

HONORS CHEMISTRY - UNIT 7 REVIEW

1. Which has more particles: a mole of H_2 or a mole of sodium atoms? Why?

neither - the H_2 both H's are bonded so it is one particle

2. Which has more mass: a mole of H_2 or a mole of sodium atoms? Why?

Sodium - the particles have 10x the mass

3. Calculate the mass of 4.59×10^{24} molecules of Magnesium chloride

molecules $\rightarrow$ moles $\rightarrow$ grams $MgCl_2$

$$\frac{4.59 \times 10^{24} \text{ molecules}}{6.022 \times 10^{23} \text{ molecules/mol}} \times \frac{95.255 \text{ g}}{\text{mol}}$$

$Mg \quad 24.350$
 $Cl \quad 35.453$
 70.9054
 95.2554

726 g $MgCl_2$

4. Calculate the % composition of each element in lead (II) sulfate

$PbSO_4$

$Pb = 207.2$ molar mass 303.2 g/mol
 $S = 32.066$
 $O(4) = 63.9760$

$Pb \quad \frac{207.2}{303.2} \times 100 = 68.34\%$
 $S \quad \frac{32.066}{303.2} \times 100 = 10.58\%$
 $O \quad \frac{63.9760}{303.2} \times 100 = 21.10\%$

5. Calculate the empirical formula of a compound which is 70.22%Cl, 23.79%C, and 5.99%H:

C	H	Cl
23.79	5.99	70.22
12.0	1.0	35.5
1.9825	5.99	1.978
1	3	1



* Carbon 1st, then H, then Rest

6. A compound that is 85.07%Br, 12.79%C, and 2.15%H is found to have a molar mass of 187.86g/mol. Calculate the empirical and molecular formulas for this compound.

C	H	Br
12.79	2.15	85.07
12.0	1.0	79.9
1.07	2.15	1.06
1	2	1



94 g/mol
 $\times 2$
 188 g/mol



T or F Equal masses of $MgSO_4$ and $LiSO_4$ will contain an equal number of molecules

T or F A sample of iron with a mass of 55.85g will have the same number of atoms as 26.98g of aluminum

T or F A mole of substance "X" will have the same mass as a mole of substance "Y", if X and Y are different substances

T or F A 47.867g sample of titanium has more atoms than a 36.459g sample of HCl

1 mol

less

1 mol

3 mol's of atoms

7. Calculate the mass of carbon atoms in a 3.86mol sample of C_3H_8 .

$$C_3H_8 \text{ mol} \rightarrow \text{Carbon} \rightarrow \text{grams}$$

$$\frac{3.86 \text{ mol } C_3H_8}{1 \text{ mol } C_3H_8} \times \frac{3 \text{ mol C}}{1 \text{ mol } C_3H_8} \times \frac{12.0107 \text{ g}}{1 \text{ mol}} = 139 \text{ g C}$$

8. How many grams of water would be contained in 12.49g sample of cobalt (II) chloride hexahydrate

hydrate $\rightarrow$ mol hydrate $\rightarrow$ mol H_2O $\rightarrow$ g H_2O

$Co - 58.933200$
 $Cl (2) 70.9054$
 $H_2O (6) 108.059$
237.898

$CoCl_2 \cdot 6H_2O$

$$\frac{12.49 \text{ g hydrate}}{237.898 \text{ g/mol}} \times \frac{6 \text{ mol } H_2O}{1 \text{ mol hydrate}} \times \frac{18.0153 \text{ g}}{1 \text{ mol}} = 5.675 \text{ g } H_2O$$

9. Describe how 2.00L of a 2.50M solution of sodium chloride could be prepared in a laboratory (Show any calculations needed):

- ① Calculate grams needed for 2L of 2.50M
- $$\frac{2.50 \text{ mol}}{1 \text{ mol}} \times \frac{2.00 \text{ L}}{1 \text{ L}} \times \frac{58.4428 \text{ g}}{1 \text{ mol}} = 292 \text{ g NaCl}$$
- ② use a balance and mass out 292g NaCl
- ③ put it in a 2L Volumetric flask
- ④ Add H_2O until 2L mark is reached.
- NaCl
 $Na - 22.989770$
 $Cl - 35.4527$
58.4425

10. If a chemist wanted to obtain 4.50g of solid potassium nitrate from a 6.00M solution, what volume would be needed and how could the solid be obtained? (show any calculations needed)

$$\frac{4.50 \text{ g } KNO_3}{101.1032 \text{ g/mol}} \times \frac{1 \text{ L}}{6.00 \text{ mol}} = 0.00742 \text{ L}$$

or
 742 mL
 6.00M KNO_3

K - 39.0983
 N - 14.00674
 O3 - 47.9982
101.1032 g/mol