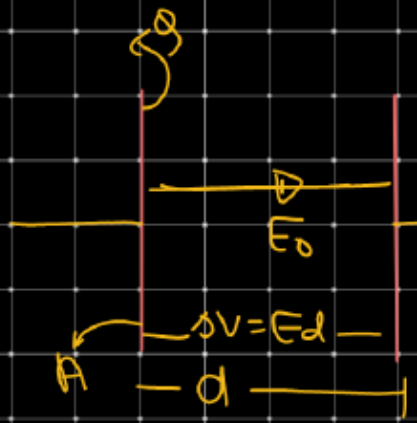
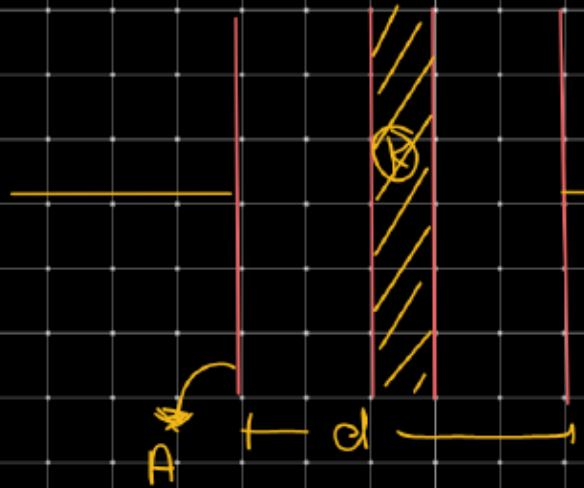
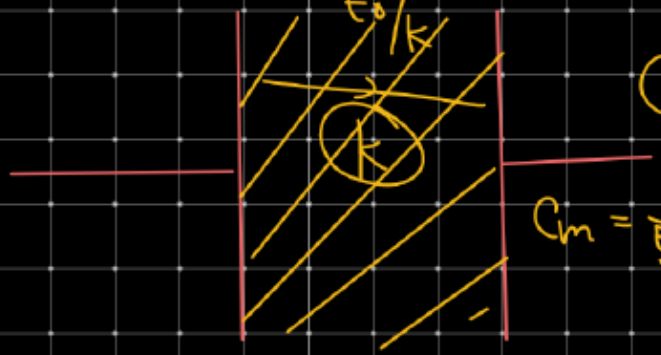
Capacitance of PPC If medium filled Partially:



