

Ex A

1) $Q_1 + Q_2 = 0$

$m_1 C_P^{liq} (T_f - T_1) + m_2 C_P^{liq} (T_f - T_2) = 0$

1) $\rightarrow T_f = \frac{m_1 T_1 + m_2 T_2}{m_1 + m_2}$ AM $T_f = 32,35^\circ C$
 $305,35 K$

2) $T_{eq} = 21,3^\circ C$

$C (T_{eq} - T_1) + (m_1 + m_2) C_P^{liq} (T_{eq} - T_f) = 0$

1) $\Rightarrow C = \frac{m_{eau} C_P^{liq} (T_f - T_{eq})}{T_{eq} - T_1}$ AM $C = 66,35 J/K$
 $C = 55 J/K$

3) $Q_c + Q_{eau} + Q_m = 0$

$C (T'_{eq} - T'_1) + m'_1 C_P^{eau} (T'_{eq} - T'_1) + m'_2 C_P^m (T'_{eq} - T'_2) = 0$

1) AM $C_P^m = 0,130 J/g/K$ $C_P^m = 0,127 J/g/K$

4) Metal = Au $\rightarrow C_P^{Au} = 0,129 J/g/K$
 $= 75,32 J/mol/K \leftarrow \text{TABLE.}$

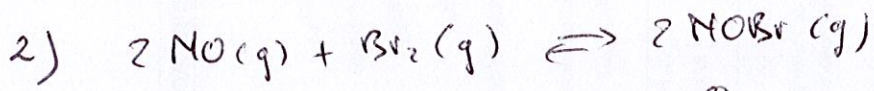
EX 8

(2)

1) $V = 1\text{ l}$
 $P = 0,2403\text{ atm}$
 $T = 20^\circ\text{C}$

$$\Rightarrow n_{\text{NO}} = \frac{PV}{RT} \Rightarrow n_{\text{NO}} = 0,01\text{ mole}$$

(1) $0,80\text{ gr de Br}_2 \Rightarrow n_{\text{Br}_2} = 0,005\text{ mole}$



t_0	0,01	0,005	0
t	0,01 - $2x$	0,005 - x	$2x$

(2) or $P = 0,304\text{ atm} = \frac{nRT}{V} \Rightarrow$

$$\begin{cases} n_T = 0,015 - x \\ n_T = \frac{PV}{RT} \Rightarrow n_T = 0,01148\text{ mole} \\ x = 0,0035\text{ mole} \end{cases}$$

(1) $\begin{cases} P_{\text{NO}} = 0,0782\text{ atm} & 7923\text{ Pa} \\ P_{\text{Br}_2} = 0,0390\text{ atm} & 3951\text{ Pa} \\ P_{\text{NOBr}} = 0,1867\text{ atm} & 18917\text{ Pa} \end{cases}$

$\Sigma P_i = P_T = 0,304\text{ atm}$

(2) $K_T = \frac{a_{\text{NOBr}}^2}{a_{\text{NO}}^2 a_{\text{Br}_2}} = \frac{P_{\text{NOBr}}^2 \times P_0}{P_{\text{NO}}^2 P_{\text{Br}_2}} \Rightarrow K_T = 143,93 \text{ a } T = 50^\circ = 323\text{ K}$

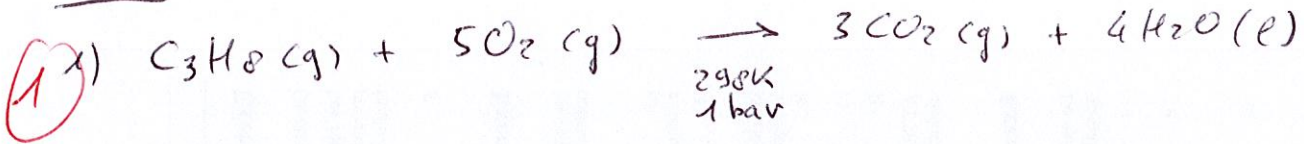
(1) $K_T = e^{-\frac{\Delta_r G^\circ}{RT}} \Rightarrow \Delta_r G^\circ = -RT \ln(K_T) \Rightarrow \Delta_r G^\circ = -13,37\text{ kJ/mole}$

(1) a 290 K : $\Delta_r G^\circ = 2\Delta_f G^\circ_{\text{NOBr}} - 2\Delta_f G^\circ_{\text{NO}} - \Delta_f G^\circ_{\text{Br}_2}$

