Percent Composition and Empirical Formula

I ① Ca: $\frac{40.1}{72.1} = 55.6\%$ O_2: $\frac{32}{72.1} = 44.4\%$

② Li: $\frac{13.88}{93.98} = 14.8\%$ S: $\frac{32.1}{93.98} = 34.2\%$ O: $\frac{48}{93.98} = 51.1\%$

③ N: $\frac{28}{132.09} = 21.2\%$ H: $\frac{9.09}{132.09} = 6.9\%$ P: $\frac{31}{132.09} = 23.5\%$

O: $\frac{64}{132.09} = 48.5\%$

④ P: $\frac{31}{137.5} = 22.5\%$ Cl: $\frac{106.5}{137.5} = 77.5\%$

⑤ Co: $\frac{58.9}{182.9} = 32.2\%$ N: $\frac{28}{182.9} = 15.3\%$ O: $\frac{96}{182.9} = 52.5\%$

II ① O: $\frac{16}{16} = 1$ $\frac{1}{.5} = 2$

C: $\frac{6}{12} = 0.5$ $\frac{.5}{.5} = 1$

CO_2

② Cl: $\frac{7.1}{35.5} = 0.2$ $\frac{.2}{.2} = 1$

C: $\frac{2.4}{12} = 0.2$ $\frac{.2}{.2} = 1$

H: $\frac{0.603}{1.01} = 0.6$ $\frac{.6}{.2} = 3$

CH_3Cl

③ Pt: $\frac{65.02}{195.1} = 0.33$ $\frac{.33}{.33} = 1$

N: $\frac{9.34}{14} = 0.67$ $\frac{.67}{.33} = 2$

H: $\frac{2.02}{1.01} = 2$ $\frac{2}{.33} = 6$

C: $\frac{23.63}{12} = 1.97$ $\frac{1.97}{.33} = 6$

$C_6H_6N_2Pt$

III ① $CHO = 12 + 1.01 + 16 = 29.01\ g$

$\frac{135}{29.01} = 4.65$ $\quad\quad$ $\frac{155}{29.01} = 5.34$

So the molar mass is probably 5x the formula

$C_5H_5O_5$

② C: $\frac{40}{12} = 3.33$ $\quad$ $\frac{3.33}{3.33} = 1$

H: $\frac{6.713}{1.01} = 6.65$ $\quad$ $\frac{6.65}{3.33} = 2$ $\quad\quad$ CH_2O

O: $\frac{53.28}{16} = 3.33$ $\quad$ $\frac{3.33}{3.33} = 1$

$CH_2O = 12 + 2.02 + 16 = 30.02\ g$

$\frac{180\ g/mol}{30.02\ g} = 6$

$C_6H_{12}O_6$

IV

Formula of Hydrate	Molar Mass of Hydrate	Formula of Anhydrate	Molar Mass of Anhydrate	% Water
$MgSO_4 \cdot 7H_2O$	246.54 g	$MgSO_4$	120.4 g	51.2%
$Na_2S_2O_3 \cdot 5H_2O$	248.2 g	$Na_2S_2O_3$	158.2 g	36.3%
$KNaC_4H_4O_6 \cdot 4H_2O$	282.14 g	$KNaC_4H_4O_6$	210.14 g	25.5%