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a) 6

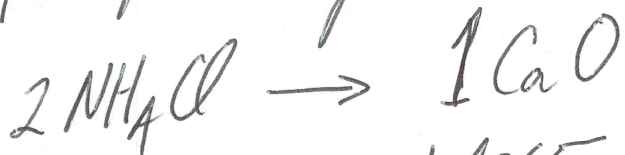
b) calculez le montant de NH_3 qu'on peut produire assumant chaque réactif est limitant

$$\text{NH}_4\text{Cl} : \frac{200.0}{53.49} = 3.7390 \xrightarrow{\times \frac{1}{2}} 3.7390 \text{ mol NH}_3$$

$$\text{CaO} : \frac{80.0}{56.08} = 1.4265 \xrightarrow{\times \frac{2}{1}} 2.8530 \text{ mol NH}_3$$

$$\Rightarrow \text{CaO limitant} \Rightarrow (2.8530)(17.03) = \underline{\underline{48.6 \text{ g de NH}_3}}$$

montant de NH_4Cl qui a réagit :



$$x \rightarrow 1.4265 \text{ mol CaO}$$

$$x = 2.8530 \text{ mol}$$

$$\begin{aligned} \text{NH}_4\text{Cl} (\text{excès}) &= \text{moles NH}_4\text{Cl} \text{ initiale} - \text{moles NH}_4\text{Cl} \text{ qui a réagit} \\ &= 3.7390 - 2.8530 = 0.8860 \text{ mol} \end{aligned}$$

$$\Rightarrow \text{masse NH}_4\text{Cl} (\text{excès}) = (0.8860)(53.49) = \underline{\underline{47.4 \text{ g}}}$$

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a) 20%

$$b) \text{C} : \frac{42.85}{12.01} = 3.5679 / 1.0194 = 3.50 \times 2 = 7$$

$$\text{O} : \frac{16.31}{16.00} = 1.0194 / 1.0194 = 1.00 \times 2 = 2$$

$$\text{N} : \frac{35.70}{14.01} = 2.5482 / 1.0194 = 2.50 \times 2 = 5$$

$$\text{H} : \frac{5.14}{1.008} = 5.0992 / 1.0194 = 5.00 \times 2 = 10$$

⇒ Formule empirique = $C_7 O_2 N_5 H_{10}$

$$M = \frac{pRT}{p} = \frac{(10.77)(0.082056)(888)}{(1.000)} = 784.8 \text{ g/mol}$$

⇒ la masse molaire de $C_7 O_2 N_5 H_{10}$ est 196.2 g/mol
⇒ exactement 4 fois plus petit que 784.8 g/mol

⇒ Formule moléculaire = $C_{28} O_8 N_{20} H_{40}$

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a) IO_2^-

$$b) n_T = \frac{P_T V}{RT} = \frac{(5.555)(20.00)}{(0.082056)(298.15)} = 4.5412 \text{ mol}$$

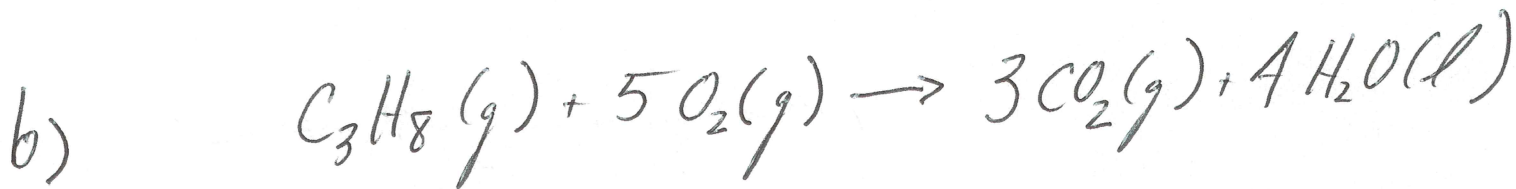
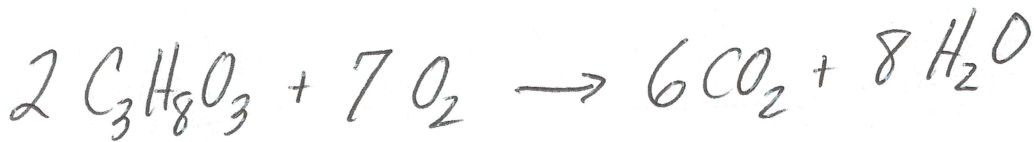
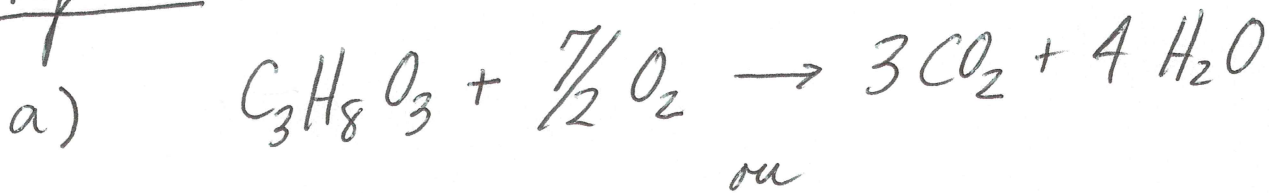
$$n_T = n_{\text{CO}_2} + n_{\text{N}_2} + n_x$$

