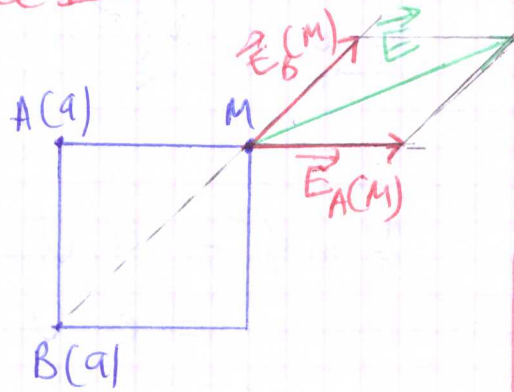


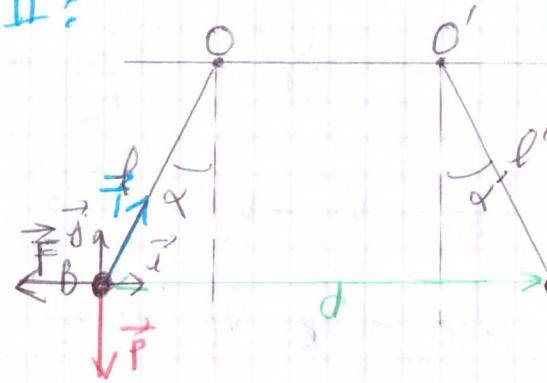
les corrections

Exercice I:

Partie I:



Partie II:



①

$$E_A(M) = \frac{k|q_A|}{AM^2} = \frac{k \cdot q}{a^2}$$

$$E_B(M) = \frac{k|q_B|}{BM^2} = \frac{kq}{2a^2}$$

1pt

②

Voir le schéma

1pt

③

$$\vec{E}(M) = \vec{E}_A(M) + \vec{E}_B(M)$$

$$E^2(M) = (\vec{E}_A + \vec{E}_B)^2$$

$$E^2(M) = E_A^2 + E_B^2 + 2E_A E_B \cos \alpha$$

$$E_A = 2E_B$$

1,5pt

$$E^2(M) = 4E_B^2 + E_B^2 + 4E_B^2 \cos \alpha$$

$$= E_B^2 (5 + 4 \cos \alpha)$$

$$E(M) = E_B \sqrt{5 + 4 \cos \alpha}$$

$$E(M) = \frac{kq}{2a^2} \sqrt{5 + 4 \cos \alpha}$$

AN

$$E(M) = \frac{9 \cdot 10^9 \times 5 \cdot 10^{-9}}{2 \times (0,1)^2} \sqrt{5 + 4 \cos 45^\circ}$$

$$E(M) = 6,92535 \text{ N/C}$$

$$\vec{F} + \vec{T} + \vec{P} = \vec{0}$$

projection (Ox):

$$F_x + T_x + P_x = 0$$

$$-F + T \sin \alpha = 0$$

$$F = T \sin \alpha$$

projection (Oy):

$$F_y + T_y + P_y = 0$$

$$0 + T \cos \alpha - P = 0$$

$$T = \frac{m \cdot g}{\cos \alpha}$$

2pt

$$F = m \cdot g \tan \alpha$$

on a

$$F = k \frac{|q_B| |q_B|}{d^2}$$

$$F = k \frac{q^2}{d^2}$$

$$\frac{kq^2}{d^2} = m \cdot g \cdot \tan \alpha$$

$$q^2 = \frac{d^2 \cdot m \cdot g \cdot \tan \alpha}{k}$$

$$q = d \sqrt{\frac{m \cdot g \cdot \tan \alpha}{k}}$$

$$d = OO' + 2 \cdot l \sin \alpha$$

Exercice 1:

$$① \quad E = \frac{U}{d} = \frac{U_{BO}}{x_B} = \frac{U_{CO}}{x_C}$$

$$U_{BO} = V_B - V_0 = V_B$$

$$U_{CO} = V_C - V_0 = V_C$$

$$V_C = V_N$$

$$V_B = \frac{U}{d} \times x_B$$

$$V_C = V_N = \frac{U}{d} \times x_C$$

Don: $V_B = 200V$

$$V_C = V_N = 700V$$

- ② Les caractéristiques de $\vec{F}$:
- point d'application: un point dans le champ
 - droite d'application: l'axe (Ox)
 - sens: A_1 vers A_2
 - intensité: $F = |q| \cdot E$

$$F = e \times \frac{U}{d}$$

$$F = 1,6 \cdot 10^{-19} N$$

- ③ Les caractéristiques de $\vec{E}$:

origine: tout point dans le champ électrique

direction:

sens: A_2 vers A_1

$$norme: E = \frac{U}{d}$$

$$E = 10000 V/m$$

- ④ d'après le T.E.C:

$$\Delta E_C = W(\vec{F})_{0 \rightarrow R}$$

$$V_0 = 0$$

$$\frac{1}{2} m v_R^2 = q \cdot U_{OR} = e \cdot U$$

$$v_R = \sqrt{\frac{2 \cdot e \cdot U}{m}}$$

A.N $v_R = \sqrt{\frac{2 \times 1,6 \cdot 10^{-19} \times 1000}{9,1 \cdot 10^{-31}}}$

$$v_R = 18,75 \cdot 10^6 m/s$$

⑤

a) $V_s = \frac{U'}{d} \times d'$

$$V_s = \frac{U'}{5}$$

b) $E_{P_{rel}}(O') = q \cdot V_{O'} = 0$

$$\begin{aligned} E_{P_{rel}}(S) &= q \cdot V_s \\ &= -e \cdot \frac{U'}{5} \\ &= 1,6 \cdot 10^{-17} J \\ &= -100 eV \end{aligned}$$

