

BTS EEC - Sciences physiques 2000Exercice 1 - Calorimétrie

$$1^{\circ} Q = mc(\theta_f - \theta_i) = 240 \cdot 4186 \cdot 75 = \underline{7,53 \cdot 10^7 \text{ J}}$$

$$2^{\circ} P = \frac{Q}{\Delta t} = \frac{7,53 \cdot 10^7}{8 \cdot 3600} = \underline{2,61 \text{ kW}}$$

$$3^{\circ} \text{Coût} = P \cdot t \cdot \text{tarif} = 2,61 \cdot 8 \cdot 0,3814 = \underline{7,98 \text{ F TTC}}$$

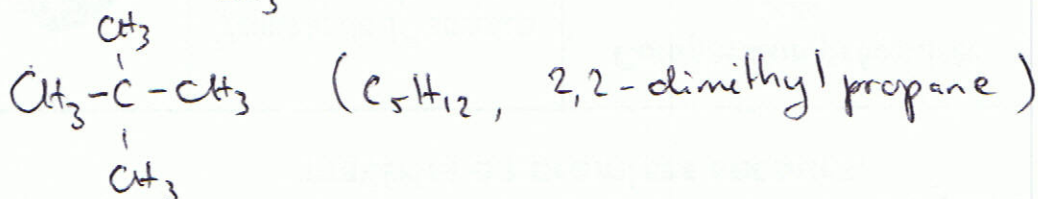
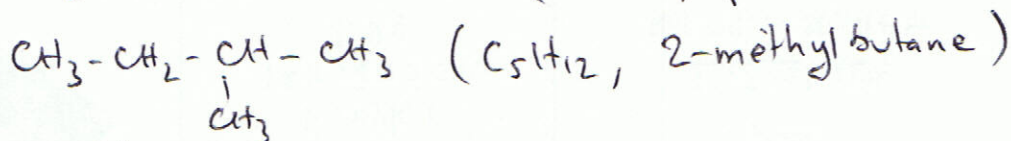
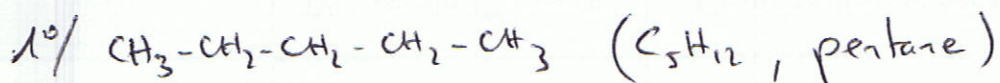
$$4^{\circ} Q_{\text{donné}} = mc(\theta_2 - \theta_1) = 160 \cdot 4186 (\theta_2 - 85)$$

$$Q_{\text{gagnée}} = mc(\theta_{\text{remp}} - \theta_2) = 80 \cdot 4186 (10 - \theta_2)$$

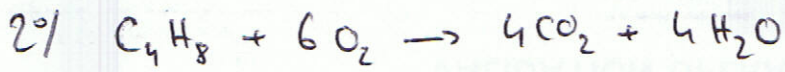
$$Q_{\text{donné}} = Q_{\text{gagné}} \quad (=) \quad 2 \cdot (\theta_2 - 85) = 10 - \theta_2$$

$$(\Rightarrow) \quad \theta_2 = \frac{170 + 10}{3} = \underline{60^{\circ} \text{C}}$$

$$5^{\circ} P_{\text{perdue}} = \frac{Q_{\text{perdue}}}{\Delta t} = \frac{mc\Delta\theta}{\Delta t} = \frac{240 \cdot 4186 \cdot 3}{6 \cdot 3600} = \underline{139 \text{ W}}$$

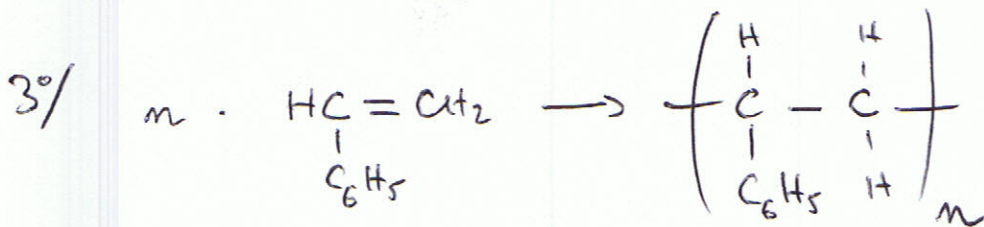
Exercice 3 - Chimie organique

Ces molécules sont des isomères (même formule brute).



$$n(\text{CO}_2) = 4 n(\text{C}_4\text{H}_8) = 4 \frac{m(\text{C}_4\text{H}_8)}{M(\text{C}_4\text{H}_8)} = 4 \cdot \frac{168}{12 \times 4 + 8} = \underline{12 \text{ mol}}$$

$$V = n(\text{CO}_2) \cdot V_m = 12 \cdot 25 = \underline{300 \text{ L}}$$



c'est une réaction de polymérisation

$$M(\text{styrène}) = 8 \times 12 + 8 = 104 \text{ g} \cdot \text{mol}^{-1}$$

$$M(\text{polystyrène}) = N \cdot M(\text{styrène}) = 1500 \cdot 104 = \underline{156000 \text{ g} \cdot \text{mol}^{-1}}$$