

# DRŽAVNO NATJECANJE IZ FIZIKE

Brodarica, 25.-28. travnja 2016.

## Osnovna škola – rješenja i smjernice za bodovanje

1.

$$v = \lambda f$$

1 bod

$$v_{\text{zrak}} = 330 \text{ m/s}$$

1 bod

$$t_{\text{Cu}} = t_{\text{zrak}} - \Delta t$$

2 boda

$$v = s/t$$

1 bod

$$t_{\text{zrak}} = 1,109 \text{ s}$$

1 bod

$$s_1 = s_2 \quad v_{\text{zrak}} t_{\text{zrak}} = v_{\text{Cu}} t_{\text{Cu}}$$

1 bod

$$v_{\text{Cu}} = 3357,8 \text{ m/s} \quad (3355 \text{ m/s}) *$$

1 bod

$$f_{\text{Cu}} = f_z$$

1 bod

$$\lambda_{\text{Cu}} = 8,39 \text{ m}$$

1 bod

- Za izraz  $t_{\text{Cu}} = t_{\text{zrak}} - 1$  dodijeliti 1 bod

\* Ovisno o načinu računanja kalkulatorom

2.

$$v_p = 72 \text{ km/h} = 20 \text{ m/s}$$

1 bod

$$F_v = F_{\text{trenja}}$$

2 boda

$$F_{\text{trenja}} = ma$$

1 bod

$$a = 0,25 \text{ m/s}^2$$

1 bod

$$a = \Delta v / \Delta t$$

1 bod

$$\Delta t = 20 \text{ s}$$

1 bod

$$v_k = 15 \text{ m/s}$$

2 boda

3.

$$R_{AB} = R_{AC} = 1/2 R$$

1 bod

$$\frac{1}{R_{\text{par}}} = \frac{1}{R_z} + \frac{1}{R_{BC}}$$

2 boda

$$R_{\text{par}} = 5 \Omega$$

1 bod

$$R_{\text{ukupno}} = R_{AB} + R_{\text{par}}$$

1 bod

$$R_{\text{ukupno}} = 12 \Omega + 3 \Omega = 15 \Omega$$

bod

$$I = U/R$$

1 bod

$$I = 0,2 \text{ A}$$

1 bod

$$U_{BC} = U_z = 3 \cdot 0,2 = 0,6 \text{ V}$$

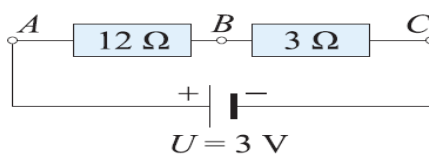
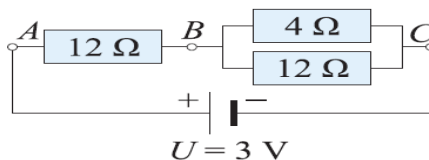
1 bod

$$I_z = U_z / R_z = 0,15 \text{ A}$$

1 bod

Kad klizač pomaknemo u točku A otpornik i baterija spojeni su paralelno na izvor. Struja kroz žaruljicu je veća, sjaj je jači.

2 boda



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4.

$P = W / t$	1bod
$\eta = P_{\text{korisno}} / P_{\text{uloženo}}$	1 bod
$Q = mc\Delta T$	1bod
$\eta = 0,58$	1 bod
$Q_{\text{dobiveno}} = Q_{\text{predano}}$	1 boda
$Q_{\text{dobiveno}} = m_m c_m (t_k - t_{\text{pm}}) + m_{\text{tj}} c_{\text{tj}} (t_k - t_{\text{ptj}})$	1 boda
$Q_{\text{predano}} = m_v c_v (t_{\text{vrenja}} - t_k)$	1 bod
$t_k = 85,42 \text{ }^{\circ}\text{C}$	1 bod
$W_{\text{dobiveno}} = Q_v + Q_m + Q_z = (m_v c_v + m_m c_m + m_z c_z) \Delta T_2$	2 boda
$W_{\text{dobiveno}} = 146529 \text{ J}$	1 bod
$W_{\text{uloženo}} = W_{\text{dobiveno}} / \eta = 252636,21 \text{ J}$	1 bod
$t = W_{\text{uloženo}} / P = 210,53 \text{ s}$	1 bod

5.

$F = k\Delta x$	1 bod
$F = mg$ ili $F_A = 10 \text{ N}$ $F_B = 20 \text{ N}$	1 bod
$l = l_0 - \Delta x$	1bod
$k = 400 \text{ N/m}$	1bod
$\Delta x_2 = 0,025 \text{ m}$	1 bod
$l_2 = l_0 - \Delta x = 7,5 \text{ cm}$	1 bod