* using dimensional analysis *
→ best to know how to do this way!

EST-4
Practice

Name:

Molar Concentration

1. How many moles of $MgCO_3$ are in 10.0g of the substance? (0.119mol)

→ 3 sig figs

$MgCO_3$
24.31 12.01 3(16.00)
84.32 g/mol

$10.0\ g\ MgCO_3 \times \frac{1\ mol\ MgCO_3}{84.32\ g\ MgCO_3} \rightarrow 0.11859\ mol\ MgCO_3$

$\rightarrow$ **0.119 mol**

2. How many moles of NaOH are in 300.0g of the substance? (7.500mol)

→ 4 sig figs

NaOH
22.99 16.00 1.01
40.00 g/mol

$300.0\ g\ NaOH \times \frac{1\ mol\ NaOH}{40.00\ g\ NaOH} \rightarrow 7.5 \rightarrow$ **7.500 mol**

3. What volume of a 1.5 mol/L solution of KOH contains 2.24g of solute? (0.027L)

KOH
39.10 16.00 1.01
56.11 g/mol

$2.24\ g\ KOH \times \frac{1\ mol\ KOH}{56.11\ g\ KOH} \times \frac{1\ L\ KOH}{1.5\ mol\ KOH} \rightarrow 0.0266\ L\ KOH$

$\rightarrow$ **0.027 L**

4. What mass of solute must be used to prepare 350.0mL of an HCl solution at a concentration of 0.75 mol/L? (9.6g)

HCl
1.01 35.45
36.46g.

$350.0\ mL\ HCl \times \frac{0.75\ mol\ HCl}{1000\ mL\ HCl} \times \frac{36.46\ g\ HCl}{1\ mol\ HCl} \rightarrow 9.5796\ g\ HCl$

$\rightarrow$ **9.6g**

5. How much HCH_3CO_2 is required to make 500.0mL of a 0.25mol/L solution? (7.5g)

HCH_3CO_2
1.01 12.00 3(1.01) 12.00 2(16.00)
60.06 g/mol

$500.0\ mL\ HCH_3CO_2 \times \frac{0.25\ mol\ HCH_3CO_2}{1000\ mL\ HCH_3CO_2} \times \frac{60.06\ g\ HCH_3CO_2}{1\ mol\ HCH_3CO_2}$

$7.5075\ g \rightarrow$ **7.5g**

6. What mass of NaCl must be used in order to make 100.0mL of a 0.20mol/L solution? (1.2g)

NaCl
22.99 35.45
58.44g/mol

$100.0\ mL\ NaCl \times \frac{0.20\ mol\ NaCl}{1000\ mL\ NaCl} \times \frac{58.44\ g\ NaCl}{1\ mol\ NaCl} \rightarrow 1.1688\ g\ NaCl$

$\rightarrow$ **1.2g**

7. Calculate the mass of NH_3OH in 200.0mL of a 0.40mol/L solution. (2.7g)

NH_3OH

14.01 3(1.01) 16.00 1.01

34.05 g/mol

$$200.0\ \text{ml}\ NH_3OH \times \frac{0.40\ \text{mol}\ NH_3OH}{1000\ \text{ml}\ NH_3OH} \times \frac{34.05\ \text{g}\ NH_3OH}{1\ \text{mol}\ NH_3OH}$$

2.724 g → 2.7g

8. How much (→ grams) potassium iodide is needed to make 250.0mL of a 0.25mol/L solution? (10g)

KI

39.10 126.90

166.00 g/mol

$$250.0\ \text{ml}\ KI \times \frac{0.25\ \text{mol}\ KI}{1000\ \text{ml}\ KI} \times \frac{166.00\ \text{g}\ KI}{1\ \text{mol}\ KI} \rightarrow 10.375\ \text{g}\ KI$$

10.375 g → 10g

9. How many moles of solute are needed to prepare 50.0mL of a 10.0mol/L solution? (0.500mol)

→ general question, no need for molar mass.

$$50.0\ \text{ml solute} \times \frac{10.0\ \text{mol solute}}{1000\ \text{ml solute}} \rightarrow 0.5$$

0.5 → 0.500 mol