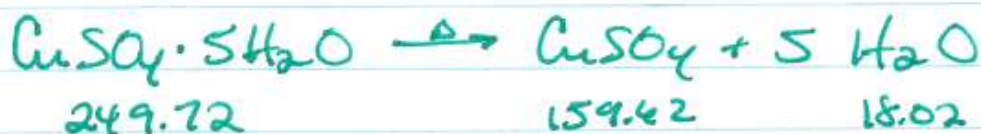


#32

$$\begin{array}{r}
 1.245 \text{ g mixture} \\
 - .832 \text{ g CuSO}_4 \\
 \hline
 .413 \text{ g H}_2\text{O}
 \end{array}$$



G: 413 g H₂O
 D: ? g CuSO₄ · 5H₂O

$$.413 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{1 \text{ mol CuSO}_4 \cdot 5\text{H}_2\text{O}}{5 \text{ mol H}_2\text{O}} \times \frac{249.72 \text{ g}}{1 \text{ mol CuSO}_4 \cdot 5\text{H}_2\text{O}}$$

$$= 1.145 \text{ g CuSO}_4 \cdot 5\text{H}_2\text{O}$$

$$\frac{1.145 \text{ g hydrate}}{1.245 \text{ g mixture}} \times 100 = \boxed{91.9\% \text{ HYDRATE}}$$

#34 G: .951 g CoCl₂
 D: ? g Al(CoCl₂)₃

$$.951 \text{ g CoCl}_2 \times \frac{1 \text{ mol CoCl}_2}{78.12 \text{ g CoCl}_2} \times \frac{1 \text{ mol Al(CoCl}_2)_3}{3 \text{ mol CoCl}_2} \times \frac{258.31 \text{ g Al(CoCl}_2)_3}{1 \text{ mol Al(CoCl}_2)_3}$$

$$= \frac{1.048}{\cancel{1.25}} \text{ g Al(CoCl}_2)_3$$

$$\frac{1.048 \text{ g}}{1.25 \text{ g mix}} \times 100 = \boxed{83.8\%}$$

#36 $1.481 \text{ g CO}_2 \times \frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \times \frac{1 \text{ mol C}}{1 \text{ mol CO}_2} = .03365 \text{ mol C}$

$.303 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} = .03363 \text{ mol H}$

Empirical formula = $\boxed{\text{C}_1\text{H}_1}$

#38 $.269 \text{ g CO}_2 \times \frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \times \frac{1 \text{ mol C}}{1 \text{ mol CO}_2} \times \frac{12.01 \text{ g C}}{1 \text{ mol C}} = .0734 \text{ g C}$

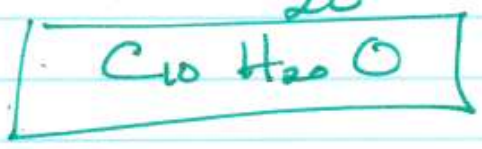
$.110 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} \times \frac{1.01 \text{ g H}}{1 \text{ mol H}} = .0123 \text{ g H}$

$.0956 \text{ g menthol} - .0734 \text{ g C} - .0123 \text{ g H} = .0099 \text{ g O}$

C	H	O
$.0734 \text{ g} \times \frac{1 \text{ mol C}}{12.01 \text{ g}}$	$.0123 \text{ g} \times \frac{1 \text{ mol H}}{1.01 \text{ g}}$	$.0099 \text{ g} \times \frac{1 \text{ mol O}}{16.00 \text{ g}}$
$= \frac{.0061157}{.00061875}$	$= \frac{.012178 \text{ mol}}{.00061875}$	$= \frac{.00061875 \text{ mol}}{.00061875}$

9.87 19.68 :

10 20 1



Si 28.09
O₂ 32.00

#40

$$11.64 \text{ g SiO}_2 \times \frac{1 \text{ mol SiO}_2}{60.09 \text{ g SiO}_2} \times \frac{1 \text{ mol Si}}{1 \text{ mol SiO}_2} = .1937 \text{ mol Si}$$

$$6.980 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} = .77469$$

Si	H
$\frac{.1937 \text{ mol}}{.1937}$	$\frac{.77469 \text{ mol}}{.1937}$

1 : 3.999

Empirical Formula = SiH₄

AP Question

$$.138 \text{ g CO}_2 \times \frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \times \frac{1 \text{ mol C}}{1 \text{ mol CO}_2} \times \frac{12.01 \text{ g C}}{1 \text{ mol C}} = \frac{.03766 \text{ g C}}{.150 \text{ g}} = 25.1\% \text{ C}$$

$$.0566 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g}} \times \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} \times \frac{1.01 \text{ g H}}{1 \text{ mol H}} = \frac{.006345 \text{ g H}}{.150 \text{ g}} = 4.23\% \text{ H}$$

$$.0238 \text{ g NH}_3 \times \frac{1 \text{ mol NH}_3}{17.04 \text{ g NH}_3} \times \frac{1 \text{ mol N}}{1 \text{ mol NH}_3} \times \frac{14.01 \text{ g N}}{1 \text{ mol N}} = \frac{.019568 \text{ g N}}{.200 \text{ g}} = 9.78\% \text{ N}$$

$$.251 \text{ g AgCl} \times \frac{1 \text{ mol AgCl}}{143.32 \text{ g}} \times \frac{1 \text{ mol Cl}}{1 \text{ mol AgCl}} \times \frac{35.45 \text{ g Cl}}{1 \text{ mol Cl}} = \frac{.06208 \text{ g Cl}}{.125 \text{ g}} = 49.66\% \text{ Cl}$$

$$100\% - 25.1\% \text{ C} - 4.23\% \text{ H} - 9.78\% \text{ N} - 49.66\% \text{ Cl} = 11.23\% \text{ O}$$

AP Q₂₄ (continued)
assume 100 g sample

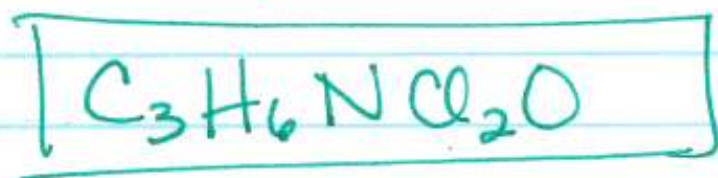
$$\text{C } 25.1 \text{ g} \times \frac{1 \text{ mol C}}{12.01 \text{ g}} = 2.0899 \text{ mol C} / .698 \approx 3$$

$$\text{H } 4.23 \text{ g H} \times \frac{1 \text{ mol}}{1.01 \text{ g}} = 4.188 \text{ mol H} / .698 \approx 6$$

$$\text{N } 9.78 \text{ g N} \times \frac{1 \text{ mol N}}{14.01 \text{ g}} = .6981 \text{ mol N} / .698 \approx 1$$

$$\text{Cl } 49.66 \text{ g Cl} \times \frac{1 \text{ mol Cl}}{35.45 \text{ g}} = 1.401 \text{ mol Cl} / .698 \approx 2$$

$$\text{O } 11.23 \text{ g O} \times \frac{1 \text{ mol O}}{16.00 \text{ g}} = .7019 \text{ mol O} / .698 \approx 1$$



whew!