

## ES. 1

Su 100 g

$$\text{mol C} = \frac{45,42 \text{ g}}{12,01 \text{ g/mol}} = 3,78 \text{ mol} / 0,598 = 10,5 \cdot 2 = 21$$

$$\text{mol H} = \frac{6,635 \text{ g}}{1,008 \text{ g/mol}} = 6,58 \text{ mol} / 0,598 \text{ mol} = 11 \cdot 2 = 22$$

$$\text{mol N} = \frac{8,98 \text{ g}}{14,007 \text{ g/mol}} = 0,641 \text{ mol} / 0,598 \text{ mol} = 1 \cdot 2 = 2$$

$$q_0 = 100 (45,42 + 6,635 + 8,98) = 9,56 \text{ g} \quad 9,56\%$$

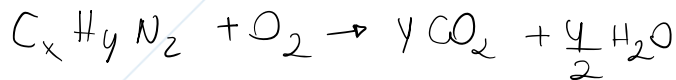
$$\text{mol O} = \frac{9,56}{15,99} = 0,598 \text{ mol} / 0,598 = 1 \cdot 2 = 2$$

$$\text{Formula minima} = \text{C}_{21}\text{H}_{22}\text{N}_2\text{O}_2$$

$$P_n = 334,42 \text{ formula incognita} \quad P_n = 334,42 \text{ formula minima}$$

↓  
formula incognita = formula minima

## ES. 2

C H N 10g composto 21,98g CO<sub>2</sub> 4,50g H<sub>2</sub>O

$$\text{mol CO}_2 = \frac{21,98 \text{ g}}{44,009 \text{ g/mol}} = 0,4994 \text{ mol in } 10 \text{ g}$$

$$\text{mol H}_2\text{O} = \frac{4,50}{18,015} = 0,2498 \text{ mol in } 10 \text{ g}$$

$$\text{mol CO}_2 \rightarrow \text{mol C} \quad \text{mol H} \rightarrow 2 \text{ mol H}_2\text{O} = 2 \cdot 0,2498 = 0,4996$$

$$\text{m carbonio} = 0,4994 \cdot 12,008 = 5,998 \text{ g}$$

$$10 \text{ g} (5,998 + 0,506 \text{ g}) = 3,48 \text{ g N}$$

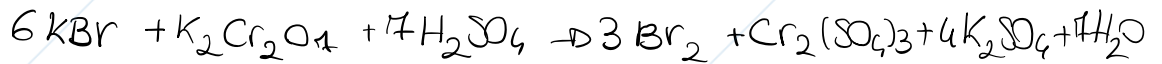
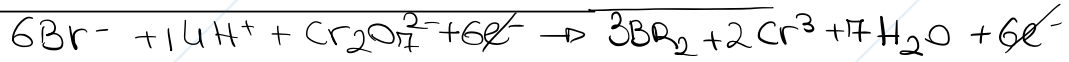
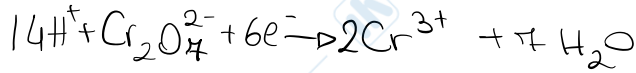
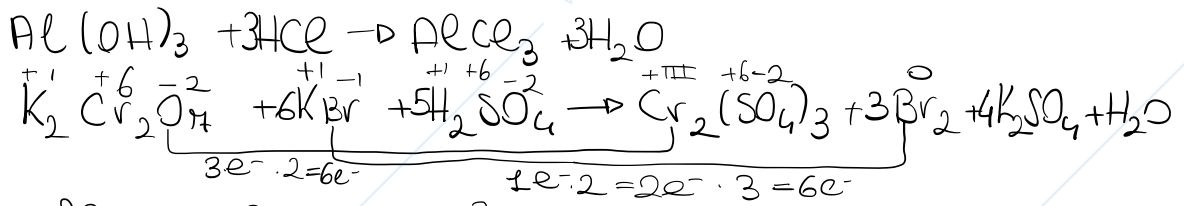
$$\text{mol N} = \frac{3,48 \text{ g}}{14,007 \text{ g/mol}} = 0,2497 \text{ mol}$$