$$n_x = n_T - n_{\text{CO}_2} - n_{\text{N}_2}$$

$$n_x = 4.5412 - \frac{33.3}{44.01} - \frac{66.6}{28.02} = 1.4077 \text{ mol}$$

$$M = \frac{88.8 \text{ g}}{1.4077 \text{ mol}} = \underline{\underline{63.1 \text{ g/mol}}}$$

$$v = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{(3)(8.3145)(298.15)}{0.02802}} = \underline{\underline{515.2 \text{ m/s}}}$$



$$\Delta H = (3)(-393.5) + (4)(-285.8) - (1)(-103.9) - (5)(0)$$

$$\Delta H = \underline{\underline{-2219.8 \text{ kJ}}}$$

$$Q = \Delta H = \underline{\underline{-2219.8 \text{ kJ}}}$$

$$\Delta U = \Delta H - RT\Delta n_g = -2219800 - (8.3145)(298.15)(3-6)$$

$$\Delta U = -2212363 \text{ J} = \underline{\underline{-2212.4 \text{ kJ}}}$$

$$\Delta U = Q + W \Rightarrow W = \Delta U - Q = -2212.4 - (-2219.8) = \underline{\underline{+7.4 \text{ kJ}}}$$

$$\Rightarrow \text{à } V \text{ constant, } Q = \Delta U$$

$$\Rightarrow Q = (2.222)(-2212.4) = \underline{\underline{-4916 \text{ kJ}}}$$

a) THOMSON

b)

$$-Q_M = Q_{\text{eau}} + Q_{\text{b cher}}$$

$$-m_M s_M \Delta T_M = m_{\text{eau}} s_{\text{eau}} \Delta T_{\text{eau}} + C_{\text{b cher}} \Delta T_{\text{b cher}}$$

$$-m_M s_M \Delta T_M = (m_{\text{eau}} s_{\text{eau}} + C_{\text{b cher}}) \Delta T$$

$$\Delta T = \frac{-m_M s_M \Delta T_M}{m_{\text{eau}} s_{\text{eau}} + C_{\text{b cher}}}$$

$$\Delta T = \frac{-(100.0)(0.4444)(-77.00)}{(222.2)(4.184) + (2222)} = \frac{3421.88}{3151.68} = 1.09$$

$$\Delta T = T_f - T_i \Rightarrow T_i = T_f - \Delta T = 23.00 - 1.09 = \underline{\underline{21.91^\circ\text{C}}}$$

c) $Q = +20.00 \text{ kJ}$   V constant $\Rightarrow \Delta U = \underline{\underline{+20.00 \text{ kJ}}}$

$$\Delta H = \Delta U + RT \Delta n_{\text{gaz}}$$

$$\Delta H = 20000 + (8.3145)(298.15)(2-1) = 22479 \text{ J}$$

$$\Delta H = \underline{\underline{22.48 \text{ kJ}}}$$

  P constante ; $Q = \Delta H = \underline{\underline{22.48 \text{ kJ}}}$

$$W = \Delta U - Q = 20.00 - (22.48) = \underline{\underline{-2.48 \text{ kJ}}}$$