

Unit 6 GROUP QUIZ

1. A 2. C 3. B 4. A/D 5. D 6. C

7. C 8. B 9. B 10. D 11. C 12. 80.07 g/mol

13. $\text{Al}(\text{C}_2\text{O}_3)_3 = 26.98 + 3(35.45) + 9(16) = 277.33 \frac{\text{g}}{\text{mol}}$ whole

$$\% = \frac{P}{W} \cdot 100 \rightarrow \% = \frac{26.98}{277.33} \cdot 100 \rightarrow \boxed{9.73\% \text{ Al}}$$

14. $\% = \frac{P}{W} \cdot 100$ $\% \text{ O} = \frac{96}{180.18} \cdot 100$ $\left\{ \begin{array}{l} n \\ \downarrow \\ (0.5328) \end{array} \right.$ $\left\{ \begin{array}{l} \text{total mass} \\ \downarrow \\ (75.0) \end{array} \right.$ $= \boxed{39.96 \text{ g O}}$ (part)

$\text{C}_6\text{H}_{12}\text{O}_6 = 180.18 \frac{\text{g}}{\text{mol}}$ whole

$53.28\% \text{ O}$

15. ionic comp. $5.00 \text{ g CoBr}_2 \cdot \frac{1 \text{ mol CoBr}_2}{218.73 \text{ g CoBr}_2} \cdot \frac{6.02 \times 10^{23} \text{ f. unit CoBr}_2}{1 \text{ mol CoBr}_2} = \boxed{1.38 \times 10^{22} \text{ f. unit CoBr}_2}$

16. $5.70 \text{ g CO}_2 \cdot \frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \cdot \frac{22.4 \text{ L CO}_2}{1 \text{ mol CO}_2} = \boxed{2.90 \text{ L CO}_2}$

17. $0.116 \text{ mol MgBr}_2 \cdot \frac{184.11 \text{ g MgBr}_2}{1 \text{ mol MgBr}_2} = \boxed{21.36 \text{ g MgBr}_2}$

18. $88.8 \text{ g Cu} \cdot \frac{1 \text{ mol Cu}}{63.55 \text{ g Cu}} = 1.40 \text{ mol Cu} / 0.70 = \textcircled{2}$

$11.2 \text{ g O} \cdot \frac{1 \text{ mol O}}{16 \text{ g O}} = 0.70 \text{ mol O} / 0.70 = \textcircled{1}$

$\rightarrow \boxed{\text{Cu}_2\text{O}}$

19. $\text{MFM} = 128.16$ $\text{EF: C}_5\text{H}_4$ $\left\{ \begin{array}{l} n = \frac{128.16}{64.09} \\ \downarrow \\ (2) \end{array} \right.$ $\left\{ \begin{array}{l} n \\ \downarrow \\ \text{EF} \\ (2) \end{array} \right.$ $\rightarrow \boxed{\text{C}_{10}\text{H}_8}$

$n = \frac{\text{MFM}}{\text{EFM}}$ $\text{EFM} = 64.09$ $n \approx 2$

20. 2-stepper \star

$40.0 \text{ g C} \cdot \frac{1 \text{ mol C}}{12.01 \text{ g C}} = 3.33 \text{ mol C} / 3.33 = \textcircled{1}$

$6.60 \text{ g H} \cdot \frac{1 \text{ mol H}}{1.01 \text{ g H}} = 6.53 \text{ mol H} / 3.33 = \textcircled{2}$

$53.40 \text{ g O} \cdot \frac{1 \text{ mol O}}{16 \text{ g O}} = 3.33 \text{ mol O} / 3.33 = \textcircled{1}$

$\left\{ \begin{array}{l} \text{EF} = \text{CH}_2\text{O} \\ \downarrow \\ \text{EFM} = 30.06 \frac{\text{g}}{\text{mol}} \\ n = \frac{\text{MFM}}{\text{EFM}} \\ n = \frac{120}{30.06} = \textcircled{4} \end{array} \right. \rightarrow \left\{ \begin{array}{l} n \\ \downarrow \\ \text{EF} \\ (4) \end{array} \right.$ $\rightarrow \boxed{\text{C}_4\text{H}_8\text{O}_4}$

$\text{EF: C}_4\text{H}_8\text{O}_4$

$\text{MF: C}_4\text{H}_8\text{O}_4$

Unit 6 Group Quiz – The Mole

Multiple Choice: (2 pts. Each)

- Which of the following correctly represents 1 mole of sodium?
a. 6.02×10^{23} atoms
b. 6.02×10^{23} molecules
c. 1.20×10^{24} atoms
d. 32.066 g
- Which of the following is the correct representation particle for magnesium chlorate?
a. atom
b. molecule
c. formula unit
d. protons
- What is the formula mass of lithium nitrate?
a. 46.00 g/mol
b. 68.95 g/mol
c. 34.83 g/mol
d. 20.95 g/mol
- Which of the following is correct? One molecule of P_2O_5 contains _____.
a. 5 atoms of oxygen
b. two ions of phosphorus
c. 5 moles of oxygen atoms
d. 7 atoms total
- For the element magnesium, the number 24.31 represents the _____.
a. atomic mass unit of an atom and the atomic number
b. number of atoms in a mole
c. atomic mass in kilograms of an atom
d. average atomic mass of an atom in amu and the number of grams in a mole
- Which of the following compounds have the same empirical formula?
a. C_2O_2 and C_2O_4
b. $C_2H_4O_2$ and CH_2O_2
c. C_3H_{12} and C_7H_{28}
d. C_2Cl_8 and C_2Cl_4
- What is the molar mass of a compound if 4 moles of that compound has a mass of 100 grams?
a. 0.04 g/mol
b. 400 g/mol
c. 25 g/mol
d. 100 g/mol
- What is the molar mass for bromine?
a. 79.90 g/mol
b. 159.80 g/mol
c. 35.45 g/mol
d. 70.90 g/mol
- One mole of which of the following substances would be equal to 22.4 L of that substance at STP?
a. NaCl (table salt)
b. CO_2 gas
c. Fe
d. water
- How many total ions are in one formula unit of Na_3PO_4 ?
a. 7
b. 3
c. 2
d. 4
- Find the molecular formula for a compound with an empirical formula of $C_5H_{10}O_2$ and a molecular mass of 102 g/mol.
a. $C_{10}H_{20}O_4$
b. CH_2O
c. $C_5H_{10}O_2$
d. $C_{15}H_{30}O_6$
- Calculate the formula mass of sulfur trioxide.

Workout: Please show ALL work on your answer sheet! Include units and substances. (8 pts. Each)

- Determine the percent composition of ONLY aluminum in aluminum chlorate.
- A sample contains 75.0 grams of glucose ($C_6H_{12}O_6$). Calculate the mass, in grams, of oxygen present in glucose.

15. How many formula units are there in 5.00 grams of cobalt (II) bromide?
16. Convert 5.70 grams of carbon dioxide gas at STP to volume, in liters.
17. Convert 0.116 moles of magnesium bromide to mass, in grams.
18. Find the empirical formula of a compound that is 88.8% copper and 11.2 % oxygen.
19. The empirical formula for naphthalene is $C_{10}H_8$. Determine the molecular formula if the molecular mass is 128.16 g/mol.
20. Determine the empirical formula and molecular formula for a compound containing 40.0% C, 6.60% H, and 53.40% O. The molecular mass is 120 g/mol.