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Milwaukee HS • AP Chemistry

Name _____
Period _____ Date ____/____/____

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MOLARITY

Note:
Concentration can be measured in terms of molarity M .
 $Molarity = \frac{\text{moles of solute}}{\text{Liters of solution}}$ often
moles of solute = (Molarity) \times (Liters of solution)

Dilution problems can be solved with the formula: $V_1M_1 = V_2M_2$
Molarity can be used as a conversion factor to convert moles to Liters of solutions.

Solution Concentration

60. If 6.73 g of Na_2CO_3 is dissolved in enough water to make 250 mL of solution, what is the molarity of the sodium carbonate?

62. What is the mass, in grams, of solute in 250 mL of a 0.0125 M solution of KMnO_4 ?

64. What volume of 0.123 M NaOH in milliliters contains 2.10 g of NaOH ?

Dilution Problems

66. If 4.00 mL of 0.250 M CaCl_2 is diluted to 16.0 mL with pure water, what is the molarity of copper(II) sulfate in the diluted solution?

Ion Concentrations

70. For each solution, identify the ions that exist in aqueous solution, & specify the concentration of each.
a) 0.25 M NH_4NO_3
b) 0.50 M HNO_3
c) 0.25 M Na_2CO_3
d) 0.60 M KClO_4

Stoichiometry of Reactions in Solution

72. What volume of 0.123 M HNO_3 in milliliters is required to react completely with 1.30 g of Ba(OH)_2 ?

$$2 \text{HNO}_3(aq) + \text{Ba(OH)}_2(s) \rightarrow \text{Ba(NO}_3)_2(aq) + 2 \text{H}_2\text{O}(l)$$

76. In the photographic developing process, silver bromide dissolved by adding sodium thiosulfate:

$$\text{AgBr}(s) + 2 \text{Na}_2\text{S}_2\text{O}_3(aq) \rightarrow \text{Na}_4\text{Ag}_2\text{S}_5\text{O}_{11}(aq) + \text{S}_4\text{O}_6^{2-}(aq)$$

If you want to dissolve 0.250 g of AgBr , what volume of 0.100 M $\text{Na}_2\text{S}_2\text{O}_3$ in milliliters, should be used?

Titration

82. What volume of 0.812 M HCl in milliliters is required to titrate 1.33 g of NaOH to the equivalence point?

$$\text{NaOH}(aq) + \text{HCl}(aq) \rightarrow \text{NaCl}(aq) + \text{H}_2\text{O}(l)$$

84. What volume of 0.955 M HCl in milliliters is needed to titrate 2.15 g of Na_2CO_3 to the equivalence point?

$$\text{Na}_2\text{CO}_3(aq) + 2 \text{HCl}(aq) \rightarrow 2 \text{NaCl}(aq) + \text{CO}_2(g) + \text{H}_2\text{O}(l)$$

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