$$C = \frac{A\varepsilon_0}{d}$$

$$C = \frac{Q}{\varepsilon_0 d} =$$

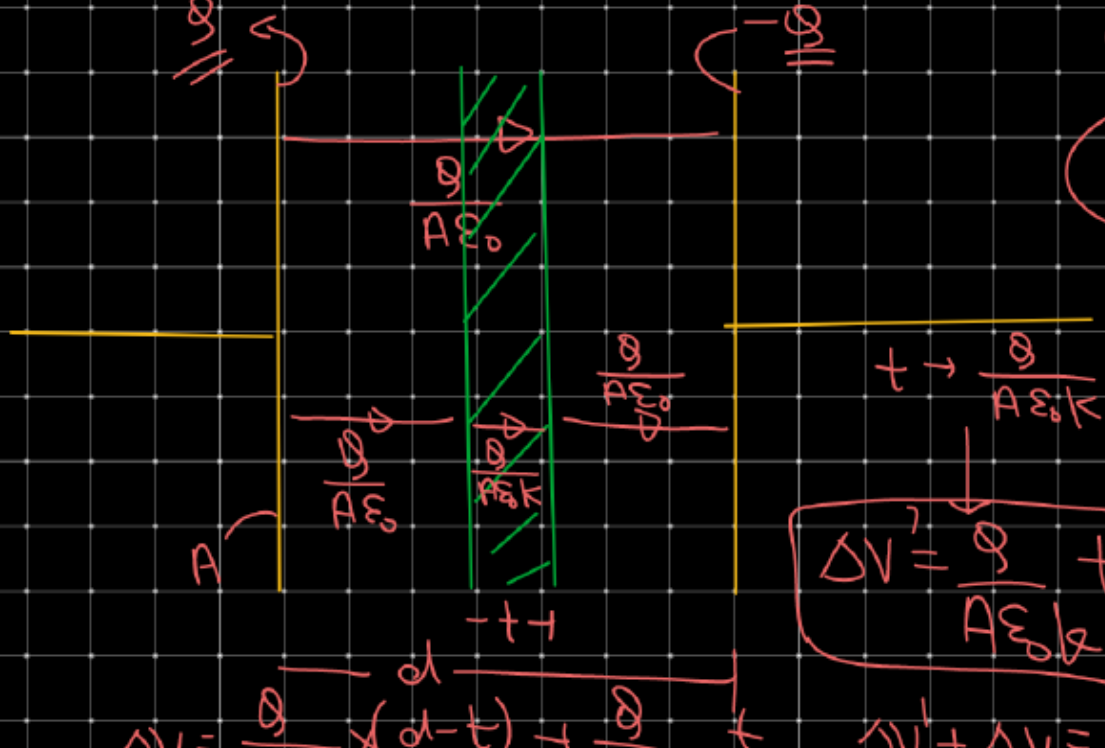




$$C_m = \frac{A\varepsilon_0 K}{d}$$

$$C_m = \frac{Q}{\frac{\varepsilon_0 d}{K}} = \frac{KQ}{\varepsilon_0 d}$$

□



① Fully charged.

$C = \frac{A\varepsilon_0}{d}$ Vacuum

$t \to \frac{Q}{A\varepsilon_0 k}$

$(d-t) \to \frac{Q}{A\varepsilon_0}$

$\Delta V' = \frac{Q}{A\varepsilon_0 k} t$

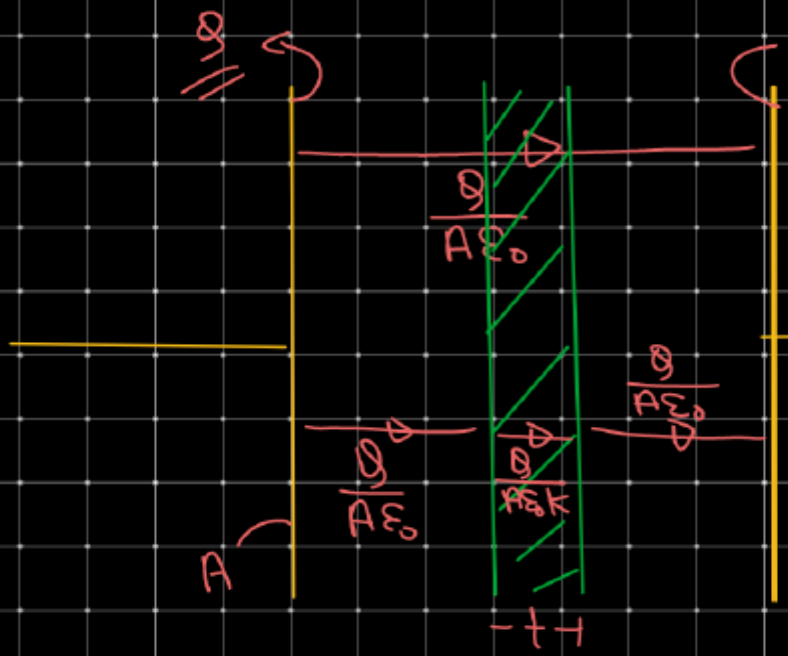
$\Delta V = \frac{Q}{A\varepsilon_0} (d-t)$

