

the POLARIZATION VECTOR

$$\epsilon_0 X_e \vec{E}$$

s the SUSCEPTIBILITY

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

= $-ec{
abla} \cdot ec{P}$ where $P_{vb} = board\ volume\ charge$

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

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

$$\epsilon_0ec{E}+ec{P}=\epsilon_0ec{E}+\epsilon_0X_eec{E}=\epsilon_0\left(1+X_e
ight)ec{E}=\epsilon_0\epsilon_rec{E}=\epsilonec{E}$$

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

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

PARALLEL PLATE CAPACITORS

k1 k2 kn	A1	<i>A</i> 2	•••	An
	k1			kn

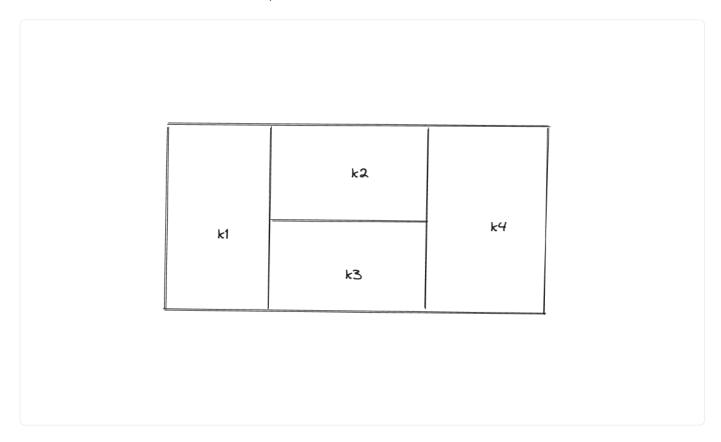
$$=C_1+C_2+C_3+...$$
 $Q=P_1A_1+P_2A_2$

$$Q = P_1 A_1 + P_2 A_2$$

k1	_
	_
	_
kn	_

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

RTANT QUESTION EXAMPLE - find in problem sets:



=?