

**Državno natjecanje iz fizike, 28.-29. travnja 2021.**

**Osnovne škole - rješenja**

<b>1. <math>s = vt</math></b>	1 bod
$t_M = t_E$	2 boda
$s_M = s_E + s_0$	1 bod
$t = 100 \text{ s}$	2 boda
$s_M = 300 \text{ m}$	1 bod
Mirna će sustići Emu na udaljenosti 300 m od Mirninog početnog položaja	1 bod
 <b>2. <math>a = \frac{\Delta v}{\Delta t}</math></b>	1 bod
Očitavanje iz dijagrama	4 boda
( za svaki uređeni par vrijednosti t,v po 2 boda, npr (20,20) ili (25,22) ili (30,24)... )	
$a = \frac{v_2 - v_1}{t_2 - t_1} = 0,4 \text{ m/s}^2$	1 bod
$F = ma$	1 bod
$F = k\Delta x$	1 bod
$F = 320 \text{ N}$	1 bod
$\Delta x = 0,07 \text{ m}$	1 bod
$L = L_0 + \Delta x$	1 bod
$L = 125 \text{ cm}$	1 bod
 <b>3. <math>Q = m c \Delta t</math></b>	1 bod
$Q = 5559,4 \text{ J}$	1 bod
$\eta = \frac{Q_{\text{dobiveno}}}{E_{\text{uloženo}}}$	1 bod
$E_{\text{uloženo}} = 22237,6 \text{ J} = 22,24 \text{ kJ}$	1 bod
$m_{\text{izgoreno}} = m_{\text{poč}} - m_{\text{kon}} = 0,37 \text{ g}$	1 bod
$E_{\text{uloženo}} / m_{\text{izgoreno}} = 60,1 \text{ kJ/g}$	2 boda
$t = 2 \cdot 45 \text{ min} = 1,5 \text{ h}$	1 bod
$E_{\text{pretvoreno na treningu}} = 2700 \text{ kJ}$	1 bod
$m_{\text{pojeden}} = 44,925 \text{ g}$	1 bod

$$4. R_s = R_1 + R_2 + R_3 + \dots \quad 1 \text{ bod}$$

$$R_s = nR \quad 1 \text{ bod}$$

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots \quad 1 \text{ bod}$$

$$\frac{1}{R_p} = \frac{n}{2R} \quad 1 \text{ bod}$$

$$R_2 = 4 \frac{R}{n} \quad 1 \text{ bod}$$

$$U = IR \quad 1 \text{ bod}$$

$$I_1 R_s = I_2 R_2 \quad 1 \text{ bod}$$

$$n^2 = 100 \quad 1 \text{ bod}$$

$$n = 10 \quad 1 \text{ bod}$$

$$R = 18 \, \Omega \quad 1 \text{ bod}$$

$$5. Q = Pt \quad 1 \text{ bod}$$

$$Q_1 = mc\Delta T_1 \quad 1 \text{ bod}$$

$$Q_{\text{taljenja}} = mL \quad 2 \text{ boda}$$

$$Q_2 = mc\Delta T_2 + mL \quad 2 \text{ boda}$$

$$P_1 = P_2 \quad 1 \text{ bod}$$

$$\frac{t_2}{t_1} = \frac{mc\Delta T_2 + mL}{mc\Delta T_1} \quad 1 \text{ bod}$$

$$L = 335 \text{ kJ/kg} \quad 2 \text{ boda}$$