

# The Mole Review

\*\*\*\*ALL ANSWERS MUST INCLUDE THE PROPER UNITS & SIG FIGS.\*\*\*\*

SOLVE THE FOLLOWING MOLAR CONVERSION & MOLARITY PROBLEMS:

1. How many grams would  $8.1 \times 10^{21}$  molecules of sucrose ( $C_{12}H_{22}O_{11}$ ) weigh?
2. How many grams of  $AgNO_3$  are required to make 25 mL of a 0.80M solution?
3. How many moles are in 53.8 g of magnesium chloride?
4. What volume of 0.15M  $SrSO_4$  can be made from 23.1 grams?
5. Find the molarity of a 2.50 L solution containing 7 g of potassium fluoride.
6. How many units are in 0.845 moles of  $NaNO_3$ ?
7. How many grams of aluminum chloride are required to make 0.50 L of a 1.0M solution?
8. How many molecules are in 50.0 g of calcium sulfide?
9. Find the molarity of an 85 mL solution containing 2.6 g of  $ZnCl_2$ .
10. How many atoms are in a 2.0 kg ingot of gold? (Note mass units.)
11. Find the molarity of a 750 mL solution containing 20.0 g of lithium bromide.

SOLVE THE FOLLOWING PERCENTAGE COMPOSITION PROBLEMS:

12. Find the percentage composition of sucrose ( $C_{12}H_{22}O_{11}$ ).
13. Find the percentage composition of a sample containing 1.29 g of carbon and 1.71 g of oxygen.
14. Find the mass percentage of water in sodium carbonate decahydrate.
15. How many grams of zinc are in a 37.2-gram sample of zinc nitrate?

SOLVE THE FOLLOWING EMPIRICAL & MOLECULAR FORMULA PROBLEMS:

16. Find the empirical formula of a compound that contains 75% carbon and 25% hydrogen.
17. Find the empirical formula of a compound that contains 9.03 g magnesium and 3.48 g of nitrogen.
18. The empirical formula of a compound is  $NO_2$ . Its molecular mass is 92 g/mol. What is its molecular formula?
19. Glucose has an empirical formula of  $CH_2O$ . Find its molecular formula if its molecular mass is 180.0 g/mol.
20. A compound is composed of 34.2% sodium, 17.7% carbon, and 47.6% oxygen. Find its empirical formula. If its molecular mass is 134 g/mol, find its molecular formula.

# The Mole Review

## ANSWER KEY

\*\*\*ALL ANSWERS MUST INCLUDE THE PROPER UNITS & SIG FIGS.\*\*\*

1. 4.6 g  $C_{12}H_{22}O_{11}$
2. 3.4 g  $AgNO_3$
3. 0.565 mol  $MgCl_2$
4. 0.84 L  $SrSO_4$  solution
5. 0.048M  $KF$
6.  $5.09 \times 10^{23}$  units  $NaNO_3$
7. 67 g  $AlCl_3$
8.  $4.17 \times 10^{23}$  molec.  $CaS$
9. 0.22M  $ZnCl_2$
10.  $6.1 \times 10^{24}$  atoms  $Au$
11. 0.31M  $LiBr$
12. 42.098% C, 6.490% H, 51.411% O
13. 43% C, 57% O
14. 62.976%  $H_2O$
15. 12.8 g zinc
16.  $CH_4$
17.  $Mg_3N_2$
18.  $N_2O_4$
19.  $C_6H_{12}O_6$
20. empirical:  $NaCO_2$  molecular:  $Na_2C_2O_4$