## Solution Composition Calculations (NO CALCULATORS)

1. A 200 mL solution is made by dissolving 3 moles of solute in water. What is the molarity of the resulting solution?

M= mols solute  
L soln
$$M=3mol$$

$$0.2 L$$

$$M=3mol = 3 \times \frac{10}{2} = \frac{30}{2} \in 15$$

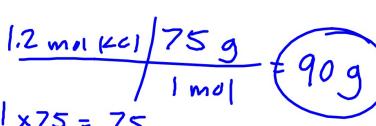
$$M=3mol = 3 \times \frac{10}{2} = \frac{30}{2} = 15$$

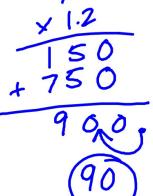
2. How many moles of solute is needed to make 500 mL of a 6 M solution?

$$6M = \frac{\times \text{ mol}}{.5L}$$

$$X = 3 \text{ mol}$$

- 3. You need to make 300 mL of a 4 M KCl solution? The molar mass of KCl is 75 g/mol.
  - a. How many grams of KCl are needed to make the solution?
  - b. Describe how you would make the KCl solution in lab.





$$1 \times 75 = 75$$
 $0.2 \times 75 = 15.0$ 
 $90$ 

bin Measure 90 g of KC1.

2) Add 90 g KCI to a 300 ml volumetric flask.

3 Add distilled water and swirl.

4) Once all solid is dissolved, add distilled Water until the volume is 300 mc (calibration) line

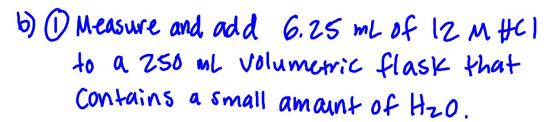
© Put a rubber stopper on top and line Invert.

4. You wish to prepare a 0.3 M HCl solution with a volume of 250 mL.

a. How many milliliters of a concentrated 12 M HCl solution will you need?

b. Describe how you would make the diluted solution in lab.

$$V_1 = \frac{75}{12} = \frac{25}{4} = 6\frac{1}{4} = 6.25 \text{ mL}$$



- 2 Swirl
- 3 Add HzO unit final volume is 250 ml (calibration) line 4) Stopper 3) Invert

5. A salt water solution is made by dissolving 20 grams of NaCl in water. The total mass of solution is 160 grams. Which of the following is the approximate mass percent of salt in the

solution is 160 grams. Which of the following is the approximate mass percent of salution?

mass percent = 
$$\frac{9 \text{ Solute}}{9 \text{ Soln}} \times 100$$

b. 12%  $\frac{209}{1609} = \frac{9 \text{ Soln}}{8} = .125$ 

A solution of antifreeze is made by mixing equal volumes of ethylene glycol (d = 1.1 g/mL) and water (d = 1.0 g/mL). Which of the following is the approximate mass percent of ethylene glycol in the solution?

$$\frac{g \, g \, | y \, col}{g \, soln} = \frac{1.1 \, g}{z \cdot l \, g} = \frac{11}{z \, l}$$