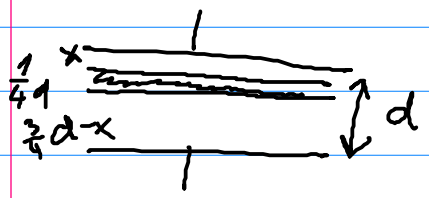
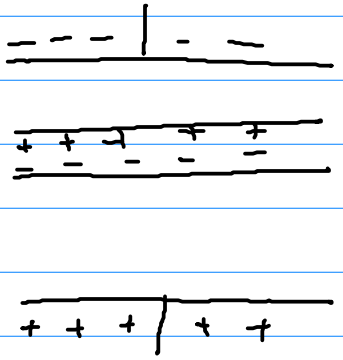
DESK. KOND. $C = 100\,pF$

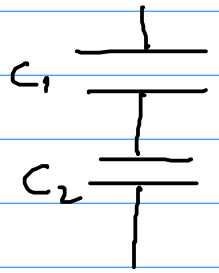


$C' = ?$

$$C = \frac{\varepsilon_0 \cdot S}{d}$$



$=$



$$\frac{1}{C'} = \frac{1}{C_1} + \frac{1}{C_2}$$

$$C_1 = \frac{\varepsilon S}{x}$$

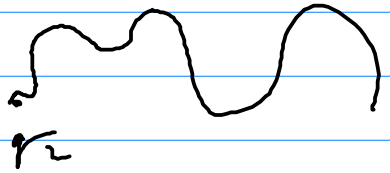
$$C_2 = \frac{\varepsilon_0 S}{\frac{3}{4}d - x}$$

$$\frac{1}{C'} = \frac{1}{\varepsilon_0 S}\left(x + \frac{3}{4}d - x\right) = \frac{3}{4}\frac{d}{\varepsilon_0 S}$$

$$C' = \frac{4}{3} C$$

ENERGIE NABOJŮ

- Zbodrť náboje q_1 R q_2

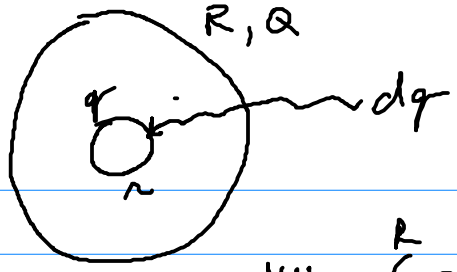


$$F = \frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{R^2}$$

$$E = \int_{\infty}^{R} \vec{F} \cdot d\vec{r} = \frac{q_1 q_2}{4\pi\varepsilon_0}\int_{\infty}^{R} \frac{1}{r^2}\,dr = -\frac{q_1 q_2}{4\pi\varepsilon_0}\cdot\frac{1}{R}$$

- N nábojů $\quad E = \frac{1}{2}\sum_{i}\sum_{i\neq j}\frac{q_i q_j}{4\pi\varepsilon_0}\cdot\frac{1}{R_{ij}}$

- NABITÁ KOULE (tloušťka)



$q = \frac{4}{3}\pi r^3 \rho$

$dW =$

$$dW = \int_0^R q \cdot dq\, dr / 4\pi\varepsilon_0 r^2 = -\frac{q\,dq}{4\pi\varepsilon_0}\,\frac{1}{R}$$

$$E = -W = \int_0^R \frac{q\,dq}{4\pi\varepsilon_0 r} = \frac{1}{4\pi\varepsilon_0}\int_0^R \frac{16}{3}\pi^2 r^4 \rho^2 dr$$

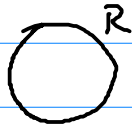
$$\frac{dq}{dr} = 4\pi r^2 \rho \qquad = \frac{4}{3}\frac{\pi\rho^2}{\varepsilon_0}\cdot\frac{R^5}{5}$$

$$dq = 4\pi r^2 \rho\, dr \qquad = \frac{4}{15}\frac{\pi\rho^2}{\varepsilon_0} R^5$$

$$Q^2 = \frac{16}{9}\pi^2 R^6 \rho^2$$

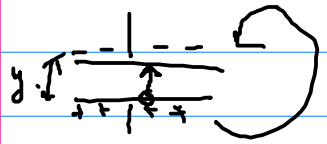
$$= \frac{1}{4\pi\varepsilon_0}\,\frac{3}{5}\,\frac{Q^2}{R} = \frac{3}{5}\,\frac{Q^2}{4\pi\varepsilon_0 R}$$

P.Ú.:



ENERGIE KULOVÉ VRSTVY SLUPEK

- ENERGIE KONDENZÁTORU



$U = \frac{Q}{C}$ a) $W_E = \int E^2 dV \cdot \frac{\varepsilon_0}{2}$

DESK. KOND. $E = \frac{\sigma}{\varepsilon_0} = \frac{Q}{S\varepsilon_0}$

b) $dW = \int_0^d \vec{E} \cdot dq \cdot dy$

$$W_E = \left(\frac{Q}{S\varepsilon_0}\right)^2 \cdot V \cdot \frac{\varepsilon_0}{2} =$$

$$= \frac{Q^2}{S^2\varepsilon_0^2}\, S \cdot d \cdot \frac{\varepsilon_0}{2} =$$

$$= \frac{1}{2}\frac{Q^2 d}{S\varepsilon_0} = \frac{1}{2}\frac{Q^2}{C}$$

DISKUSE:

$U = \frac{Q}{C}$

$dW = U \cdot dQ = \frac{Q}{C} dQ$

$$W = \frac{1}{2}\frac{Q^2}{C} = \frac{1}{2} C \cdot U^2$$