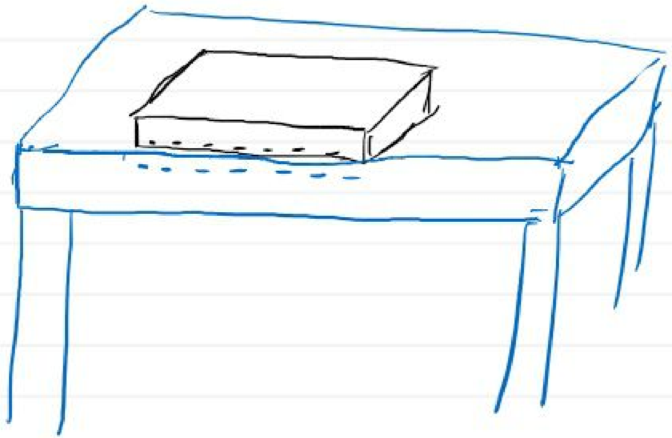
Ηλεκτρικό Φορτίο

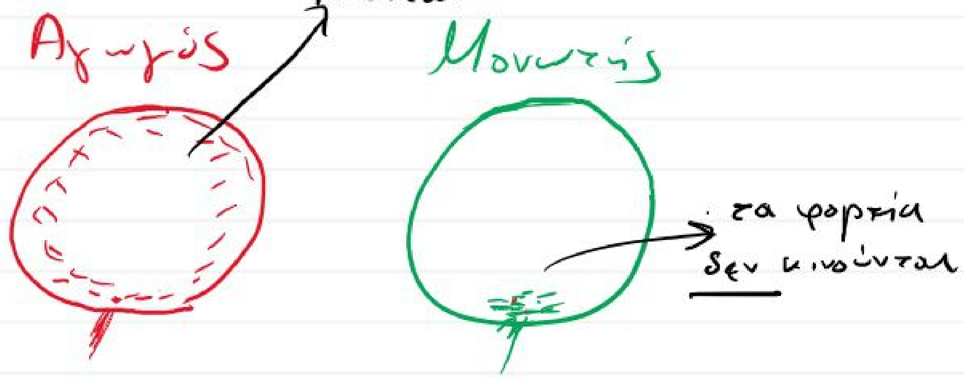
- → Θετικό → πρωτόνια
- → Αρνητικό → ηλεκτρόνια e
- → Ουδέτερο → # ηλ = # πρωτ.

Q   1 Coulomb (SI)

q

$q_e = -1{,}6 \cdot 10^{-19}\ C$
$q_p = 1{,}6 \cdot 10^{-19}\ C$



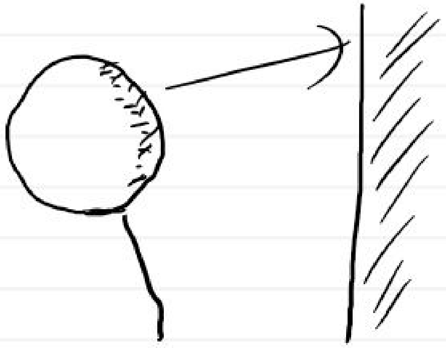


Μονωτές → μη μέταλλα

ισχυρή έλξη e-πυρ

Αγωγούς → μέταλλα

Ασθενή έλξη e-πυρήνα



$F = F'$

$$F_c = k\frac{|Q|\cdot|q|}{r^2} \quad N$$

$k = 9\cdot 10^9$ (SI)

Άσκηση 1

$q_1 = -3\,\mu C$

$q_2 = 4\,\mu C$

$12\ mm \;|\; 10^{-3}$ → $12\cdot 10^{-3}\ m$

$F = ;$

$3\,\mu C \rightsquigarrow C$

10^{-6}

$$F = 9\cdot 10^9 \frac{3\cdot 10^{-6}\cdot 4\cdot 10^{-6}}{(12\cdot 10^{-3})^2} = \frac{9\cdot 12\cdot 10^{-3}}{144\cdot 10^{-6}}\ N = 0{,}75\cdot 10^3\ N \Rightarrow$$

