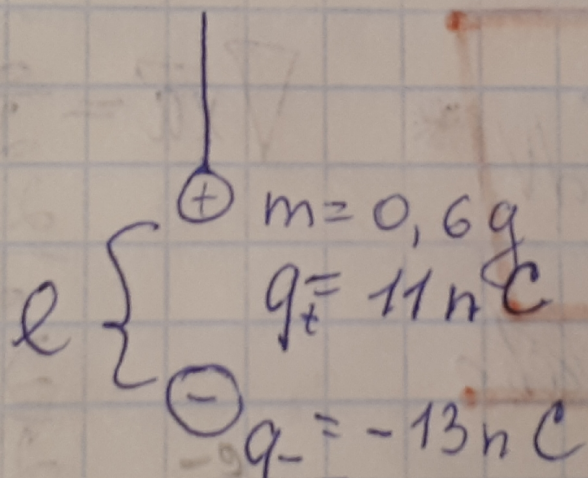


ovícen 1.

N3.

$$T_{\max} = 10 \text{ mN}$$

$l - ?$  kdy  $T > T_{\max}$



$$F_g + F_q > T_{\max}$$
$$mg + k \frac{q_+ q_-}{l^2} > T_{\max}$$

$$l < \sqrt{\frac{k q_+ q_-}{T_{\max} - mg}}$$

$$l < \sqrt{\frac{9 \cdot 10^9 \cdot 11 \cdot 13 \cdot 10^{-18}}{10 \cdot 10^{-3} - 0,6 \cdot 10^{-3} \cdot 10}} = \underline{\underline{17,9 \text{ mm}}}$$

CV. 2

$N \perp q = 5C, N = ? \quad \Delta m = ?$

a)  $N = \frac{q}{e} = \frac{5}{1,602 \cdot 10^{-19}} = 3,12 \cdot 10^{19}$

b)  $m = m_e \cdot N = 9,1 \cdot 10^{-31} \cdot 3,12 \cdot 10^{19} = 2,84 \cdot 10^{-11} \text{ kg}$

16.03.  
2020  
CV.

CV. 3-4

N3  $R, \rho, r; E, \varphi - ?$

a)  $r < R$

1)  $Q = \rho V = \frac{4}{3} \pi r^3 \rho$   
 ~~$E = \frac{F}{q}$~~  2)  $\Phi = \frac{Q}{\epsilon_0} = \oint \vec{E} \cdot d\vec{S} = E 4\pi r^2$

3)  $E = \frac{r \cdot \rho}{3\epsilon_0}$  4)  $\frac{Q}{Q_0} = \frac{\frac{4}{3} \pi r^3 \rho}{\frac{4}{3} \pi R^3 \rho} \Rightarrow Q = Q_0 \frac{r^3}{R^3}$

~~5)  $E = \frac{Q_0}{4\pi \epsilon_0 R^3}$~~

~~N6  $a = 20 \text{ cm} = 0,2 \text{ m} \quad R = 0,1 \text{ m} \quad Q = 1 \cdot 10^{-6} \text{ C} \quad \varphi - ?$~~

~~$S = \pi r^2$~~

$\varphi = - \int_{\infty}^R E_0 dr - \int_R^r E_{ad} dr$

$\varphi = - \int_{\infty}^R \frac{\rho R^3}{3\epsilon_0 r^2} dr - \int_R^r \frac{\rho r}{3\epsilon_0} dr$

$\varphi = - \frac{\rho R^3}{3\epsilon_0} \left(-\frac{1}{R}\right) - \frac{\rho}{3\epsilon_0} \left(\frac{r^2}{2} - \frac{R^2}{2}\right) \quad \varphi = \frac{\rho R^2}{6\epsilon_0} \left(3 - \frac{r^2}{R^2}\right)$

b)  $r > R$

$\oint \vec{E} \cdot d\vec{S} = E 4\pi r^2 = \frac{Q}{\epsilon_0}$

$E = \frac{Q}{4\pi r^2 \epsilon_0}$

$Q = \rho V = \frac{4}{3} \pi R^3 \rho$

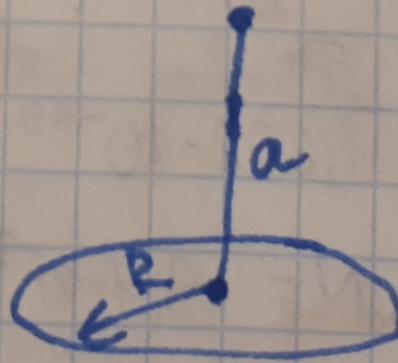
$E = \frac{\rho R^3}{3\epsilon_0 r^2}$

$$\underline{\varphi} = - \int_{\infty}^{\text{Body}(\vec{r})} \vec{E} d\vec{r} = - \int_{\infty}^r \frac{\rho R^3}{3\epsilon_0 r^2} dr = - \frac{\rho R^3}{3\epsilon_0} \int_{\infty}^r \frac{1}{r^2} dr =$$

$$= \underline{\underline{\frac{\rho R^3}{3\epsilon_0 r}}}$$

N 6

$$S = \pi R^2$$



$$R = 0,1 \text{ m} \quad a = 0,2 \text{ m}$$

$$q = 10^{-6} \text{ C}$$