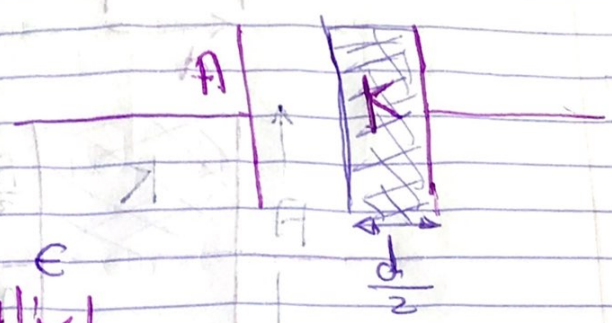
62 ص

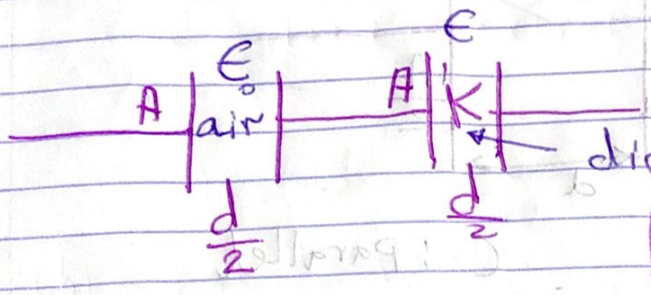
A | d | $C_0 = \frac{\epsilon_0 A}{d}$

(e) K: dielectric constant

EX Find C_{eq}



$C_{eq} = \frac{C_1 C_2}{C_1 + C_2}$



$\epsilon = \epsilon_0 K$

$C_1 = \frac{\epsilon_0 A}{\frac{d}{2}}$ $C_2 = \frac{\epsilon A}{\frac{d}{2}} = \frac{K \epsilon_0 A}{\frac{d}{2}}$

$C_{eq} =$

$$C_{eq} = \frac{\frac{2\epsilon_0 A}{d} \cdot \frac{2K\epsilon_0 A}{d}}{\frac{2\epsilon_0 A}{d} + \frac{2K\epsilon_0 A}{d}}$$

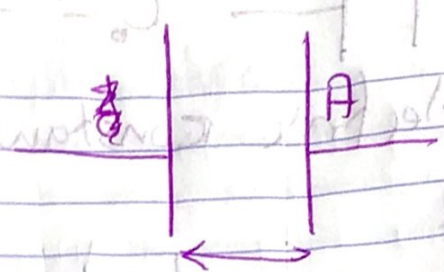
$$= \frac{\frac{2\epsilon_0 A}{d} 2K}{\frac{2\epsilon_0 A}{d}(1+K)} \cdot \frac{\epsilon_0 A}{d}$$

$$\boxed{C_{eq} = \frac{2K}{(1+K)} C_0}$$

$K = 3$

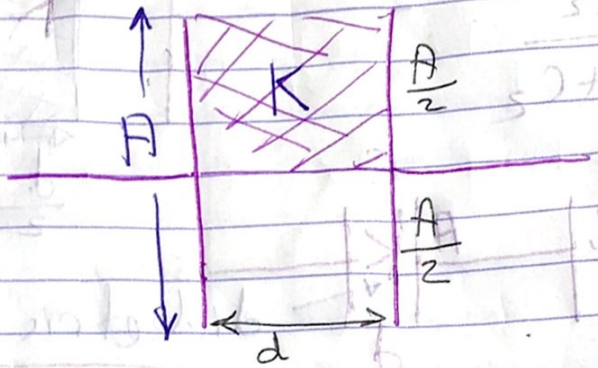
$C_{eq} = \frac{2*3}{(1+3)} = 1.5\, C_0$

Given



$$C_0 = \frac{\epsilon_0 A}{d}$$

if



$C_{eq} = C_1 + C_2$ C : parallel

$$C_{eq} = \frac{\epsilon_0 \frac{A}{2}}{d} + \frac{\epsilon_0 K \frac{A}{2}}{d}$$

$$= \frac{\epsilon_0 A}{d}\left(\frac{K+1}{2}\right)$$

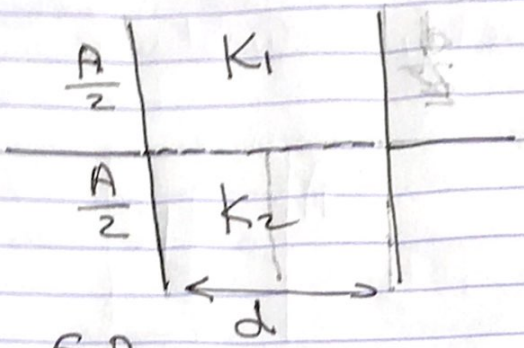
$$C = \left(\frac{K+1}{2}\right) C_0$$

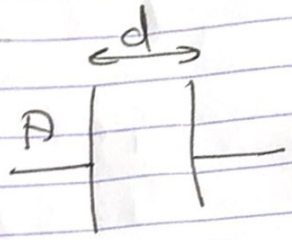
EX

$K = 3 \longrightarrow$

$$C_{eq} = \left(\frac{3+1}{2}\right) C_0$$

$$C_{eq} = 2 C_0$$





$C_1 = \frac{\epsilon_1 A_1}{d}$

$= \frac{\epsilon_0 K_1 \frac{A}{2}}{d} = \frac{\epsilon_0 A}{d}\left(\frac{K_1}{2}\right)$

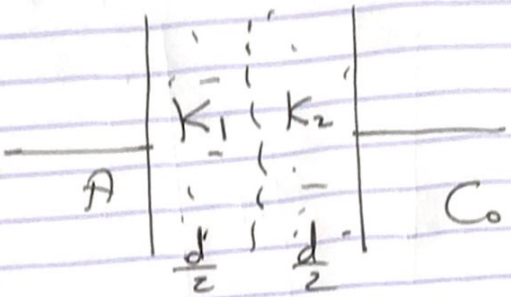
$C_2 = \frac{\epsilon_0 A}{d}\left(\frac{K_2}{2}\right)$

$C_0 = \frac{\epsilon_0 A}{d}$

$\rightarrow C_{eq} = C_1 + C_2$ (parallel

$= \left(\frac{K_1}{2} + \frac{K_2}{2}\right)\frac{\epsilon_0 A}{d}$

$C_{eq} = \left(\frac{K_1 + K_2}{2}\right) C_0$



$$C_0 = \frac{\epsilon_0 A}{d}$$

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2}$$

$$= \frac{1}{2C_0K_1} + \frac{1}{2C_0K_2}$$

$$C_1 = \frac{\epsilon_0 K_1 A}{\frac{d}{2}}$$

$$C_1 = 2C_0K_1$$

$$C_2 = 2C_0K_2$$

$$\frac{1}{C_{eq}} = \frac{1}{2C_0}\left(\frac{1}{K_1} + \frac{1}{K_2}\right)$$

$$\frac{1}{C_{eq}} = \frac{1}{2C_0}\left(\frac{K_1 + K_2}{K_1K_2}\right)$$

$$C_{eq} = 2C_0\left(\frac{K_1K_2}{K_1 + K_2}\right)$$

ex

if $K_1 = 2 \quad K_2 = 4$

$$C_{eq} = 2C_0\left(\frac{2 \times 4}{2+4}\right)$$

$$C_{eq} = \frac{8}{3}C_0$$