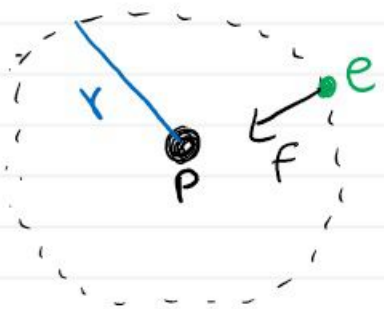
$9/12 \cdot 10^3\ N$

$10^{-9}\ N$

$\Rightarrow$ **$F = 750\ N$**

Άσκηση 2

H $r = 5,2 \cdot 10^{-11}$ m



$F = ;$

$q_e = -1,6 \cdot 10^{-19}$ C

$$F = 9 \cdot 10^9 \frac{1,6 \cdot 10^{-19} \cdot 1,6 \cdot 10^{-19}}{(5,2 \cdot 10^{-11})^2} =$$

$$= 9 \cdot 1,6 \cdot 1,6 \cdot \frac{10^{-10} \cdot 10^{-19} \cdot 10^{22}}{5,2^2} = 0,852 \cdot 10^{-7} \, N = 8,52 \cdot 10^{-8} \, N$$

Άσκηση 3

$q_1 = 16 \, \mu C$

60 cm

$q_2 = -24 \, \mu C$

$F = ;$

$q_3 = 12 \, \mu C$ στο μέσο

Άσκηση 3

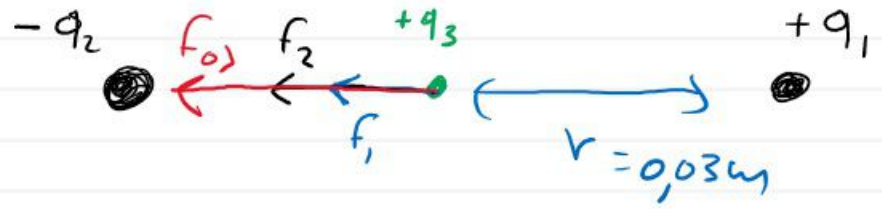
$q_1 = 16\,\mu C$

$60\,cm$

$q_2 = -24\,\mu C$

$f = ;$

$q_3 = 12\,\mu C$ στο μέσο



$$f_1 = 9 \cdot 10^9 \frac{16 \cdot 10^{-6} \cdot 12 \cdot 10^{-6}}{(0{,}03)^2} = \dots$$

$$f_2 = 9 \cdot 10^9 \frac{24 \cdot 10^{-6} \cdot 12 \cdot 10^{-6}}{(0{,}03)^2} = -\dots$$

$$f_{01} = f_1 + f_2$$

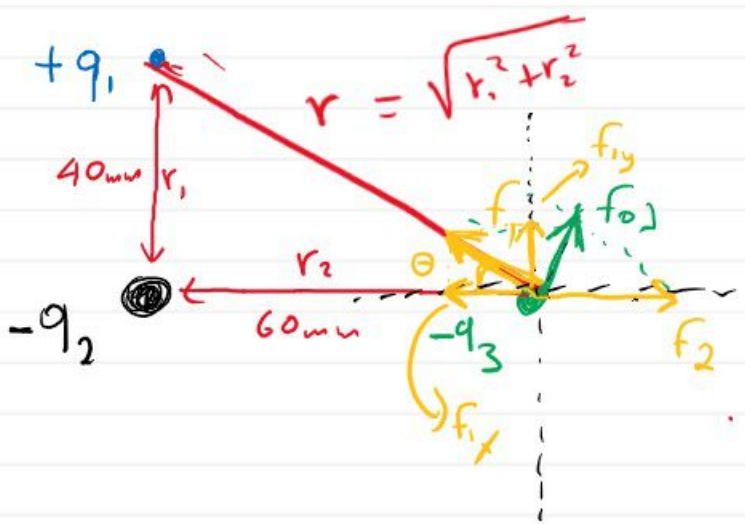
Άσκηση 4

$q_1 = 20\,nC$ — 40mm πάνω

$q_2 = -50\,nC$

$f_{01} = ;$

$q_3 = -40\,nC$ — 60mm δεξιά q_2



$$f_2 = k\frac{q_2 \cdot q_3}{r_2^2} = 9\cdot 10^9 \frac{50\cdot 10^{-9}\cdot 40\cdot 10^{-9}}{(0{,}06)^2} = \dots \quad \surd$$

$$f_1 = k\frac{q_1 \cdot q_3}{r^2} = 9\cdot 10^9 \frac{20\cdot 10^{-9}\cdot 40\cdot 10^{-9}}{\sqrt{0{,}06^2 + 0{,}04^2}} = \dots$$

