Chapter 13 section 13.4 Exam Blank

1. **(6 Point)** An aqueous solution is 22.0% rubidium chloride by mass. The density of the solution is 1.127 g/mL. What are the molality, the mole fraction, and the molarity of the solution?

22.0 g RbCl	1 mol RbCl	= 0.1819 mol RbCl
	120.92 g RbCl	

78.0 g H_2O	1 mol H_2O	= 4.339 mol H_2O
	1.008 g H	

Molality	0.1819 mol RbCl	=2.33 $\underline{m}$ RbCl sol'n
	0.0780 kg H_2O	

Mole fraction	0.1819 mol RbCl	= 0.0403
	4.510 total moles	

Molarity

22.0 g RbCl	1.127 g sol'n	1 mL	1 mol RbCl	= 2.05MRbCl sol'n
100.0 g RbCl sol'n	1 mL sol'n	0.001 L	120.92 g RbCl	

2. **(6 points)** A sulfuric acid solution containing 571.6 g of H_2SO_4 per liter of solution has a density of 1.329 g/cm^3. Calculate the:

(a) Mass percentage of this solution
(b) The mole fraction of this solution
(c) The molarity of H_2SO_4 of this solution

The molarity of H_2SO_4 of this solution

571.6 g H_2SO_4	1 mol H_2SO_4	5.826 M H_2SO_4
1L solution	98.086 g H_2SO_4	

Mass percentage of this solution

571.6 g H_2SO_4	1 mL sol'n x100	=43.01% H_2SO_4 by mass
1000 mL solution	1.329 g sol'n	

This means there is 56.99 g of water in 100 g of sol'n

56.99 g g H_2O	1 mol H_2O	= 3.163 mol H_2O
	18.02 g H	

43.01 g H_2SO_4	1 mol H_2SO_4	= 0.4383 mol H_2SO_4
	98.086 g H_2SO_4	

The mole fraction of this solution

0.4383 mol H_2SO_4	= 0.1217
3.601 mol in the sol'n	