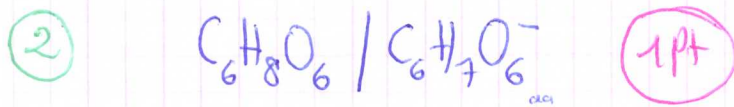
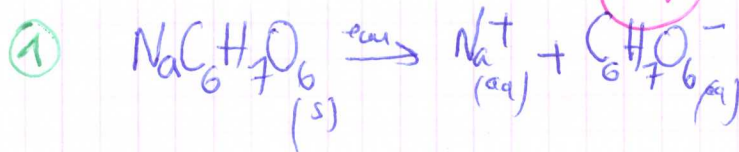
c) $E_m(O') = E_m(S)$ ($E_m =$

$$E_C(O) + E_{P_{rel}}(O') = E_C(S) + E_{P_{rel}}(S)$$

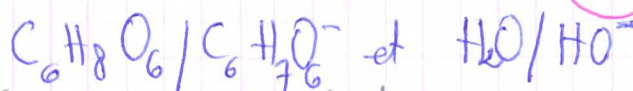
$$\begin{aligned} E_{P_{rel}}(S) &= E_C(O) - E_{P_{rel}}(O') \\ &= e \cdot U + e \cdot \frac{U'}{5} \end{aligned}$$

Chimie :

Partie I :



③ a) les couples acide / base : (1 pt)



équation de la réaction :



b)

équation de la réaction		$\text{C}_6\text{H}_8\text{O}_6 + \text{HO}^- \rightarrow \text{C}_6\text{H}_7\text{O}_6^- + \text{H}_2\text{O}$			
état	avancement	quantité de matière en mol			
$t = 0$	0	n_{acide}	n_{base}	0	cons somm
$t \neq 0$	x	$n_A - x$	$n_B - x$	x	
t_f	x_{max}	$n_A - x_{\text{max}}$	$n_B - x_m$	x_m	

$$n_{\text{acide}} = \frac{m}{M} = 17,045 \cdot 10^{-3} \text{ mol}$$

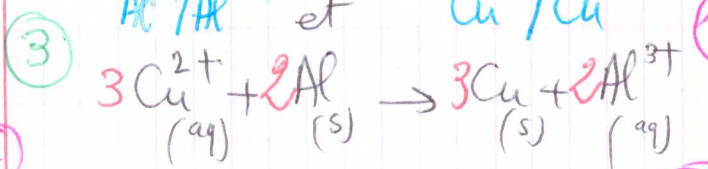
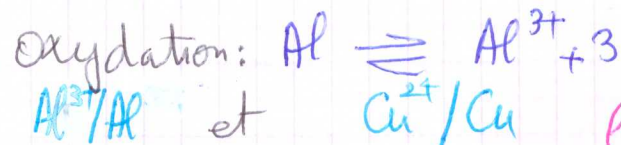
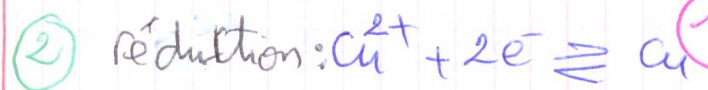
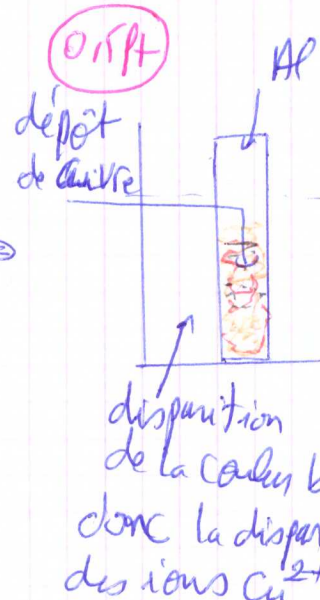
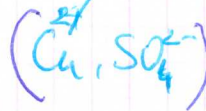
$$n_{\text{base}} = C \cdot V = 37,5 \cdot 10^{-3} \text{ mol}$$

$$\frac{n_A}{1} > \frac{n_B}{1}$$

le réactif limitant $\text{C}_6\text{H}_8\text{O}_6$

Partie II :

① Avant la réaction



④ $n(\text{Cu}^{2+}) = C \cdot V = 0,1 \text{ mol}$ (1 pt)

$$m(\text{Cu}) = 3x_{\text{max}} \times M(\text{Cu}) = 6,36 \text{ g}$$

$$[\text{Al}^{3+}] = \frac{2x_{\text{max}}}{V} = 0,333 \text{ mol/L}$$