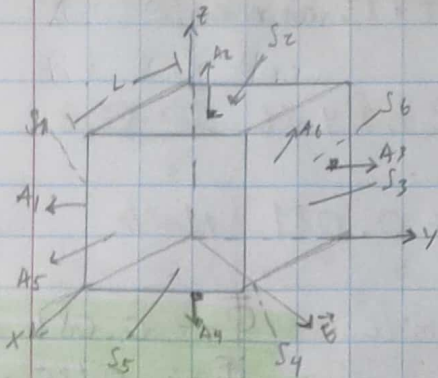


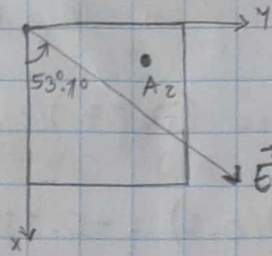


UNIVERSIDAD DE SAN CARLOS DE GUATEMALA  
FACULTAD DE INGENIERÍA  
ESCUELA DE CIENCIAS  
DEPARTAMENTO DE FÍSICA  
FÍSICA 2  
INGA. CLAUDIA CONTRERAS

TAREA	<b>X</b>	NOMBRES: <u>Leonel Antonio</u>		SECCIÓN:  <b>B+</b>
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a) Caras  $S_2$  y  $S_4$  vista desde  $\vec{E}$



$$L = 0.01 \text{ m}$$

$$E = 4 \times 10^3 \text{ N/C}$$

$$\theta = 53.1^\circ$$

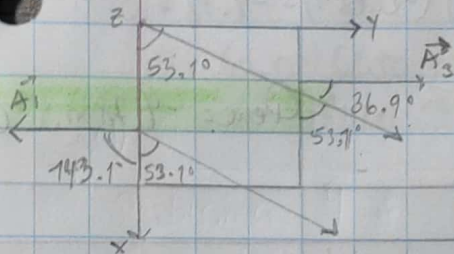
$$\Phi_{E, S_2} = E A_2 \cos \theta = (4 \times 10^3) (0.1^2) \cos 90^\circ = 0 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{E, S_4} = (4 \times 10^3) (0.1^2) \cos 90^\circ = 0 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{S_2} = 0 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{S_4} = 0 \text{ N}\cdot\text{m}^2/\text{C}$$

Caras  $S_1$  y  $S_3$ :



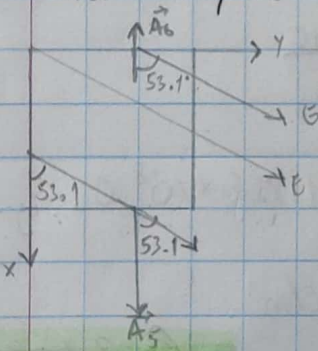
$$\Phi_{E, S_3} = (4 \times 10^3) (0.1^2) \cos 36.9^\circ = 32 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{E, S_1} = (4 \times 10^3) (0.1^2) \cos 143.1^\circ = -32 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{S_3} = +32 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{S_1} = -32 \text{ N}\cdot\text{m}^2/\text{C}$$

Caras  $S_5$  y  $S_6$ :



$$\Phi_{E, S_5} = (4 \times 10^3) (0.1^2) \cos 53.1^\circ = 24 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{E, S_6} = (4 \times 10^3) (0.1^2) \cos 126.9^\circ = -24 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{S_5} = 24 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{S_6} = -24 \text{ N}\cdot\text{m}^2/\text{C}$$

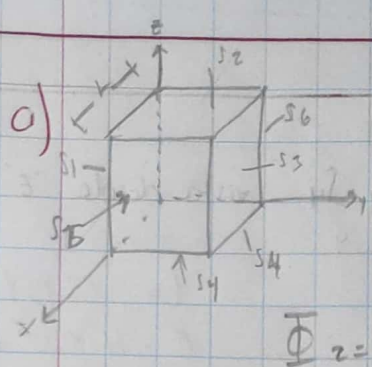
b)  $\Phi_{\text{total}} = \Phi_1 + \Phi_2 + \dots + \Phi_6$

$$\Phi_{\text{r}} = 0 \text{ N}\cdot\text{m}^2/\text{C}$$

$$\Phi_{\text{total}} = (-32) + 0 + 32 + 0 + 24 + (-24) = 0 \text{ N}\cdot\text{m}^2/\text{C}$$



