

## Molarity Practice Problems

- 1) How many grams of potassium carbonate are needed to make 200 mL of a 2.5 M solution?  $K_2CO_3 = 138.2g$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$2.5 = \frac{x}{.2} \quad x = 0.5 \text{ mol}$$

$$1 \text{ mol} = 138.2g$$

$$.5 = x$$

$$x = \underline{69.1g}$$

- 2) How many liters of 4 M solution can be made using 100 grams of lithium bromide?  $LiBr = 86.84g$

$$1 \text{ mol } LiBr = 86.84g$$

$$x \quad 100g$$

$$x = 1.15 \text{ mol}$$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$4 = \frac{1.15}{x} \quad x = \underline{0.29L}$$

- 3) What is the concentration of an aqueous solution with a volume of 450 mL that contains 200 grams of iron (II) chloride?  $FeCl_2 = 126.8g$

$$1 \text{ mol } FeCl_2 = 126.8g$$

$$x \quad 200g$$

$$x = 1.58 \text{ mol}$$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$\text{conc} = \frac{1.58}{.45} = \underline{3.51 \text{ mol/L}}$$

- 4) How many grams of ammonium sulfate are needed to make a 0.25 M solution at a concentration of 6 M?  $(NH_4)_2SO_4 = 132.18g$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$.25 = \frac{x}{1} \quad x = .25 \text{ mol}$$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$6 = \frac{x}{1} \quad x = 6 \text{ mol}$$

$$\therefore \text{we add } 6 - .25 = 5.75 \text{ mol}$$

$$1 \text{ mol} = 132.18g$$

$$5.75 \text{ mol} = x$$

$$x = \underline{760g}$$

- 5) What is the concentration of a solution with a volume of 2.5 liters containing 660 grams of calcium phosphate?  $Ca_3(PO_4)_2 = 310.3g$

$$1 \text{ mol} = 310.3g$$

$$x \quad 660g$$

$$x = 2.13 \text{ mol}$$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$= \frac{2.13}{2.5} = \underline{0.85 \text{ mol/L}}$$

- 6) How many grams of copper (II) fluoride are needed to make 6.7 liters of a 1.2 M solution?  $CuF_2 = 101.5g$

$$\text{conc} = \frac{\text{mol}}{L}$$

$$1.2 = \frac{x}{6.7} \quad x = 8.04 \text{ mol}$$

$$1 \text{ mol} = 101.5g$$

$$8.04 = x$$

$$x = \underline{816g}$$

- 7) How many liters of a 0.88 M solution can be made with 25.5 grams of lithium fluoride?  $\text{LiF} = 25.94 \text{ g}$   
 $1 \text{ mol} = 25.94 \text{ g}$        $\text{conc} = \frac{\text{mol}}{\text{L}}$   
 $x \quad 25.5 \text{ g}$        $.88 = \frac{0.98}{x}$        $x = 1.11 \text{ L}$   
 $x = 0.98 \text{ mol}$
- 8) What is the concentration of a solution with a volume of 660 mL that contains 33.4 grams of aluminum acetate?  $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3 = 204.09 \text{ g}$   
 $1 \text{ mol} = 204.09 \text{ g}$        $\text{conc} = \frac{\text{mol}}{\text{L}}$   
 $x \quad 33.4 \text{ g}$        $= \frac{0.16}{.66} = 0.24 \text{ mol/L}$   
 $x = 0.16 \text{ mol}$
- 9) How many liters of a 0.75 M solution can be made with 75 grams of lead (II) oxide?  $\text{PbO} = 223.2 \text{ g}$   
 $1 \text{ mol} = 223.2 \text{ g}$        $\text{conc} = \frac{\text{mol}}{\text{L}}$   
 $x \quad 75 \text{ g}$        $.75 = \frac{.34}{x}$        $x = 0.45 \text{ L}$   
 $x = 0.34 \text{ mol}$
- 10) How many grams of manganese (IV) oxide are needed to make 5.6 liters of a 2.1 M solution?  $\text{MnO}_2 = 86.9 \text{ g}$   
 $\text{conc} = \frac{\text{mol}}{\text{L}}$        $1 \text{ mol} = 86.9 \text{ g}$   
 $2.1 = \frac{x}{5.6}$        $11.76 = x$   
 $x = 11.76 \text{ mol}$        $x = 1022 \text{ g}$
- 11) What is the concentration of a solution with a volume of 9 mL that contains 2 grams of iron (III) hydroxide?  $\text{Fe}(\text{OH})_3 = 106.83 \text{ g}$   
 $1 \text{ mol} = 106.83 \text{ g}$        $\text{conc} = \frac{\text{mol}}{\text{L}}$   
 $x \quad 2 \text{ g}$        $= \frac{0.019}{.009} = 2.1 \text{ mol/L}$   
 $x = 0.019 \text{ mol}$
- 12) How many liters of a 3.4 M isopropanol solution can be made with 78 grams of isopropanol ( $\text{C}_3\text{H}_8\text{O}$ )?  $\text{C}_3\text{H}_8\text{O} = 60.08 \text{ g}$   
 $1 \text{ mol} = 60.08 \text{ g}$        $\text{conc} = \frac{\text{mol}}{\text{L}}$   
 $x \quad 78 \text{ g}$        $3.4 = \frac{1.3}{x}$        $x = 0.38 \text{ mol/L}$   
 $x = 1.3 \text{ mol}$
- 13) What is the concentration of a solution with a volume 3.3 mL that contains 12 grams of ammonium sulfite?  $(\text{NH}_3)_2\text{SO}_3 = 114.16 \text{ g}$   
 $1 \text{ mol} = 114.16 \text{ g}$        $\text{conc} = \frac{\text{mol}}{\text{L}}$   
 $x \quad 12 \text{ g}$        $= \frac{0.105}{0.0033} = 31.8 \text{ mol/L}$   
 $x = 0.105 \text{ mol}$