

Percent Composition

Name - _____

1.) Calculate the percentage composition of the following.

a.) $C_2H_6 = 30.08 \frac{g}{mol}$

$C \frac{12.01 g}{100.09 g} \times 100 = 12.00 \% \quad Ca \frac{40.08 g}{100.09 g} \times 100 = 40.04 \%$

Answer - $C = 24.02 g \quad H = 2.02 g$

$O \frac{48.00 g}{100.09 g} \times 100 = 47.96 \%$

$C \frac{24.02 g}{30.08 g} \times 100 = 79.85 \%$

f.) $NaOH = 40.00 \frac{g}{mol}$

$H \frac{6.06 g}{30.08 g} \times 100 = 20.1 \%$

Answer - $Na = 22.99 g \quad H = 1.01 g \quad O = 16.00 g$

b.) $FeCl_2 = 126.76 \frac{g}{mol}$

$Na \frac{22.99 g}{40.00 g} \times 100 = 57.48 \% \quad H \frac{1.01 g}{40.00 g} \times 100 = 2.53 \%$

Answer - $Fe = 55.85 g \quad Cl = 70.90 g$

$O \frac{16.00 g}{40.00 g} \times 100 = 40.00 \%$

$Fe \frac{55.85 g}{126.76 g} \times 100 = 44.06 \%$

g.) $CaCl_2 \cdot 2H_2O = 147.02 \frac{g}{mol} \quad Ca = 40.08 g$

$H \frac{70.90 g}{126.76 g} \times 100 = 55.93 \%$

Answer - $Cl = 70.90 g \quad H = 4.04 g \quad O = 32.00 g$

c.) $FeCl_3 = 162.21 \frac{g}{mol}$

$Ca \frac{40.08 g}{147.02 g} \times 100 = 27.26 \% \quad Cl \frac{70.90 g}{147.02 g} \times 100 = 47.67 \%$

Answer - $Fe = 55.85 g \quad Cl = 106.35 g$

$H \frac{4.04 g}{147.02 g} \times 100 = 2.75 \% \quad O \frac{32.00 g}{147.02 g} \times 100 = 21.77 \%$

$Fe \frac{55.85 g}{162.21 g} \times 100 = 34.43 \%$

h.) $(NH_4)_3PO_4 = 149.12 \frac{g}{mol} \quad N = 42.03 g$

$H \frac{106.35 g}{162.21 g} \times 100 = 65.56 \%$

Answer - $P = 30.97 g \quad H = 12.12 g \quad O = 64.00 g$

d.) $C_2H_4O_2 = 60.06 \frac{g}{mol}$

$N \frac{42.03 g}{149.12 g} \times 100 = 28.19 \% \quad P \frac{30.97 g}{149.12 g} \times 100 = 20.77 \%$

Answer - $C = 24.02 g \quad H = 4.04 g \quad O = 32.00 g$

$H \frac{12.12 g}{149.12 g} \times 100 = 8.13 \% \quad O \frac{64.00 g}{149.12 g} \times 100 = 42.92 \%$

$C \frac{24.02 g}{60.06 g} \times 100 = 39.99 \% \quad H \frac{4.04 g}{60.06 g} \times 100 = 6.73 \%$

i.) $Ag(NH_3)_2Cl = 177.40 \frac{g}{mol} \quad Ag = 107.87 g$

$O \frac{32.00 g}{60.06 g} \times 100 = 53.28 \%$

Answer - $Cl = 35.45 g \quad H = 6.06 g \quad N = 28.02 g$

e.) $CaCO_3 = 100.09 \frac{g}{mol}$

$Ag \frac{107.87 g}{177.40 g} \times 100 = 60.806 \% \quad Cl \frac{35.45 g}{177.40 g} \times 100 = 19.98 \%$

Answer - $C = 24.02 g \quad Ca = 40.08 g \quad O = 48.00 g$

$H \frac{6.06 g}{177.40 g} \times 100 = 3.42 \% \quad N \frac{28.02 g}{177.40 g} \times 100 = 15.79 \%$

$$j.) C_{17}H_{15}N_3O_2Cl = 328.80 \frac{g}{mol}$$

$$\text{Answer} - C = 204.2 g \quad Cl = 35.45 g \quad H = 15.15 g$$

$$N = 42.03 g \quad O = 32.00 g$$

$$C \frac{204.17 g}{328.80 g} \times 100 = 62.10 \% \quad Cl \frac{35.45 g}{328.80 g} \times 100 = 10.78 \%$$

