

Molarity Problems 1

Answer Key

- 1) **How many moles of Na^+ ions are there in 22.0 mL of 0.150 M Na_2CO_3 solution?**

$$M = \text{moles/Liter} \quad \text{mol} = ML = (.150M)(.0220 \text{ L}) = .0033 \text{ mol Na}_2\text{CO}_3$$

$$.0033 \text{ mol Na}_2\text{CO}_3 \times (2 \text{ mol Na}^+ / \text{mol Na}_2\text{CO}_3) = .0066 \text{ mol Na}^+ \text{ ions}$$

- 2) **What is the molar concentration of potassium permanganate in a solution prepared by dissolving 47.4 g of KMnO_4 in water and then making up the solution to 2.50 L?**

$$47.4 \text{ g KMnO}_4 \times (\text{mol} / 157.58\text{g}) = .301 \text{ mol KMnO}_4$$

$$.301 \text{ mol} / 2.50 \text{ L} = .120 \text{ M}$$

- 3) **How many grams of KMnO_4 would be required to prepare 200mL of a 0.178M solution?**

$$\text{mol} = ML \rightarrow \text{mol} = .2 \times .178 = (.0356 \text{ mol KMnO}_4 \times 157.58\text{g/mol}) = 5.61 \text{ g KMnO}_4$$

- 4) **How many mL of a 0.130 M solution of CaCl_2 contains 2.00g of CaCl_2 ?**

$$2.00\text{g CaCl}_2 \times (\text{mol} / 110.97\text{g}) = .018 \text{ mol CaCl}_2$$

$$L = \text{mol} / M = .018 / .130 = .138\text{L} = 138 \text{ mL}$$

- 5) **How many grams of sodium chloride should be put into a 50.0 mL volumetric flask to give 0.15 M solution when the flask is filled to the score mark with water?**

$$M = \text{mol} / L \rightarrow \text{mol} = ML = (.05) (.15) = .0075 \text{ mol NaCl}$$

