

Rješenja zadatka za opštinsko takmičenje za devete razrede šk. 2014/2015

1) $q_1 = -5 \mu\text{C}$

$F_{12} = k \cdot q_1 \cdot q_2 / r_1^2$ - privlačna sila

$q_2 = 10 \mu\text{C}$

$F_{13} = k \cdot q_1 \cdot q_3 / r_2^2$ - privlačna sila

$q_3 = 6 \mu\text{C}$

F_{12} i F_{13} imaju isti pravac a suprotan smjer pa je $F = F_{12} - F_{13}$

$r_1 = r_2 = \frac{d}{2} = 5\text{cm}$

$F = kq_1 \left(\frac{q_2}{r_1^2} - \frac{q_3}{r_1^2} \right) = 72 \text{ N}$

$k = 9 \cdot 10^9 \frac{\text{Nm}^2}{\text{C}^2}$

$F = ?$

2) $E = 12 \text{ Va}$ $I = \frac{E}{R+r}$; $I = \frac{q}{t} \rightarrow q = \frac{Et}{R+r}$

$r = 0,25 \Omega$

$R = 2 \Omega$ $q = n \cdot e \rightarrow n = \frac{Et}{(R+r)e} \rightarrow n = 66,66 \cdot 10^{19}$

$t = 20 \text{ s}$

$D = 2\text{mm} \rightarrow r = 1\text{mm}$ b) $J = \frac{I}{s}$; $s = r^2 \pi$; $I = 5,33 \text{ A}$; $s = 3,14 \cdot 10^{-6} \text{ m}^2$

$e = 1,6 \cdot 10^{-19} \text{ C}$ $J = 1,69 \cdot 10^6 \frac{\text{A}}{\text{m}^2}$

$n = ?$ $J = ?$

3) $H_0 = 200 \text{ A/m}$ $E = \frac{\Delta \phi}{\Delta t} = \frac{\phi - \phi_0}{\Delta t}$; $\phi = Bs$; $\phi_0 = B_0 s$; $\phi = 3\phi_0$; $B = H \cdot \mu_0$

$t = 15 \text{ s}$ $B = 2500,12 \cdot 10^{-7} \text{ T}$; $s = r^2 \pi = 7850 \cdot 10^{-4} \text{ m}^2 = 0,785 \text{ m}^2$

$R = 100 \text{ cm} \rightarrow E = \frac{0,66Bs}{\Delta t} = 0,08635 \cdot 10^{-4} \text{ v}$

$r = 50 \text{ cm} = 0,5 \text{ m}$

$\mu_0 = 4\pi \cdot 10^{-7} \frac{\text{Tm}}{\text{A}}$

$E = ?$

$$4) m = 20 \text{ g} = 20 \cdot 10^{-3} \text{ kga) } T = 2\pi \sqrt{\frac{r}{g}}; T = 0.628 \text{ s}$$

$$r = 10 \text{ cm} = 0.1 \text{ m}$$

$$F = 0,5 \text{ N}$$

$$b) T = 2\pi \sqrt{\frac{r}{g+a}}; T = 1.05 \text{ s}$$

$$T = ?; T = ?$$

$$a = \frac{F}{m} = 25 \text{ m/s}^2$$