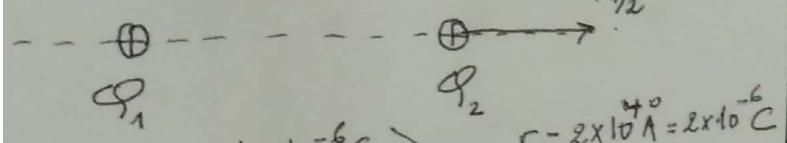
UNIVERSITE DE RELIZANE
FACULTE DES SCIENCES ET TECHNOLOGIES
Domaine : Sciences et techniques
Enseignant : Dr : GUERMIT
Module : PHYSIQUE-II
Année universitaire : 2021 /2022
Niveau : 1L(ST)

جامعة غليزان
RELIZANE UNIVERSITY

Elément de correction de la série de TD N°01 (*électrostatique*)

Exercice 01 : $\vec{F} = K \frac{q_1 \cdot q_2}{r^2} \vec{u}_r$

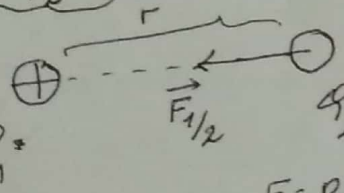


$q_1 = 4\,\mu C = 4\times10^{-6}\,C > 0$, $r = 2\times10^{-6}\,C$

$$F_{1/2} = K \cdot \frac{q_1 \cdot q_2}{r^2}$$

$$F_{1/2} = 9\times10^{9} \times \frac{4\times10^{-6} \times 4\times10^{-6}}{(2\times10^{-6})^2}$$

$$F_{1/2} = 36\times10^{9}\ N$$



$r = 50\,cm = 0,5\,m$, $F = 0,1\ N$

$q_1 = 10\,nC = 10\times10^{-9}\,C = 10^{-8}\,C$

$$F_{1/2} = K \frac{q_1 \cdot q_2}{r^2} \Rightarrow q_2 = \frac{F_{1/2} \cdot r^2}{K q_1}$$

$$q_2 = \frac{0,1 \times (0,5)^2}{9\times10^{9}\,(10^{-8})}$$

$$q_2 = 2,7\times10^{-4}\,C$$

Puisque la force $f_{1/2}$ est attractive.

q_2 est negative.

$$q_2 = -2,7\times10^{-4}\,C$$

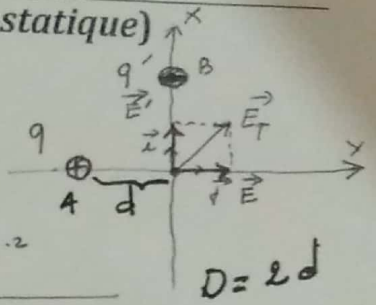
Ex = 02

① $q > 0$, $q' = -q$

$\begin{cases} q = 1\,\mu C = 10^{-9}\,C \\ q' = -10^{-9}\,C \end{cases}$

$D = 2\,cm = 2\times10^{-2}\,m$

$K = 9\times10^{9}\ N.m^2.C^{-2}$



$D = 2d$

$AC = D$

1-1- $\vec{E}' = K \frac{|q'|}{d^2} \vec{i}$

$\vec{E} = K \frac{q}{d^2} \vec{j}$

1-2 : $\vec{E}_T = \vec{E} + \vec{E}'$

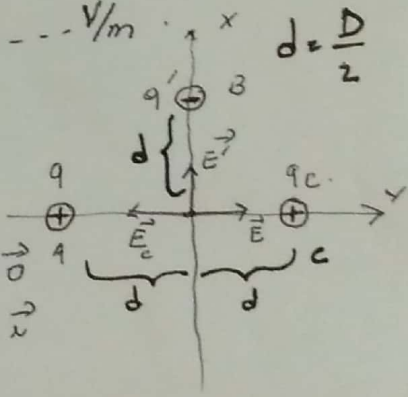
$$\vec{E}_T = K \frac{|q'|}{d^2} \vec{i} + K \frac{q}{d^2} \vec{j}$$

1-2 : $E_T = \sqrt{E^2 + E'^2}$

$$E_T = \sqrt{2} \cdot K \frac{q}{d^2}$$

AN : $E_T = \sqrt{2} \times 9\times10^{9} \times \frac{10^{-9}}{(1\times10^{-2})^2}$

$E_T = \dots\dots V/m$



$d = \frac{D}{2}$

② 2-1 $\vec{E}_T = \vec{E} + \vec{E}' + \vec{E}_c$

$\vec{E} = -\vec{E}_c \Rightarrow \vec{E} + \vec{E}_c = \vec{0}$

$\vec{E}_T = \vec{E}' = K \frac{|q'|}{d^2} \vec{i}$

$E_T = K \cdot \frac{|q'|}{d^2}$

$E_T = 9\times10^{9} \times \frac{10^{-9}}{(1\times10^{-2})^2}$

$E_T = \dots\dots V/m$

2-2 : le potentiel V, $V = \frac{Kq}{d}$

$V_T = V + V' + V_c =$

$= K\frac{q}{d} + K\frac{q'}{d} + K\frac{q_c}{d} = K\frac{q_c}{d}$

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$V_T = V + V' + V_C$

$= \frac{Kq}{d} + \frac{Kq'}{d} + K\frac{q_c}{d} = K\frac{q_c}{d}$

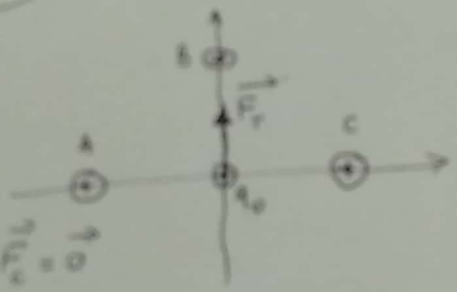
$V_T = K \cdot \frac{q}{d}$

AN $V_T = 9\times10^9 \times \frac{10^{-9}}{1\times10^{-2}}$

$V_T = 9\times10^2 V$

1h et 30 min

Si possible



$\vec{F_T} = \vec{F_A} + \vec{F_B} + \vec{F_C}$

$\vec{F_B} = -\vec{F_C} \Rightarrow \vec{F_B} + \vec{F_C} = \vec{0}$

$\vec{F_T} = \vec{F_A} = K\frac{|q||q_0|}{D^2}\vec{i}$

$F_T = 9\times10^9 \cdot \frac{10^{-9}\times10^{-9}}{(1\times10^{-2})^2}$

$F_T = \ldots\ldots N$

l'énergie potentielle E_p.

$E_p = q_0 \cdot V_T$

$E_p = 10^{-9} \times 9{,}0\times10^2$

$E_p = 9\times10^{-7} J$