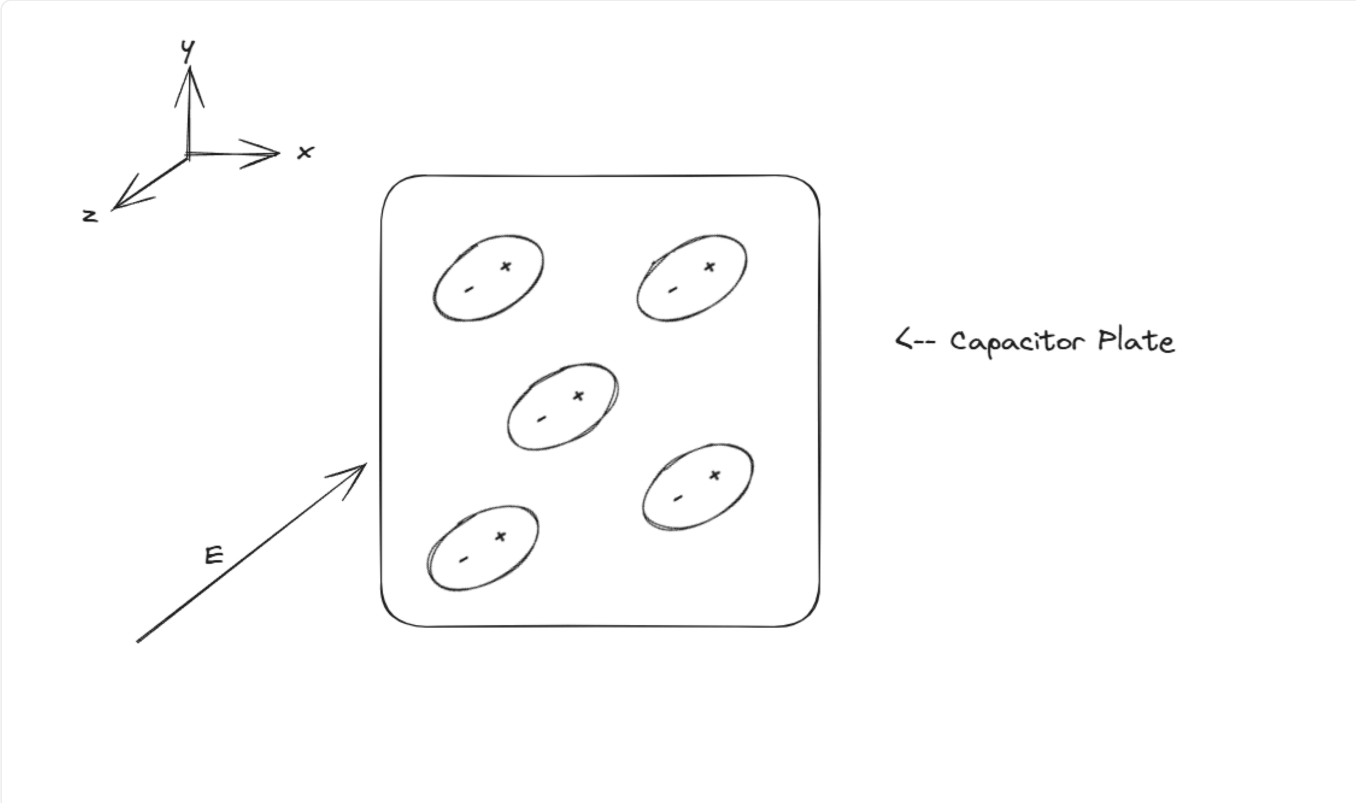


$the\ POLARIZATION\ VECTOR$

$\epsilon_0 X_e \vec{E}$

$s\ the\ SUSCEPTIBILITY$

$= \hat{P} \cdot \hat{n} \qquad where\ P_{sb} = board\ surface\ charge$

$= -\vec{\nabla} \cdot \vec{P} \qquad where\ P_{vb} = board\ volume\ charge$

$_b ds + \int_v P_{vb} dv = 0$

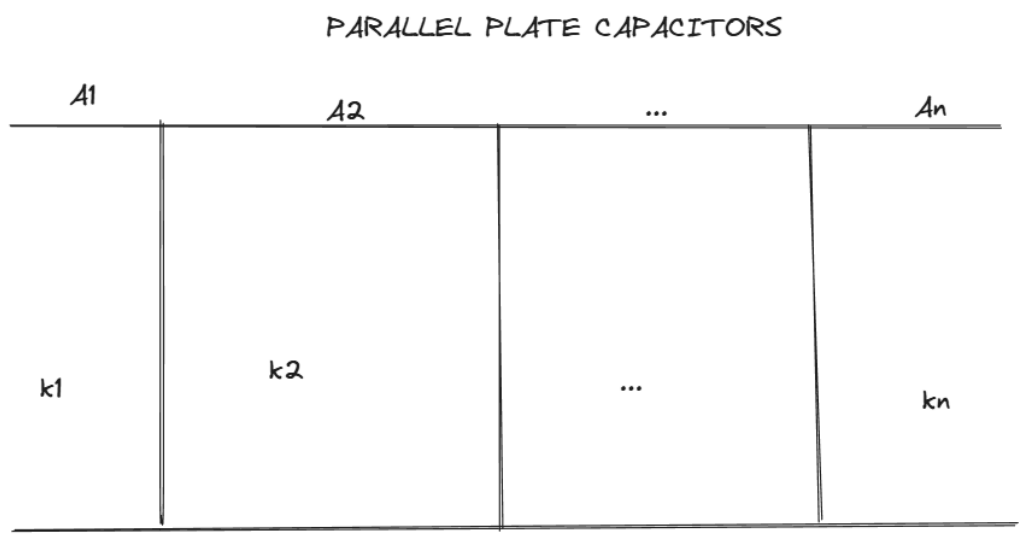
$\epsilon_0 \vec{E} + \vec{P} \Rightarrow closed \int \vec{D} \cdot \vec{ds} = Q_{en} \qquad where\ \vec{D}\ is\ electric\ flux\ density$

$\epsilon_0 \vec{E} + \vec{P} = \epsilon_0 \vec{E} + \epsilon_0 X_e \vec{E} = \epsilon_0 (1 + X_e) \vec{E} = \epsilon_0 \epsilon_r \vec{E} = \epsilon \vec{E}$