$$\text{C} \quad 0,4994 / 0,2497 = 2$$

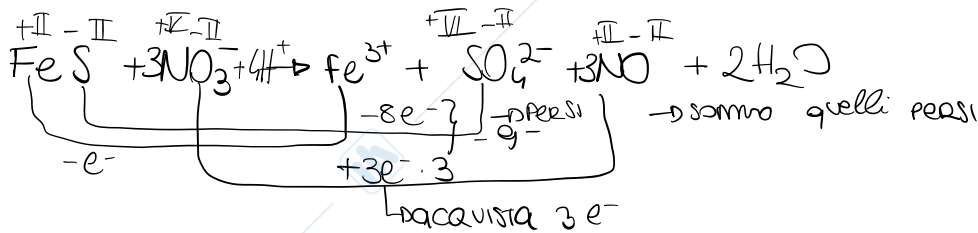
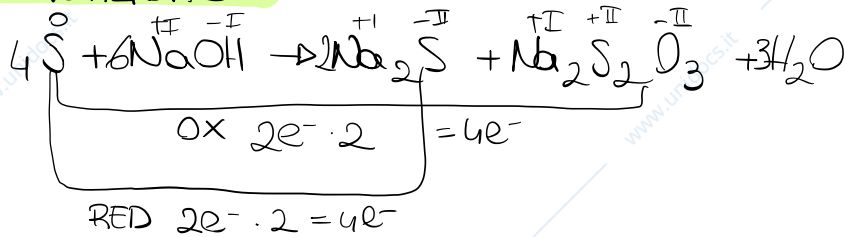
$$\text{H} \quad 0,4996 / 0,2497 = 2$$

$$\text{N} \quad \frac{0,2497}{0,2497} = 1$$

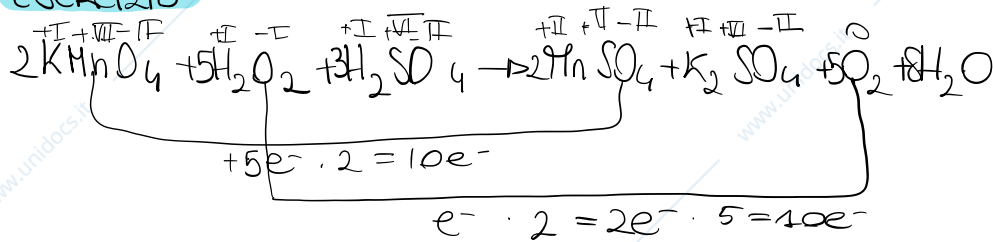
Formula minima C<sub>2</sub>H<sub>2</sub>N



**DISMUTAZIONE :**



**ESERCIZIO :**



$$\text{mol KMnO}_4 = \frac{0,150 \text{ g}}{158,032 \text{ g/mol}} = 9,49 \cdot 10^{-4} \text{ mol} \rightarrow \text{m KMnO}_4 \cdot 5 = 2,37 \cdot 10^{-3} \text{ mol}$$

$$\text{masse H}_2\text{O}_2 = 0,140 \text{ g} \cdot \frac{12}{100} = 0,0168 \text{ g}$$

$$\text{mol H}_2\text{O}_2 = \frac{0,0168 \text{ g}}{34,014 \text{ g/mol}} = 4,939 \cdot 10^{-4} \text{ mol} \rightarrow \text{reagente limitante}$$

$$\text{mol H}_2\text{O}_2 = \text{mol O}_2$$

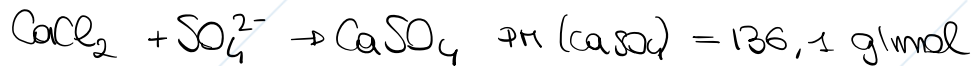
$$\text{mO}_2 = 4,939 \cdot 10^{-4} \cdot 31,998 \text{ g/mol}^{-1} = 0,0158 \text{ g} = 15,8 \text{ mg}$$

$$n \text{ KMnO}_4 \text{ reagito} = \frac{4,939 \cdot 10^{-4}}{5} \cdot 2 = 1,98 \cdot 10^{-4} \text{ mol}$$

$$n \text{ KMnO}_4 \text{ rimaste} = 9,49 \cdot 10^{-4} - 1,98 \cdot 10^{-4} = 7,51 \cdot 10^{-4} \text{ mol KMnO}_4$$

$$\text{massa KMnO}_4 \text{ rimasto} = 7,51 \cdot 10^{-4} \cdot 158,032 = 0,118 \text{ g}$$

### ESERCIZIO 6 → scheda



$$n \text{ CaSO}_4 = \frac{0,6209}{136,1 \text{ g/mol}} = 4,555 \cdot 10^{-3} \text{ mol}$$

$$M(\text{CaCl}_2) = 111 \text{ g/mol}$$

$$m \text{ CaCl}_2 = 4,555 \cdot 10^{-3} \cdot 111 = 0,5057 \text{ g CaCl}_2$$

$$m \text{ H}_2\text{O} = 1,00 - 0,5057 = 0,4943 \text{ g} \cdot 100 = 49,4\% \text{ H}_2\text{O}$$

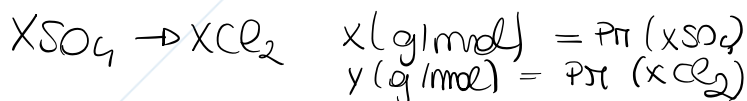
$$n \text{ H}_2\text{O} = \frac{0,4943}{18,02 \text{ g/mol}} = 0,02743 \text{ mol}$$

$$\frac{0,02743}{4,555 \cdot 10^{-3}} = 6,02 \approx 6 \rightarrow \text{molecole di H}_2\text{O}$$

$$\downarrow$$

$$\text{CaCl}_2 \cdot 6 \text{ H}_2\text{O}$$

### ESERCIZIO 7



$$n \text{ XSO}_4 = \frac{59,759}{x(\text{g/mol})} = n \frac{54,79}{y(\text{g/mol})}$$

