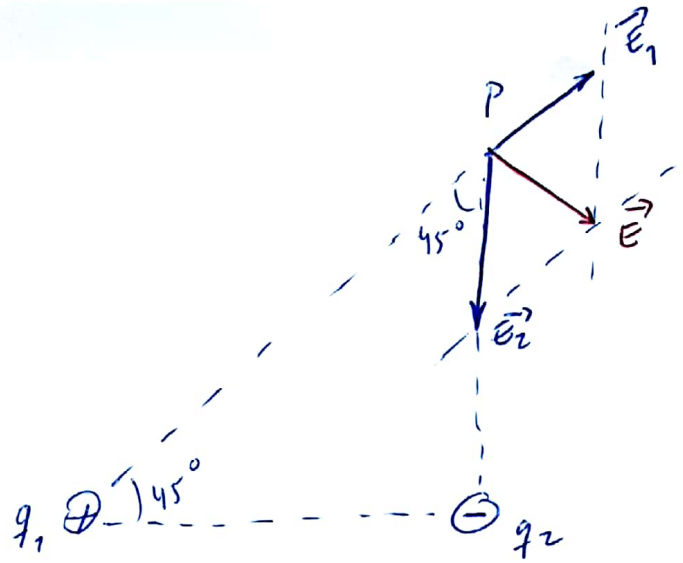
1)



$d = \sqrt{10^2 + 10^2}$

$d = 14\,cm$

a)

$$E_1 = \frac{9\times10^9 \frac{Nm^2}{c^2} \cdot 3\times10^{-6} C}{(0{,}14m)^2} = 1{,}4\times10^6 \frac{N}{c}$$

$$E_2 = \frac{9\times10^9 \frac{Nm^2}{c^2} \cdot 2\times10^{-6} C}{(0{,}10m)^2} = 1{,}8\times10^6 \frac{N}{c}$$

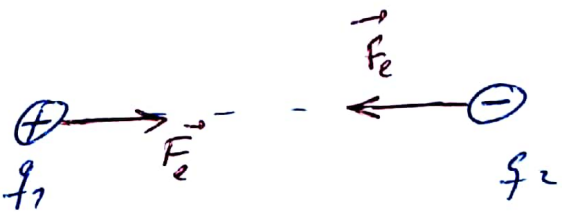
$$E = \sqrt{(1{,}4\times10^6)^2 + (1{,}8\times10^6)^2 + 2(1{,}4\times10^6)(1{,}8\times10^6)\cdot\cos(135)}$$

$$\boxed{E = 1{,}3\times10^6 \frac{N}{c}}$$

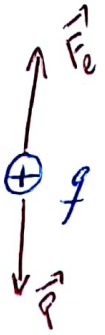
b)

$$F_e = \frac{K|q_1||q_2|}{d^2} = \frac{9\times10^9 \frac{Nm^2}{c^2} \cdot 3\times10^{-6} C \cdot 2\times10^{-6} C}{(0{,}10m)^2}$$

$$\boxed{F_e = 5{,}4\,N}$$



2)



$q = 1 \times 10^{-3} C$

$\sigma = ?$

a)

LA PLACA REPELE A LA PARTÍCULA, POR LO TANTO ESTÁ CARGADA POSITIVAMENTE.

LA PARTÍCULA ESTÁ EN REPOSO $\Rightarrow \sum F_{neta} = 0 \Rightarrow F_e = P$

$$P = m \cdot g = 3 \times 10^{-3} kg \cdot 10 \frac{m}{s^2} = 3 \times 10^{-2} N$$

$$\Rightarrow F_e = 3 \times 10^{-2} N$$

$$E = \frac{|\sigma|}{2\varepsilon_0} \Rightarrow |\sigma| = E \cdot 2 \cdot \varepsilon_0 \quad (??)$$

PRECISAMOS CALCULAR EL CAMPO DE LA PLACA.

$$F_e = |q| \cdot E \Rightarrow E = \frac{F_e}{|q|} = 30 \frac{N}{C}$$

$$\Rightarrow |\sigma| = E \cdot 2\varepsilon_0 = 30 \frac{N}{C} \cdot 2 \cdot 8{,}85 \times 10^{-12}$$

$$\boxed{|\sigma| = 5{,}3 \times 10^{-10} \frac{C}{m^2}}$$

b) SI q ES EL DOBLE $\Rightarrow F_e$ TAMBIÉN $\Rightarrow$ LA PARTÍCULA ACELERA HACIA ARRIBA.

