

~~11~~ #4

1) $D = 19.05$ $r = 9.525 \text{ mm} \times 10^{-3} \text{ m}$

$$C = \frac{A}{d} \epsilon_0 \quad d = \frac{A \epsilon_0}{C} \quad d = \frac{\pi (9.525 \times 10^{-3})^2 (8.85 \times 10^{-12})}{1 \times 10^{-12}}$$

$d = 2.5224 \times 10^{-3} \text{ m}$ - Si se puede tratar las monedas como laminas infinitas xq el tamaño de las monedas es mayor a la distancia entre de ellas

2) $Q = 3.30 \text{ nC}$ $\Delta V = 220 \text{ V}$ $\text{interno} = 4.00 \text{ cm}$

a) $C = \frac{3.30 \times 10^{-9} \text{ C}}{220 \text{ V}} = 1.5 \times 10^{-11} \text{ F}$

b) $\Delta V = \frac{Q}{4\pi\epsilon_0} \left[\frac{1}{a} - \frac{1}{b} \right] \quad \frac{\Delta V (4\pi\epsilon_0)}{Q} + \frac{1}{b} = \frac{1}{a}$

$\rightarrow a = \frac{bQ}{Q + 4\pi b \epsilon_0 \Delta V} = \frac{(4 \times 10^{-2})(3.30 \times 10^{-9})}{(3.30 \times 10^{-9}) + 4\pi (4 \times 10^{-2}) \epsilon_0 220}$

$a = 0.03 \text{ m}$

c) $E = \frac{Q}{4\pi\epsilon_0 r^2} = \frac{3.30 \times 10^{-9}}{4\pi (8.85 \times 10^{-12}) (0.03)^2} = 32969.95 \text{ N/C}$

3) $\Delta V = 50 \text{ V}$  $C_y = 5 \mu\text{F} + 8 \mu\text{F} = 13 \mu\text{F}$

a) $C_x = \left[\frac{1}{10} + \frac{1}{13} + \frac{1}{a} \right]^{-1} \mu\text{F} = 3.47 \mu\text{F} = 3.47 \times 10^{-6} \text{ F}$

b) $C = \frac{Q}{\Delta V} \quad C \Delta V = Q = (3.47 \times 10^{-6})(50) = 1.735 \times 10^{-4} \text{ C}$

c) $Q = 1.735 \times 10^{-4} \text{ C}$

4) $C_0 = 5 \text{ pF}$ $d = 1.50 \text{ mm}$ $E = 3.00 \times 10^4 \text{ V/m}$

$C = \frac{A}{d} \epsilon_0 \quad \frac{Cd}{\epsilon_0} = A \quad E = \frac{Q}{\frac{Cd}{\epsilon_0}} = \frac{Q}{C} \frac{\epsilon_0}{d} = \frac{Q}{C} \frac{\epsilon_0}{d} = Q$

$$a) (3 \times 10^4)(1.50 \times 10^{-3})(5 \times 10^{-12}) = 2.25 \times 10^{-10} C$$

$$b) C = K C_0 = 1.35 \times 10^{-11} F$$

$$Q = 3 \times 10^4 (1.50 \times 10^{-3})(1.35 \times 10^{-11}) = 6.075 \times 10^{-10} C$$

$$6) \quad \rightarrow 1 \cdot (1 - h/L)$$



$$K_{ef} = (1 - \frac{h}{L}) + K \frac{h}{L}$$

K_{ef}

$$\hookrightarrow K \cdot \frac{h}{L}$$

d) más práctico para el metal xq el medidor marcara con mayor diferecia a medida qe el tanque rellene

$$b) K = (1 - 1/4) + 1.95 \times 1/4 = 1.2375$$

$$K = (1 - 1/2) + 1.95 \cdot 1/2 = 1.475$$

$$K = (1 - 3/4) + 1.95 \cdot 3/4 = 1.7125$$

$$c) K = 1 - 1/4 + 33 \cdot 1/4 = 9$$

$$K = 1 - 1/2 + 33 \cdot 1/2 = 17$$

$$K = 1 - 3/4 + 33 \cdot 3/4 = 25$$