

Correction Exercice 1



2°) $n(\text{C}_2\text{H}_6\text{O}) = \frac{m(\text{C}_2\text{H}_6\text{O})}{M(\text{C}_2\text{H}_6\text{O})}$

$$M(\text{C}_2\text{H}_6\text{O}) = 2 \underbrace{M(\text{C})}_{12} + 6 \underbrace{M(\text{H})}_{1} + \underbrace{M(\text{O})}_{16}$$

$$M(\text{C}_2\text{H}_6\text{O}) = 46 \text{ g} \cdot \text{mol}^{-1}$$

$$n(\text{C}_2\text{H}_6\text{O}) = \frac{200}{46} = 4,35 \text{ mol}$$

3°) on a calculé le nombre de moles d'éthanol

$$\frac{n(\text{C}_2\text{H}_6\text{O})}{1} = \frac{4,35}{1} = 4,35$$

$$\text{et } \frac{n(\text{O}_2)}{3} = \frac{24}{3} = 8$$

on a $\frac{n(\text{C}_2\text{H}_6\text{O})}{1} < \frac{n(\text{O}_2)}{3} \Rightarrow$ l'éthanol

$\text{C}_2\text{H}_6\text{O}$ est le réactif limitant.

4°) D'après l'équation 1 mole de $(\text{C}_2\text{H}_6\text{O})$ produit 2 moles de CO_2 donc : $n(\text{CO}_2) = 2 \times n(\text{C}_2\text{H}_6\text{O})$

$$n(\text{CO}_2) = 2 \times 4,35 = 8,7 \text{ mol}$$

et on a aussi $n(\text{H}_2\text{O}) = 3 \times n(\text{C}_2\text{H}_6\text{O}) = 3 \times 4,35$
donc $n(\text{H}_2\text{O}) = 13,05 \text{ mol}$

5°) $m(\text{CO}_2) = n(\text{CO}_2) \times M(\text{CO}_2) = 8,7 \times 44$

$$m(\text{CO}_2) = 382,8 \text{ g}$$

$$M(\text{CO}_2) = M(\text{C}) + 2M(\text{O}) = 12 + 2 \times 16 = 44 \text{ g} \cdot \text{mol}^{-1}$$

$$m(\text{H}_2\text{O}) = n(\text{H}_2\text{O}) \times M(\text{H}_2\text{O}) = 13,05 \times 18 = 235 \text{ g}$$

6°) $E = m \times PC = \frac{200}{1000} \times 28,8 = 5,76 \text{ MJ}$

exercice 2

1°/ $m = \rho \times V = 700 \times 38 \cdot 10^{-3} = 26,6 \text{ kg} = 26600 \text{ g}$

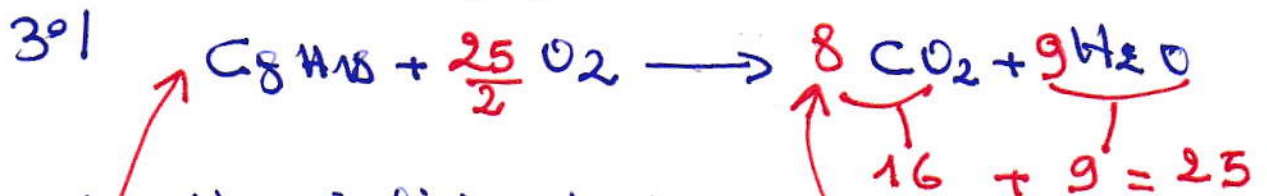
$$V = 38 \text{ L} = 38 \cdot 10^{-3} \text{ m}^3$$

2°/ $n = \frac{m}{M}$

$$M(\text{C}_8\text{H}_{18}) = 8M(\text{C}) + 18M(\text{H}) \\ = 8 \times 12 + 18 \times 1$$

$$M(\text{C}_8\text{H}_{18}) = 114 \text{ g} \cdot \text{mol}^{-1}$$

$$n = \frac{26600}{114} = 233,34 \text{ mol}$$



4°/ D'après l'équation de combustion ci-dessus
1 mole de $\text{C}_8\text{H}_{18} \longrightarrow$ produit 8 moles de CO_2

$$\text{donc } n(\text{CO}_2) = 8 \times n(\text{C}_8\text{H}_{18}) \\ = 8 \times 233,34$$

$$n(\text{CO}_2) = 1866,7 \text{ mol}$$

5°/ $V(\text{CO}_2) = n(\text{CO}_2) \times V_M \\ = 1866,7 \times 24 = 44800 \text{ litres}$

$$m(\text{CO}_2) = n(\text{CO}_2) \times \underbrace{M(\text{CO}_2)}_{44 \text{ g} \cdot \text{mol}^{-1}}$$

$$m(\text{CO}_2) = 1866,7 \times 44 =$$

$$m(\text{CO}_2) = 82135 \text{ g} = \underline{\underline{82,135 \text{ kg}}}$$