$$H \frac{15.15 g}{328.80 g} \times 100 = 4.61 \% \quad N \frac{42.03 g}{328.80 g} \times 100 = 12.78 \%$$

$$O \frac{32.00 g}{328.80 g} \times 100 = 9.73 \%$$

$$k.) Sn(SO_4)_2 \cdot 2H_2O = 346.87 \frac{g}{mol} \quad Sn = 118.71 g$$

$$\text{Answer} - S = 64.12 g \quad H = 4.04 g \quad O = 160.0 g$$

$$Sn \frac{118.71 g}{346.87 g} \times 100 = 34.223 \% \quad S \frac{64.12 g}{346.87 g} \times 100 = 18.49 \%$$

$$H \frac{4.04 g}{346.87 g} \times 100 = 1.16 \% \quad O \frac{160.0 g}{346.87 g} \times 100 = 46.13 \%$$

$$l.) (NH_4)_2Sn(OH)_6 = 256.87 \frac{g}{mol} \quad Sn = 118.71 g$$

$$\text{Answer} - N = 28.02 g \quad H = 14.14 g \quad O = 96.00 g$$

$$Sn \frac{118.71 g}{256.87 g} \times 100 = 46.214 \% \quad N \frac{28.02 g}{256.87 g} \times 100 = 10.91 \%$$

$$H \frac{14.14 g}{256.87 g} \times 100 = 5.50 \% \quad O \frac{96.00 g}{256.87 g} \times 100 = 37.37 \%$$

$$m.) C_2H_4N_2O_4 = 120.08 \frac{g}{mol}$$

$$\text{Answer} - C = 24.02 g \quad H = 4.04 g$$

$$N = 28.02 g \quad O = 64.00 g$$

$$C \frac{24.02 g}{120.08 g} \times 100 = 20.00 \%$$

$$H \frac{4.04 g}{120.08 g} \times 100 = 3.36 \%$$

$$O \frac{64.00 g}{120.08 g} \times 100 = 53.30 \% \quad N \frac{28.02 g}{120.08 g} \times 100 = 23.33 \%$$

$$n.) K_3Fe(CN)_6 = 329.27 \frac{g}{mol}$$

$$\text{Answer} - K = 117.3 g \quad Fe = 55.85 g$$

$$C = 72.06 g \quad N = 84.06 g$$

$$K \frac{117.3 g}{329.27 g} \times 100 = 35.62 \%$$

$$C \frac{72.06 g}{329.27 g} \times 100 = 21.88 \% \quad N \frac{84.06 g}{329.27 g} \times 100 = 25.53 \%$$

$$Fe \frac{55.85 g}{329.27 g} \times 100 = 16.96 \%$$

2.) Calculate the percentage of the **bold** species in each of the following.

$$a.) CaCl_2 \cdot 2H_2O = 147.02 \frac{g}{mol}$$

$$\text{Answer} - \frac{36.04 g}{147.02 g} \times 100 = 24.51 \%$$

$$b.) NiSO_4 \cdot 7H_2O = 280.89 \frac{g}{mol}$$

$$\text{Answer} - \frac{126.14 g}{280.89 g} \times 100 = 44.91 \%$$

$$c.) Ce_2(C_2O_4)_3 \cdot 9H_2O = 706.47 \frac{g}{mol}$$

$$\text{Answer} - \frac{162.18 g}{706.47 g} \times 100 = 22.96 \%$$

$$d.) Al_2(SO_4)_3 \cdot 18H_2O = 666.50 \frac{g}{mol}$$

$$\text{Answer} - \frac{324.36 g}{666.50 g} \times 100 = 48.67 \%$$

$$e.) Cr(NH_3)_6Cl_3 \cdot H_2O = 278.61 \frac{g}{mol}$$

$$\text{Answer} - \frac{102.24 g}{278.61 g} \times 100 = 36.70 \%$$

$$f.) Cr(NH_3)_6Cl_3 \cdot H_2O = 278.61 \frac{g}{mol}$$

$$\text{Answer} - \frac{18.02 g}{278.61 g} \times 100 = 6.468 \%$$

$$g.) \text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 2\text{NH}_3 = 215.73 \frac{\text{g}}{\text{mol}}$$

$$\text{Answer} - \frac{118.10 \text{ g}}{215.73 \text{ g}} \times 100 = 54.744 \%$$

$$h.) \text{Fe}(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O} = 506.21 \frac{\text{g}}{\text{mol}}$$

$$\text{Answer} - \frac{288.18 \text{ g}}{506.21 \text{ g}} \times 100 = 56.929 \%$$

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