$\Rightarrow \Delta_r G^\circ_{290\text{K}} = -11,51\text{ kJ/mole}$

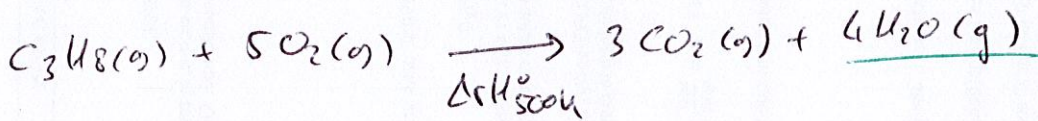
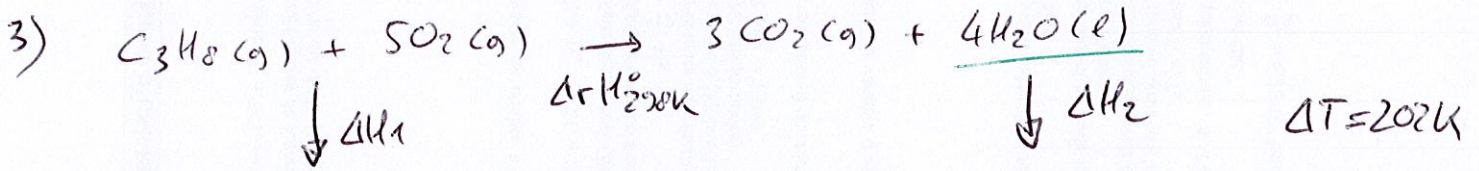
(1) $K_{290} = e^{-\frac{\Delta_r G^\circ_{290}}{RT}} \Rightarrow K_{290} = 104,4$

(1) $T = 323\text{ K} \rightarrow T = 298\text{ K} \Rightarrow P \downarrow \Rightarrow$ déplacement vers la gauche
 $2+1 \Leftrightarrow 2$
Principe de Le Chatelier



2) $\Delta_r H_{298\text{K}}^\circ = 3\Delta_f H_{CO_2(g)}^\circ + 4\Delta_f H_{H_2O(l)}^\circ - \Delta_f H_{C_3H_8(g)}^\circ$

1) $\rightarrow \Delta_r H_{298\text{K}}^\circ = -2217,1 \text{ kJ/mol}$



$\Delta H_1 = C_p(C_3H_8) \Delta T + 5C_p(O_2) \Delta T = 44440 \text{ J/mol}$

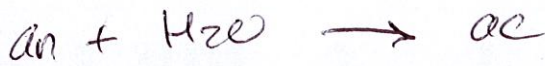
$\Delta H_2 = 3C_p(CO_2) \Delta T + 4C_p(H_2O(l)) (373-298) + 4\Delta_{vap} H_{H_2O}^\circ + 4C_p(H_2O(g)) (500-373) = 22482,6 + 22620 + 1,67 \cdot 10^5 + 17068,8 = 224651,4 \text{ J/mol}$

$\Delta_r H_{500\text{K}}^\circ = -\Delta H_1 + \Delta_r H_{298\text{K}}^\circ + \Delta H_2$

2) $\rightarrow \Delta_r H_{500\text{K}}^\circ = -2036,9 \text{ kJ/mol}$

Ex D

(4)



$$t_0 \quad c_0 \quad \text{exer} \quad 0$$

$$t \quad c = c_0 - x \quad x$$

1) ordve 1 $\Rightarrow v = k [a_n] = k c = -\frac{dc}{dt}$

$$\Rightarrow \frac{dc}{c} = -k dt \Rightarrow \ln c = -kt + c^0 \quad t=0 \Rightarrow c^0 = \ln c_0$$

(2) Sait $\ln\left(\frac{c}{c_0}\right) = -kt \Rightarrow \boxed{c = c_0 e^{-kt}}$

2) $\tau \Rightarrow c = \frac{c_0}{2} \Rightarrow \frac{c_0}{2} = c_0 e^{-k\tau} \Rightarrow 2 = e^{k\tau} \Rightarrow \boxed{\tau = \frac{\ln 2}{k}}$

3) $\tau = 2,45' \Rightarrow k = \frac{\ln 2}{\tau} \Rightarrow \boxed{k = 0,283 \text{ min}^{-1}}$
 $4,72 \cdot 10^{-5} \text{ s}^{-1}$

4) $\frac{c}{c_0} = e^{-kt}$ at $t = 15 \text{ min} : \frac{c}{c_0} = 0,014 = 1 - \alpha$
 $\Rightarrow \alpha = 0,985$

(1) $t = 2,45 \text{ min} \quad \alpha = 0,7$
 $t = 15 \text{ min} \quad \alpha = 0,985$

5) $v_0 = k [a_n]_0 \rightarrow \boxed{v_0 = 0,034 \text{ mol/l/min}}$
 $5,67 \cdot 10^{-4} \text{ mol/l/s}$