$\Delta V = \frac{Q}{A\varepsilon_0}(d-t) + \frac{Q}{A\varepsilon_0 k} t$

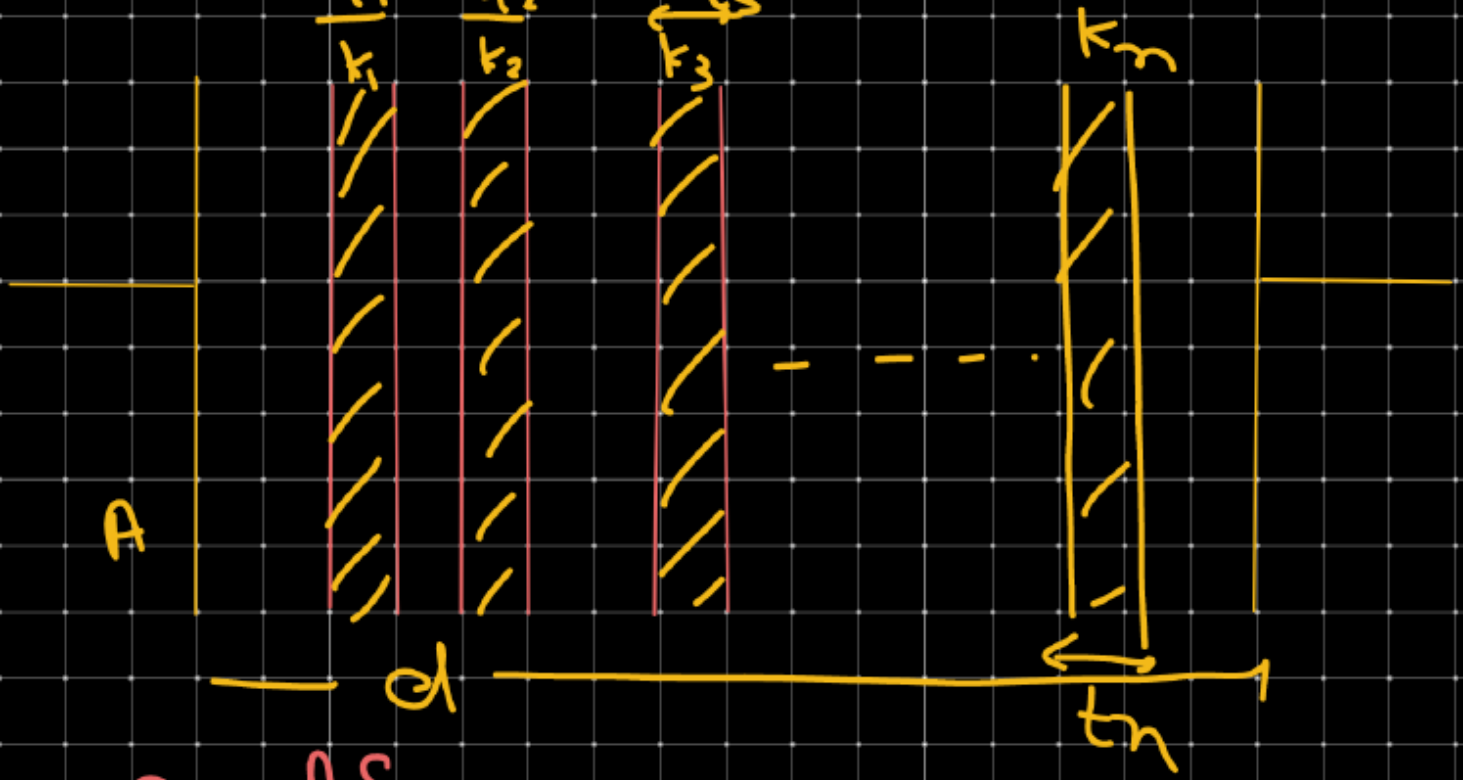
$\Delta V = \frac{Q}{A\varepsilon_0}\left(d - t + \frac{t}{k}\right)$