3)

a) $\Phi_{E_{S_1}} = \frac{q_A}{\epsilon_0} \Rightarrow q_A = 4,52 \times 10^5 \frac{N m^2}{C} \cdot 8,85 \times 10^{-12}$

$$\boxed{q_A = 4,0 \times 10^{-6} C}$$

$$\Phi_{E_{S_2}} = \frac{q_{neta}}{\epsilon_0} \Rightarrow q_{neta} = 2,26 \times 10^5 \cdot 8,85 \times 10^{-12}$$

$$q_{neta} = 2,0 \times 10^{-6} C$$

PARA S_2 LA $q_{neta} = q_A + q_B$

$$\Rightarrow q_B = q_{neta} - q_A$$

$$\boxed{q_B = -2,0 \times 10^{-6} C}$$

b) ES ~~IGUAL~~ IGUAL A LA PARTE (a) DEL EJERCICIO 1 DE ESTE REPARTIDO.

4) a) $\Phi_E = \frac{q_{neta}}{\varepsilon_0} = \frac{5,3 \times 10^{-6} C}{8,85 \times 10^{-12} \frac{C^2}{Nm^2}} = 6,0 \times 10^5 \frac{Nm^2}{C}$

b) $\Phi_{E\ 1\,CARA} = \frac{\Phi_{E\ TOTAL}}{6} = 1,0 \times 10^5 \frac{Nm^2}{C}$

c) NO PORQUE EL FLUJO NO SE REPARTIRÁ EN 6 PARTES IGUALES COMO ANTES.

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5) $\Phi_{E\ S_1} = \frac{q_1 + q_2}{\varepsilon_0} \Rightarrow q_1 + q_2 = \Phi_{E\ S_1} \cdot \varepsilon_0 = 2,8 \times 10^{-6} C$

POR LO TANTO Y SABIENDO QUE $q_1 = q_2$:

$q_1 = 1,4 \times 10^{-6} C$

$q_2 = 1,4 \times 10^{-6} C$

$q_3 = ?$

$\Phi_{E\ S_2} = \frac{q_{neta}}{\varepsilon_0} \Rightarrow q_{neta} = \Phi_{E\ S_2} \cdot \varepsilon_0 = 0$

$\Rightarrow q_1 + q_2 + q_3 = 0$

$q_3 = -q_1 - q_2 = \boxed{-2,8 \times 10^{-6} C}$

6) $\Phi_{E_{S_1}} = 6,8 \times 10^5 \frac{Nm^2}{C}$ $\Phi_{E_{S_2}} = 3,0 \times 10^5 \frac{Nm^2}{C}$

$q_1 = q_2$

$\Phi_{E_{S_1}} = \frac{q_3}{\varepsilon_0} \Rightarrow q_3 = 6,8 \times 10^5 \cdot 8,85 \times 10^{-12}$

$$\boxed{q_3 = 6,0 \times 10^{-6} C}$$

$\Phi_{E_{S_2}} = \frac{q_{neta}}{\varepsilon_0} \Rightarrow q_{neta} = 3,0 \times 10^5 \cdot 8,85 \times 10^{-12}$

$q_{neta} = 2,7 \times 10^{-6} C$

PARA S_2 LA $q_{neta} = q_1 + q_2 + q_3$

$2,7 \times 10^{-6} C = q_1 + q_2 + 6,0 \times 10^{-6} C$

$\Rightarrow q_1 + q_2 = -3,3 \times 10^{-6} C$

Y COMO $q_1 = q_2$, ENTONCES:

$$\boxed{\begin{aligned} q_1 &= -1,65 \times 10^{-6} C \\ q_2 &= -1,65 \times 10^{-6} C \end{aligned}}$$

— x —