

Molarity Calculations

KEY

Calculate the molarities of the following solutions:

- 1) 2.3 moles of sodium chloride in 0.45 liters of solution.

$$\frac{2.3 \text{ mol}}{.45 \text{ L}} = 5.1 \text{ M NaCl}$$

- 2) 1.2 moles of calcium carbonate in 1.22 liters of solution.

$$\frac{1.2 \text{ mol}}{1.22 \text{ L}} = .98 \text{ M}$$

- 3) 0.09 moles of sodium sulfate in 12 mL of solution:

$$\frac{.09 \text{ mol}}{.012 \text{ L}} = 7.5 \text{ M}$$

$$12 \text{ mL} = .012 \text{ L}$$

- 4) How many grams of HCl are needed to make 2 L of 6 M HCl? (molar mass = 36.46 g)

$$\frac{6 \text{ mol}}{\text{L}} \cdot 2 \text{ L} = 12 \text{ mol HCl} \times \frac{36.46 \text{ g}}{1 \text{ mol}} = 437.52 \text{ g} \quad \boxed{400 \text{ g HCl}}$$

- 5) How many grams of NaOH are needed to make 1.5 L of 2 M NaOH? (molar mass = 40.00 g)

$$\frac{2 \text{ mol}}{\text{L}} \times 1.5 \text{ L} = 3 \text{ mol NaOH} \times \frac{40.00 \text{ g}}{1 \text{ mol}} = 120 \text{ g NaOH} \quad \boxed{100 \text{ g NaOH}}$$

- 6) How many liters of 4 M solution can be made using 100 grams of lithium bromide? molar mass = 86.85 g

$$1.15141 \text{ mol} \times \frac{1 \text{ L}}{4 \text{ mol}} = \boxed{0.3 \text{ L}}$$

$$100 \text{ g} \cdot \frac{1 \text{ mol}}{86.85 \text{ g}} = 1.15141 \text{ mol}$$

- 7) How many liters of 0.88 M solution can be made with 25.5 grams of lithium fluoride? molar mass = 25.94 g

$$.98303778 \text{ mol} \times \frac{1 \text{ L}}{0.88 \text{ mol}} = \boxed{1.1 \text{ L}}$$

$$25.5 \text{ g} \times \frac{1 \text{ mol}}{25.94 \text{ g}} = .98303778 \text{ mol}$$