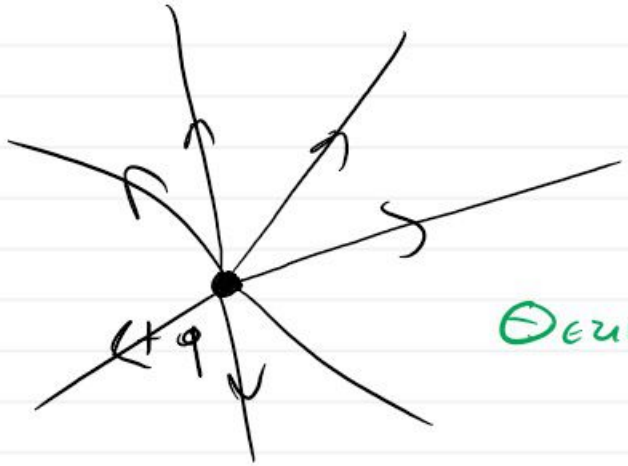
$$\dots \rightarrow \tan\theta = \frac{r_1}{r_2} \rightarrow \theta = \dots$$

$$f_{1y} = f_1 \cdot \sin\theta \quad \surd$$

$$f_{1x} = f \cdot \cos\theta$$

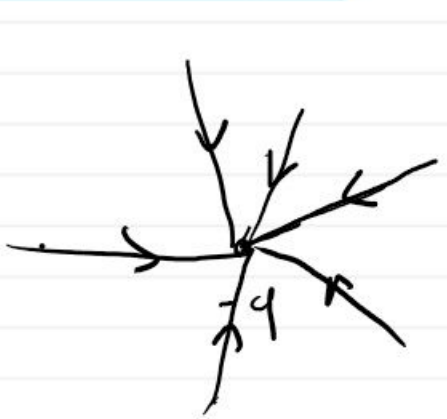
Ηλεκτρικό Πεδίο

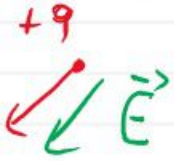
$$\vec{\mathcal{E}} = \frac{\vec{F}}{q} \quad (1)$$



Θετικό

Αρνητικό





$$\mathcal{E} = \frac{f}{q} \ N/C \qquad f = k\frac{Q \cdot q}{r^2}$$

V/m

$$\mathcal{E} = k\frac{Q}{r^2} \quad (2)$$

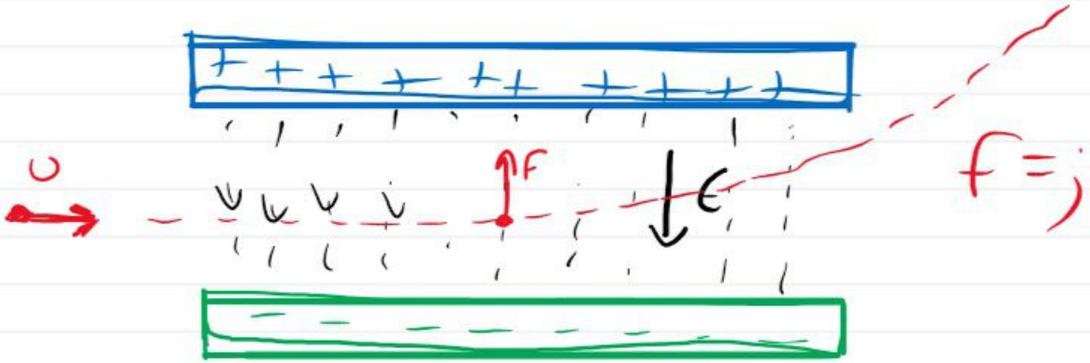
$$\epsilon = \frac{F}{q} \ N/C$$

$$f = k\frac{Q \cdot q}{r^2}$$

$$\epsilon = k\frac{Q}{r^2} \quad (2)$$

V/m

Άσκηση 5



$$\epsilon = \frac{F}{q} \Rightarrow F = q \cdot \epsilon \Rightarrow$$

$1{,}6 \cdot 10^{-19}\ C$

$$\Rightarrow F = 1{,}6 \cdot 10^{-19} \cdot 5 \cdot 10^{4}\ N \Rightarrow F = \ldots N$$