

RJEŠENJE ZADATAKA ZA DEVETI RAZRED

1)

$$m = 8 \text{ g} = 8 \cdot 10^{-3} \text{ kg}$$

$$q_1 = 100 \text{ nC} = 100 \cdot 10^{-9} \text{ C}$$

$$q_2 = 2 \text{ } \mu\text{C} = 2 \cdot 10^{-6} \text{ C}$$

$$F_{\text{rez}} = 89 \text{ mN} = 89 \cdot 10^{-3} \text{ N}$$

$$F_{\text{rez}} = F_k + G$$

$$F_k = F_{\text{rez}} - G$$

$$G = mg = 80 \cdot 10^{-3} \text{ N}$$

$$F_k = 9 \cdot 10^{-3} \text{ N}$$

$$F_k = k \frac{q_1 q_2}{r^2}$$

$$r = \sqrt{\frac{k q_1 q_2}{F}}$$

$$r = 4,47 \cdot 10^{-2} \text{ m}$$

(20 BODOVA)

2) $R = 9,5 \text{ } \Omega$

$$r = 0,5 \text{ } \Omega$$

$$E = 5 \text{ V}$$

$$I = ?, U = ?, I_{\text{max}} = ? \quad U = ?$$

$$I = \frac{E}{R+r} = 0,5 \text{ A}$$

$$U = I R = 4,75 \text{ V}$$

$$I_{\text{max}} = \frac{E}{r} = 10 \text{ A}$$

$$U = E - I r = 4,75 \text{ V}$$

(20 BODOVA)

3) $U = 220 \text{ V}$

$$m = 0,704 \text{ kg}$$

$$t_1 = 10 \text{ } ^\circ\text{C}$$

$$t_2 = 100 \text{ } ^\circ\text{C};$$

$$I = 2 \text{ A}$$

$$c = 4186 \text{ J/kg}\cdot\text{K}$$

a) $Q = m \cdot c \cdot (t_2 - t_1)$

$$Q = U \cdot I \cdot t$$

$$U \cdot I \cdot t = m \cdot c \cdot (t_2 - t_1)$$

$$t = \frac{m \cdot c \cdot (t_2 - t_1)}{U \cdot I}$$

$$t \approx 600 \text{ s} = 10 \text{ min}$$

b) $E = U \cdot I \cdot t = 220 \cdot 2 \cdot 600 \text{ VA s} = 264 \text{ kJ}$

$$E = 264 \text{ 000} \cdot 3600 \text{ Wh} = 73,33 \text{ Wh} = 0,073 \text{ kW} \quad \textbf{(20 BODOVA)}$$

4)

$$s = 1 \text{ mm}^2 = 10^{-6} \text{ m}^2$$
$$a = 20 \text{ cm}$$

$$H = 10 \text{ A/m}$$

$$\rho_{\text{Al}} = 0,027 \cdot 10^{-6} \Omega \text{m}$$

$$U = I R \quad (1)$$

$$U = \frac{\Delta \Phi}{\Delta t} \quad (2) \quad I z \quad (1) \quad i \quad (2) \rightarrow I = \frac{\Delta \Phi}{R \Delta t} \quad (3)$$

$$I = \frac{\Delta q}{\Delta t} \quad (4) \quad I z \quad (3) \quad i \quad (4) \rightarrow \Delta q = \frac{\Delta \Phi}{R} = 2,32 \cdot 10^{-5} \text{ C}$$

$$\Delta \Phi = B S = \mu_0 H a^2 = 4\pi \cdot 10^{-7} \text{ T} \cdot 10 \text{ A/m} \cdot 400 \cdot 10^{-4} \text{ m}^2 \rightarrow$$
$$\Delta \Phi = 5,024 \cdot 10^{-7} \text{ Wb}$$

$$R = \rho \frac{l}{s} = \rho \frac{4 a}{s} = 0,0216 \Omega$$

5) $U = 380 \text{ V}$

$$I = 25 \text{ A}$$

$$k = 78\% = 0,78$$

$$v = 0,5 \text{ m/s}$$

$$g = 9,81 \text{ m/s}^2$$

$$P_k = F \cdot v$$

$$P_k = k \cdot U \cdot I$$

$$F = mg$$

$$m = \frac{kUI}{vg}$$

$$m = 1511 \text{ kg}$$