Worksheet: Calculating Concentrations

1) A 4.0 mol / L solution of NaOH contains _____ of NaOH in _____ of ____.
b) A 4.0 % (w/v) NaOH solution contains _____ of NaOH in _____ of _____.

2. Find the molar concentrations of the following solutions:
a) 1.4 moles of HCl in 250 mL of solution
b) 1.4 moles of HNO_3 in 250mL of solution
c) 1.4 moles of $C_6H_{12}O_6$ in 250 mL of solution [note a pattern]
d) 20g of NaOH in 1.0 L of solution
e) 20g of NaOH in 400 mL of solution
f) 20 g of NaOH in 22.5 L of solution

3. How many moles of solute are contained in the following:
a) 2.0 L of a 1.0 M NaCl solution
b) 100 mL of a 2.5 M HCL solution
c) 50 mL of a 0.48 M HCl solution
d) 50 mL of a 0.48 M glucose solution

4. What volume of a 1.25 M solution of calcium sulfate would contain:
a) 1.0 moles of solute b) 5.0 moles of solute c) 136g of $CaSO_4$ d) 27.2 g of $CaSO_4$

5. How many grams of solute would you use to prepare these solutions?
a) 1.0 L of a 0.10 M NaOH solution? b) 500 mL of a 0.25 M NaOH solution
c) 500 mL of a 0.25 M HCl solution? d) 500 mL of a 0.25 M $CaSO_4$ solution

6. How many moles of solute are contained in:
i) 1.00 L of a 1.50 mol/L NaOH solution?
ii) 200 mL of a 1.50 M NaOH solution?
iii) 200 mL of a 1.50 M $CaCO_3$ solution?
b) how many grams of solute are in each solution?
c) calculate the w/v % concentration of each solution.

<u>Solutions:</u>
2a),b),c) 5.6 mol / L d) 0.50 M e) 1.25 mol/L f) 0.022 mol/L
3a) 2.0 moles b) 0.25 moles c) 0.024 moles d) 0.024 moles
4a) 800 mL b) 4.0L c) 800 mL d) 160 mL
5a) 4.0 g NaOH b) 5.0 g NaOH c) 4.56 g HCl d) 17.0 g $CaSO_4$
6a) 1.50 mol, 0.300 mol, 0.300 mol
b) 60.0 g, 12.0 g , 30.0 g
c) 6.0 %, 6.0%, 15.0 %