$\Delta V' + \Delta V =$

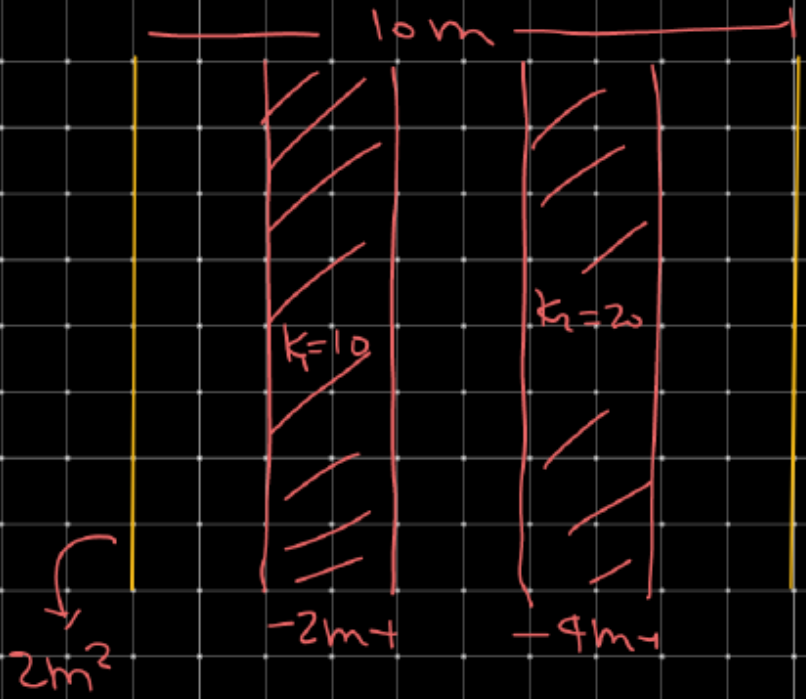
$C_{neu} = \frac{Q}{\Delta V} = \frac{Q}{\frac{Q}{A\varepsilon_0}\left(d - t + \frac{t}{k}\right)} = \frac{A\varepsilon_0}{(d-t) + \left(\frac{t}{k}\right)}$



$$C = \frac{A\varepsilon_0}{(d-t)+\frac{t}{K}}$$



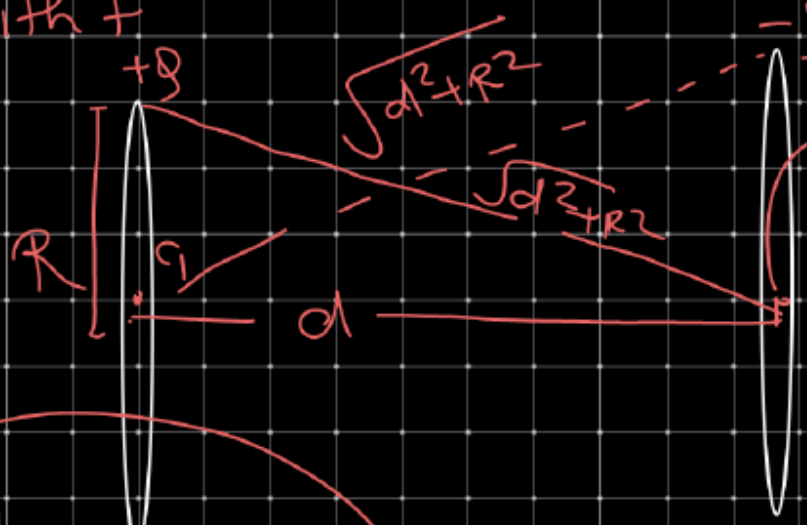
$$C = \frac{A\varepsilon_0}{\left[d-(t_1+t_2+t_3+\cdots+t_n)\right]+\frac{t_1}{K_1}+\frac{t_2}{K_2}+\cdots+\frac{t_n}{K_n}}$$



