. Each mole of particles impacts the solutions colligative properties.

1 What is the freezing point and the boiling point of a 2.50 M  $\text{NaCl}_{(\text{AQ})}$  solution? Show math.

2 What is the freezing point and the boiling point of a 3.00 M  $\text{Ca}(\text{NO}_3)_{2(\text{AQ})}$  solution? Show math.

3 What is the freezing point and the boiling point of a 2.50 M  $\text{C}_6\text{H}_{12}\text{O}_{6(\text{AQ})}$  solution? Show math.

4 Explain your thoughts: There are 2 saturated solutions:  $\text{NaCl}$  and  $\text{KCl}$ , both are at  $90^\circ\text{C}$ ?

\_\_\_\_\_ has the lower freezing point because...

\_\_\_\_\_ has the higher boiling point because...