

Name: _____

Hour: _____ Date: _____

Chemistry: *Molarity of Solutions*

Directions: Solve each of the following problems. Show your work and include units for full credit.

1. What mass of the following chemicals is needed to make the solutions indicated?

- a. 1.0 liter of a 1.0 M mercury (II) chloride (HgCl_2) solution
- b. 2.0 liters of a 1.5 M sodium nitrate (NaNO_3) solution
- c. 5.0 liters of a 0.1 M $\text{Ca}(\text{OH})_2$ solution
- d. 100 mL of a 0.5 M $(\text{NH}_4)_3\text{PO}_4$ solution

2. Calculate the molarity of the following solutions.

- a. 12 g of lithium hydroxide (LiOH) in 1.0 L of solution
- b. 198 g of barium bromide (BaBr_2) in 2.0 L of solution
- c. 54 g of calcium sulfide (CaS) in 3.0 L of solution

3. Calculate the volume of each solution, in liters.

- a. a 1.0 M solution containing 85 g of silver nitrate (AgNO_3)
- b. a 0.5 M solution containing 250 g of manganese (II) chloride (MnCl_2)
- c. a 0.4 M solution containing 290 g of aluminum nitrate ($\text{Al}(\text{NO}_3)_3$)

Answers:

- 1a. 272 g HgCl_2
- 1b. 255 g NaNO_3
- 1c. 37 g $\text{Ca}(\text{OH})_2$
- 1d. 7.5 g $(\text{NH}_4)_3\text{PO}_4$

- 2a. 0.50 M LiOH (aq)
- 2b. 0.33 M BaBr_2 (aq)
- 2c. 0.25 M CaS (aq)

- 3a. 0.50 L AgNO_3 (aq)
- 3b. 4.0 L MnCl_2 (aq)
- 3c. 3.4 L $\text{Al}(\text{NO}_3)_3$ (aq)

4. How many grams of potassium chloride (KCl) are required to make 2.0 L of a 3.0 M solution?
5. How many grams of magnesium chloride (MgCl_2) are needed to make 6.0 L of a 3.0 M solution?
6. What mass of barium chloride (BaCl_2) is needed to make 0.5 L of a 4.0 M solution?
7. What mass of iron (II) sulfate (FeSO_4) is needed to make 200 mL of a 0.25 M solution?
8. What is the molarity of a solution in which 1.6 g of sodium hydroxide (NaOH) are dissolved in 125 mL of solution?
9. What is the molarity of a solution in which 5.0 g of sodium carbonate (Na_2CO_3) are dissolved in 200 mL of solution?
10. How many grams of silver nitrate (AgNO_3) are needed to make 2.0 L of a 0.10 M solution?
11. 2.0 L of a solution contain 25 g of potassium permanganate (KMnO_4). What is the molarity of the solution?
12. How many grams of glycerine ($\text{C}_3\text{H}_8\text{O}_3$) are needed to make 100 mL of a 2.5 M solution?
13. What is the molarity of a solution containing 150 g of zinc sulfate (ZnSO_4) per liter?
14. A test tube contains 10 mL of a 3.0 M CaCO_3 solution. Calculate the number of grams of CaCO_3 in the tube.

Answers:

4. 448 g KCl	8. 0.32 M NaOH (aq)	12. 23 g $\text{C}_3\text{H}_8\text{O}_3$
5. 1715 g MgCl_2	9. 0.24 M Na_2CO_3 (aq)	13. 0.93 M ZnSO_4 (aq)
6. 417 g BaCl_2	10. 34 g AgNO_3	14. 3.0 g CaCO_3
7. 7.6 g FeSO_4	11. 0.08 M KMnO_4 (aq)	