2/22.34

1) 

$l = 0.30 \text{ m}$

$E = (-5.00 \text{ N/C})\hat{i} + (3.00 \text{ N/C})\hat{j}$

En las caras 1, 3, 4 y 6  $\Phi = 0$

$$\Phi_2 = (0.77)(0.3) = 0.081 \text{ Nm}^2/\text{C}$$

$$\Phi_5 = (-0.45)(0.3) = -0.135 \text{ Nm}^2/\text{C}$$

$$\Phi_2 = 0.081 \text{ Nm}^2/\text{C}$$

$$\Phi_5 = -0.135 \text{ Nm}^2/\text{C}$$

b)  $\Phi_T = \Phi_2 + \Phi_5 = (0.081 - 0.135)$   
 $\Phi_T = -0.054 \text{ Nm}^2/\text{C}$

$$\Phi_E = \frac{Q_{\text{enc}}}{\epsilon_0} \Rightarrow Q_{\text{enc}} = \epsilon_0 \Phi$$

$$Q_{\text{enc}} = (8.8542 \times 10^{-12}) (-0.054) = -4.78 \times 10^{-13} \text{ C}$$

$$Q_{\text{enc}} = -4.78 \times 10^{-13} \text{ C}$$

Capítulo 22 Ley de Gauss

3/22.21

$$R = 0.355$$

$$r = 0.500 \text{ m}$$

a)  $E = 1750 \text{ N/C}$ ;  $d = 0.145 \text{ m}$

$$\oint E \cdot dA = \frac{Q_{\text{enc}}}{\epsilon_0}$$

$$Q_{\text{enc}} = EA\epsilon_0$$

$$Q_{\text{enc}} = (1750)4\pi(0.500)^2(8.8542 \times 10^{-12}) = 4.866 \times 10^{-8} \text{ C}$$

$$\rho = \frac{Q}{V} = \frac{4.86 \times 10^{-8}}{\frac{4}{3}\pi(0.355)^3} = 2.60 \times 10^{-7} \text{ C/m}^3$$

$$\rho = 2.60 \times 10^{-7} \text{ C/m}^3$$

b)  $Q_{\text{enc}} = \rho V$  en  $r = 0.200 \text{ m}$ ,

$$Q_{\text{enc}} = (2.60 \times 10^{-7}) \frac{4}{3}\pi(0.200)^3 = 8.70 \times 10^{-9} \text{ C}$$

$$E = \frac{k Q_{\text{enc}}}{r^2} = 9 \times 10^9 \frac{(8.70 \times 10^{-9})}{(0.200)^2} = 1.96 \times 10^3 \text{ N/C}$$

$$E = 1.96 \times 10^3 \text{ N/C}$$

4/22.24

$$R = 4.00 \text{ cm} \quad r = 8.00 \text{ cm}$$

$$E = 940 \text{ N/C}$$

$$a) \quad \rho = \frac{q}{V}$$

$$E = \frac{kq}{r^2} \Rightarrow q = \frac{Er^2}{k} = \frac{(940)(0.08)^2}{9 \times 10^9} = 6.68 \times 10^{-10} \text{ C}$$

$$\rho = \frac{6.68 \times 10^{-10}}{\frac{4}{3} \pi (0.04)^3} = 2.49 \times 10^{-6} \text{ C/m}^3$$

$$\rho = 2.49 \times 10^{-6} \text{ C/m}^3$$

$$b) \quad r = 0.02 \text{ m}$$

$$\oint E dA = \frac{q_{\text{enc}}}{\epsilon_0} \Rightarrow EA = \frac{q_{\text{enc}}}{\epsilon_0}$$

$$E(4\pi r^2) = \frac{4/3 \pi r^3 \rho}{\epsilon_0} = E = \frac{r\rho}{3\epsilon_0}$$

$$E = \frac{(0.02)(2.50 \times 10^{-6})}{3(8.8542 \times 10^{-12})} = 1880 \text{ N/C}$$

$$E = 1880 \text{ N/C}$$