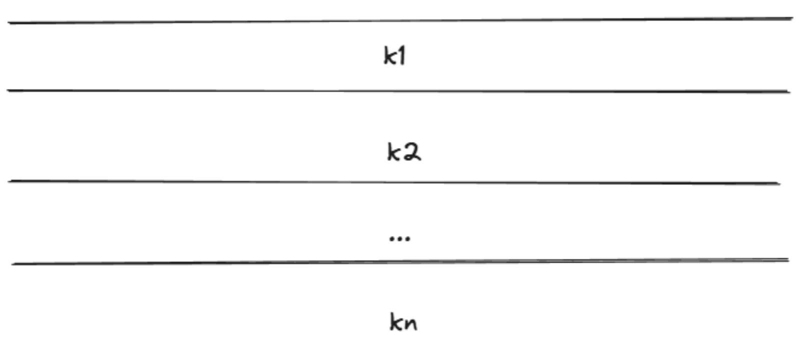
$where\ (1 + X_e) = \epsilon_r = relative\ dielectric\ constant,\ and\ \epsilon = dielectric\ constant$

$n\ C = \frac{\epsilon_0 A}{d}\ we\ now\ apply\ a\ dielectric\ material\ constant\ (between\ the\ plates),\ so:$

$\frac{\epsilon_r \epsilon_0 A}{d}\ or\ \frac{k \epsilon_0 A}{d}$

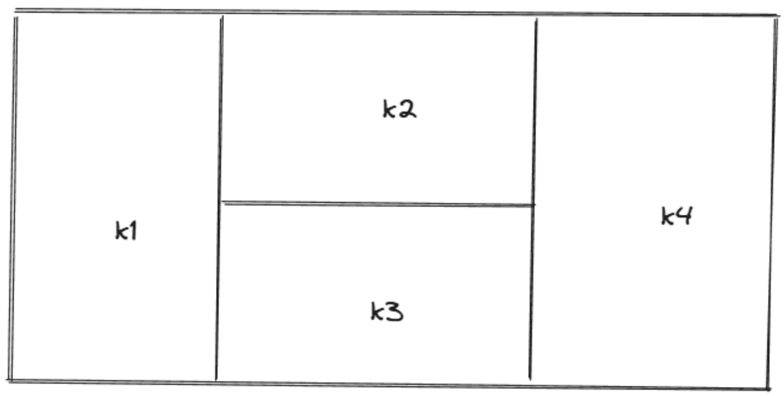


$= C_1 + C_2 + C_3 + ...$ $Q = P_1A_1 + P_2A_2$



$= \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + ...$

ꞏRTANT QUESTION EXAMPLE - find in problem sets:



$=?$