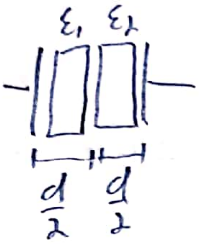
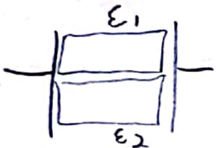
SABEMOS QUE PARA UM CAPACITOR DE PLACAS PARALELAS SUA CAPACITÂNCIA É DADA POR

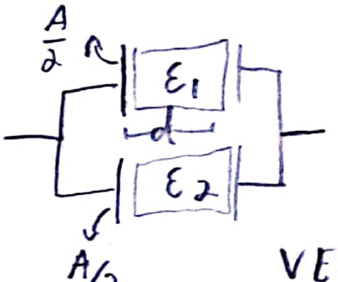
$C = \frac{\varepsilon_0 A}{d}$. DE FORMA GERAL $C = \frac{Q}{V}$

(A)

• NO CASO  TEMOS $C = \frac{Q}{V_1 + V_2}$ TENSÃO TOTAL NO CAPACITOR

$$V_1 = E\frac{d}{2} = \frac{Q}{\varepsilon_1 A}\frac{d}{2} \; ; \; V_2 = \frac{Q}{\varepsilon_2 A}\frac{d}{2} \Rightarrow C_A = \frac{Q}{\frac{Qd}{2A}\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2}\right)} = \frac{2A}{d\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2}\right)}$$

• NO CASO  TEMOS UMA ASSOCIAÇÃO DE CAPACITORES EM PARALELO.



$$C_{eq} = C_1 + C_2 \Rightarrow C_B = \frac{\varepsilon_1}{d}\frac{A}{2} + \frac{\varepsilon_2}{d}\frac{A}{2}$$

VEMOS QUE O 1º CASO TEM MAIOR CAPACITÂNCIA

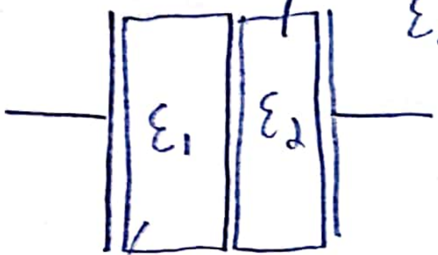
(B) $C = \frac{Q}{V_0}$; $C \propto Q \Rightarrow$ COMO $C_A > C_B \Rightarrow Q_A > Q_B$

$$\frac{Q_A}{Q_B} = \frac{C_A V_0}{C_B V_0} = \frac{C_A}{C_B} = \frac{\frac{2A\varepsilon_1\varepsilon_2}{d(\varepsilon_1+\varepsilon_2)}}{\frac{A}{2d}(\varepsilon_1+\varepsilon_2)} = \frac{2A}{d}\frac{\varepsilon_1\varepsilon_2}{(\varepsilon_1+\varepsilon_2)} \cdot \frac{2d}{A(\varepsilon_1+\varepsilon_2)} = \frac{4\varepsilon_1\varepsilon_2}{(\varepsilon_1+\varepsilon_2)^2}$$

(c)

$$E = \frac{Q}{\varepsilon A} \; ; \quad \vec{P} = \overset{\varepsilon - \varepsilon_0}{\chi}\, \varepsilon_0 \vec{E}$$

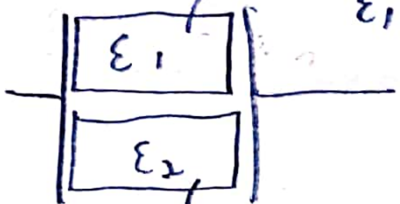
$$E = \frac{C V_0}{\varepsilon A} \Rightarrow P = \frac{(\varepsilon - \varepsilon_0) C V_0}{\varepsilon A} = (\varepsilon - \varepsilon_0) E$$



$$\frac{C_A V_0}{\varepsilon_2 A} = E$$

$$E = \frac{C_A V_0}{\varepsilon_1 A}$$

;



$$E = \frac{C_B V_0}{\varepsilon_1 A}$$

$$E = \frac{C_B V_0}{\varepsilon_2 A}$$