Name:_____ Block:_____ Date:_____

Chemistry 11 **Molarity Worksheet** Assignment

*Complete on lined paper. Show **all** your work and watch your significant figures!*

1) Calculate the molar concentration of the following solutions:

a. 2.8 moles of HNO_3 in 4.0 L of solution
b. 0.0700 moles of NH_4Cl in 50.0 L of solution
c. 25.0 grams of NaCl in 250.0 mL of solution
d. 10.0 grams of $Cr(NO_3)_3$•9H2O in 325 mL of solution

2) How many grams of the substance would be used to prepare the following solutions?

a. 1.00 L of 3.00 M NH_4Cl
b. 125 mL of 0.500 M $Ba(NO_3)_2$
c. 250.0 mL of 0.100 M $SbCl_3$
d. 2.75 L of 0.0120 M NaOH

3) How many moles of $AlCl_3$ are contained in 350.0 mL of 0.250 M $AlCl_3$?

4) What volume of 2.40 M HCl can be made from 100.0 g of HCl?

5) How many moles of $Sr(NO_3)_2$ are contained in 55.0 mL of 1.30×10^{-3} M $Sr(NO_3)_2$?

6) What volume of 2.8×10^{-2} M NaF contains 0.15 g of NaF?

7) The density of water at 4°C is 1.000 kg/L. What is the molar concentration of H_2O in pure water at 4°C? (Hint: how many moles of H_2O are contained in 1L)

8) The density of acetic acid, CH_3COOH is 1049 g/L. What is the molarity of pure acetic acid?

9) The molar concentration of pure $HClO_4$ is 17.6 M. What is the density of pure $HClO_4$?

10) How many grams of $CaCl_2$ are contained in 225 mL of 0.0350 M $CaCl_2$ solution?

11) Acetone has a density of 0.790 g/mL. What mass of acetone and benzoic acid, C_6H_5COOH, is required to make 350.0 mL of a 0.0100 M solution of benzoic acid dissolved in acetone? Ignore the contribution which the benzoic acid makes to the volume. Based on your answer, why does it seem appropriate that you can ignore the contribution made by benzoic acid to the total volume?

12) If 1 drop (0.050 mL) of 0.20 M NaBr is added to 100.00 mL of water, what is the molarity of the NaBr in the resulting solution?

13) Concentrated HNO_3 is 15.4 M. How would you prepare 2.50 L of 0.375 M HNO_3 from the concentrated solution?

14) Concentrated H_3PO_4 is 14.6 M. How would you prepare 45.0 L of 0.0600 M H_3PO_4?

15) If 300.0 mL of solution A contains 25.0 g of KCl and 250.0 mL of solution B contains 60.0 g of KCl, what is the molarity of the KCl in the solution resulting from mixing solutions A and B?

16) If 500.0 mL of 0.750 M NaCl is boiled down until the final volume is reduced to 300.0 mL, what is the final molarity of the NaCl? (Assume no salt is lost during the boiling process.)

17) How would you prepare 250.0 mL of 0.350 M HCl, starting with 6.00 M HCl?

18) What mass of NaCl is needed to prepare 500.0 mL of 0.400 M NaCl?

19) What is the concentration of the NaOH solution produced by mixing 125.0 mL of 0.250 M NaOH with 200.0 mL of 0.175 M NaOH?

20) What volume of 12.0 M NaOH is required in order to prepare 3.00 L of 0.750 M NaOH?

21) What is the concentration of $CaCl_2$ produced when 55.0 mL of 0.300 M HCl is mixed with 80.0 mL of 0.550 M $CaCl_2$?

22) When 350.0 mLof 0.250 M $MgCl_2$ is boiled down to a final volume of 275.0 mL, what is the molarity of the $MgCl_2$ in the resulting solution?

23) If 20.0 mL of 0.350 M NaCl and 75.0 mL of 0.875 M NaCl are mixed and the resulting solution is boiled down to a volume of 60.0 mL, what is the molarity of the NaCl in the final solution?

24) A solution is made by mixing 100.0 mL of 0.200 M $BaCl_2$ and 150.0 mL of 0.400 M NaCl. What is the concentration of sodium chloride in the final solution?

25) What is the molarity of each of the following solutions?
   a. 5.62 g of $NaHCO_3$ is dissolved in enough water to make 250.0 mL
   b. 184.6 mg of K_2CrO_4 is dissolved in enough water to make 500.0 mL
   c. 0.584 g of oxalic acid ($H_2C_2O_4$) is diluted to 100.0 mL

26) What is the concentration of solution produced when:
   a. 125 mL of 3.55 M LiOH is mixed with 475 mL of 2.42 M LiOH
   b. 150.0 mL of water is added to 200.0 mL of 0.250 M NaCl
   c. 75 mL of water is mixed with 5.0 mL of 2.50 M KBr
   d. 50.0 mL of 0.125 M HCl is mixed with 75.0 mL of 0.350 M HCl

27) What is the molarity of the solution produced when:
   a. 250.0 mL of 0.750 M KBr is boiled down to a volume of 175.0 mL?
   b. 350.0 mL of water and 75.0 mL of 0.125 M $NaNO_3$ are mixed and boiled down to 325.0 mL
   c. 150.0 mL of 0.325 M LiBr and 225.0 mL of 0.500 M LiBr are mixed and boiled down to 275.0 mL

28) What mass of solid solute is present in:
   a. 5.0 L of 2.5 M KBr
   b. 225 mL of 0.135 M MgI_2
   c. 350.0 mL of 0.250 M NaCl

29) What is the molarity of the following pure liquids?
   a. C_8H_{18}, d = 0.7025 g/mL
   b. CH_3COCH_3, d = 789.9 g/L
   c. $POCl_3$, d = 1.675 g/mL

30) What volume of 3.00 M HCl is required to make up 5.00 L of 0.250 M HCl?

31) What volume of 15.4 M HNO_3 is needed to make up 500.0 mL of 0.100 M HNO_3?

32) What mass of KBr is contained in 500.0 mL of 0.235 M KBr?

33) How many moles of LiCl are contained in 5.50 L of 0.850 M LiCl?

34) What is the density of pure liquid $CHBr_3$? (molarity = 11.4 M)

35) What volume of 0.0675 M $Ba(NO_3)_2$ contains 2.55 g of $Ba(NO_3)_2$?

36) How many moles of $FeCl_3$ are contained in 1.50 L of 0.368 M $FeCl_3$?

37) What volume of 0.995 M HCl is required to make 3.50 L of 0.0450 M HCl?

38) What is the molarity of NaCl made by mixing 185.0 mL of water with 55.0 mL of 0.543 M NaCl?

39) What is the concentration of $CaCl_2$ produced by mixing 145 mL of 0.550 M $CaCl_2$ with 55 mL of 0.135 M $CaCl_2$?

40) What is the molarity of pure liquid C_6H_6 (d = 0.8787 g/mL)?