$$C = ?$$

$$C = \frac{A\varepsilon_0}{(10-2-4)+\frac{2}{10}+\frac{4}{20}}$$

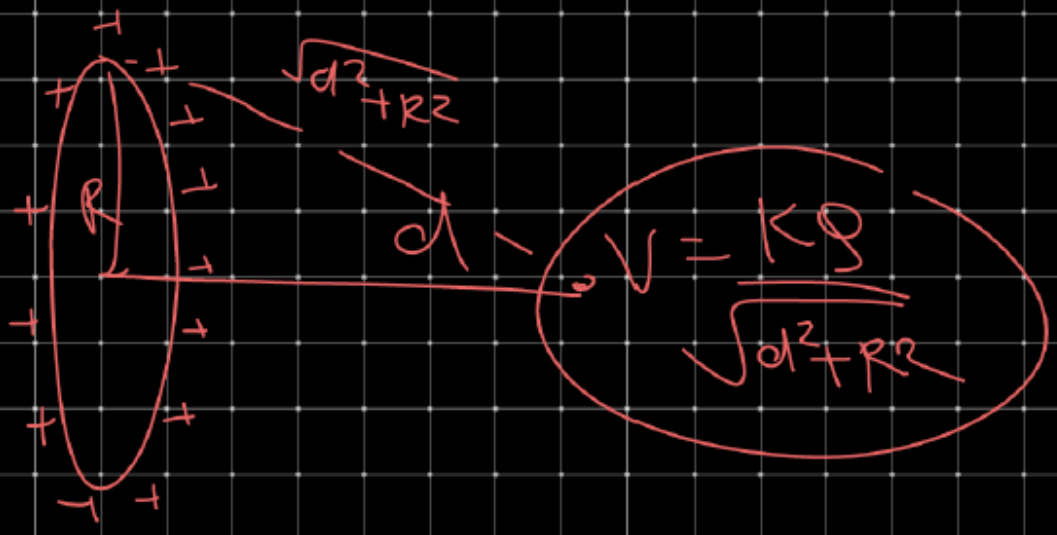
two thin wire rings each have radius R placed at distance d apart with +Q and −Q

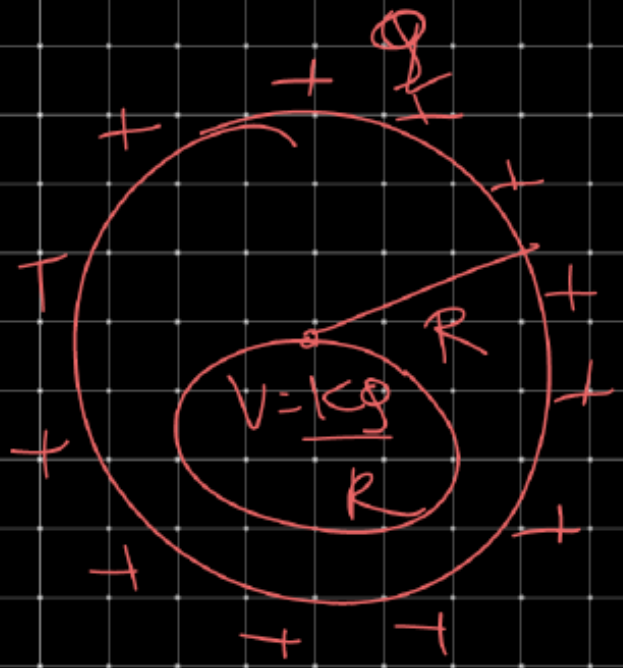


$V_1 = \frac{kQ}{R} - \frac{kQ}{\sqrt{d^2+R^2}}$

$V_2 = \frac{-kQ}{R} + \frac{kQ}{\sqrt{d^2+R^2}}$

$V_1 - V_2 = ?$


R
$\sqrt{d^2+R^2}$
d
$V = \frac{KQ}{\sqrt{d^2+R^2}}$


Q
R
V=kQ/R