Z massa atomica dell'elemento incognito

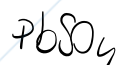
$$x(\text{g/mol}) = Z + 32,1 + 4 \cdot 16,0 = (Z + 96,1) \text{ g/mol}$$

$$y(\text{g/mol}) = Z + 2 \cdot 35,5 = Z + 71,0 \text{ g/mol}$$

$$n \text{ XSO}_4 = \frac{59,759}{Z + 96,1} = n \text{ XCl}_2 = \frac{54,39}{Z + 71,0}$$

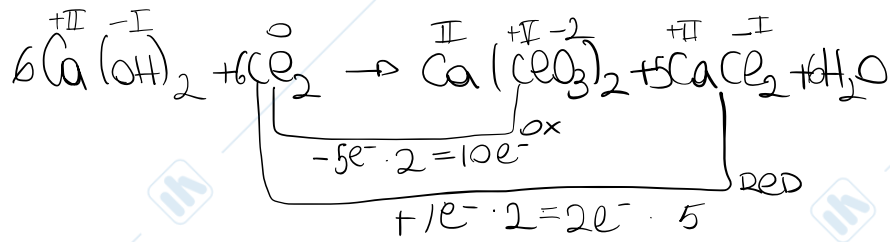
$$59,759 (Z + 71,0) = 54,39 (Z + 96,1)$$

$$4,96Z = 1029 \quad Z = 207,4 \text{ g/mol Pb}$$



## 2 scheda

N°1



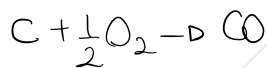
$$M(\text{CaCl}_2) = 110,98 \text{ g/mol}$$

$$m \text{ CaCl}_2 = \frac{28,3 \text{ g}}{110,98 \text{ g/mol}} = 0,255 \text{ mol effettive}$$

$$0,255 \cdot \frac{100}{78,5} = 0,325 \text{ mol CaCl}_2 \text{ (mol teoriche)}$$

$$\frac{0,325}{5} \cdot 6 = 0,390 \text{ mol di Cl}_2 \rightarrow 0,390 \cdot 71 = 27,6 \text{ g}$$

N°2



$$\text{C} = \frac{1,00 \cdot 10^6}{100} \cdot 93 = 9,30 \cdot 10^5 \text{ g} \rightarrow 17,74 \cdot 10^4 \text{ mol}$$

$$\text{S} = \frac{1,00 \cdot 10^6}{100} \cdot 0,99 = 9,90 \cdot 10^3 \text{ g} \rightarrow 3,09 \cdot 10^2 \text{ mol}$$

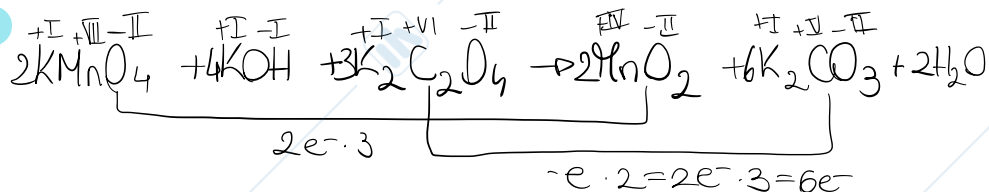
$$\text{mol di CO} = \frac{17,34 \cdot 10^4}{100} \cdot 95 = 17,35 \cdot 10^4 \text{ mol CO effettive}$$

$$\text{mol di SO}_2 = \frac{3,09 \cdot 10^2}{100} \cdot 95 = 2,93 \cdot 10^2 \text{ mol SO}_2 \text{ effettive}$$

$$\text{mol di O}_2 \text{ consumate} = \frac{17,74 \cdot 10^4}{2} + 3,09 \cdot 10^2 = 3,90 \cdot 10^4 \text{ mol}$$

$$M \text{ kg O}_2 = 3,90 \cdot 10^4 \text{ mol} \cdot 31,99 \text{ g/mol} = 1,25 \cdot 10^6 \text{ g} \rightarrow 1,25 \cdot 10^3 \text{ kg}$$

N°3



$$\text{mol K}_2\text{C}_2\text{O}_4 = \frac{3,00}{166,2} = 0,0180 \text{ mol}$$

$$\text{mol } K_2MnO_4 = \frac{0,0180 \cdot 2}{3} = 0,0120 \text{ mol effettive}$$
$$m \text{ } KMnO_4 = 0,0120 \text{ mol} \cdot 158,04 \text{ g/mol} = 1,90 \text{ g}$$

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