

FIZIKA 9

*Oznaka **F9 01 01 00 01** – številka strani in zaporedna številka naloge v preizkusu

2. Poglavje: DELO IN ENERGIJA

FIZ9_02_01_00

F9 02 01 00 01

Sonce

F9 02 01 00 02

obnovljivi viri: geotermalna energija, energija vetra, sončna energija, energija vode, biomasa
neobnovljivi viri: nafta, premog, zemeljski plin

F9 02 01 00 03

Takrat, ko je v Sloveniji zima.

F9 02 01 00 04

ni direktnih sončnih žarkov

F9 02 01 00 05

plimovanje

F9 02 01 00 06

zmanjša; dvigati; veter; vetrnic

F9 02 01 00 07

Fosilna goriva so nastala iz odmrlih organizmov.
V Sloveniji imamo več hidroelektrarn.
Energija vode je obnovljivi vir energije.

F9 02 01 00 08

Ko se Sonce zdi najvišje na nebu.

F9 02 01 00 09

Ker je Zemljina os nagnjena.

F9 02 01 00 10

21. junija

FIZ9_02_02_00

F9 02 02 00 01

$$A = F \cdot s = 200 \text{ N} \cdot 500 \text{ m} = 100000 \text{ J}$$

$$A_{\text{skupno}} = A \cdot \text{število palčkov} = 7 \cdot 100000 \text{ J} = 700000 \text{ J}$$

F9 02 02 00 02

$$A = F \cdot s = 350 \text{ N} \cdot 1,2 \text{ m} = 420 \text{ J}$$

F9 02 02 00 03

$$s = A / F = 12000000 \text{ J} / 5000 \text{ N} = 2400 \text{ m} = 2,4 \text{ km}$$

F9 02 02 00 04

joule

F9 02 02 00 05

Veter ne opravi dela, saj piha pravokotno na progo.

F9 02 02 00 06

$$A = F_{\text{vzporedna}} \cdot s = 24 \text{ N} \cdot 0,45 \text{ m} = 10,8 \text{ J}$$

F9 02 02 00 07

$$A = - F \cdot s = - 54 \text{ N} \cdot 32 \text{ m} = - 1728 \text{ J}$$

F9 02 02 00 08

nazaj

F9 02 02 00 09

$$A = F \cdot s = 45 \text{ N} \cdot 2 \text{ m} = 90 \text{ J}$$

F9 02 02 00 10

Pomagamo si s skico, silo razstavimo na skici v gibanju pravokotno in vzporedno komponento. Vzporedna komponenta se izkaže, da je približno 260 N.

$$A = F_{\text{vzporedna}} \cdot s = 260 \text{ N} \cdot 10 \text{ m} = 2600 \text{ J} = 2,6 \text{ kJ}$$

F9 02 02 00 11

$$a = \Delta v / t = 30 \text{ m/s} / 3 \text{ s} = 10 \text{ m/s}^2$$

$$F = m \cdot a = 1500 \text{ kg} \cdot 10 \text{ m/s}^2 = 15000 \text{ N}$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 10 \text{ m/s}^2 \cdot (3 \text{ s})^2 = 45 \text{ m}$$

$$A = F \cdot s = 15000 \text{ N} \cdot 45 \text{ m} = 675000 \text{ J} = 675 \text{ kJ}$$

F9 02 02 00 12

$$F = A/s = 105000 \text{ J} / 15 \text{ m} = 7000 \text{ N} = 7 \text{ kN}$$

F9 02 02 00 13

$$\langle v \rangle = (v_1 + v_2)/2 = (10 \text{ m/s} + 15 \text{ m/s})/2 = 12,5 \text{ m/s}$$

$$t = s/\langle v \rangle = 100 \text{ m} / 12,5 \text{ m/s} = 8 \text{ s}$$

$$a = \Delta v/t = 5 \text{ m/s} / 8 \text{ s} = 0,625 \text{ m/s}^2$$

$$F = m \cdot a = 1200 \text{ kg} \cdot 0,625 \text{ m/s}^2 = 750 \text{ N}$$

$$A = F \cdot s = 750 \text{ N} \cdot 100 \text{ m} = 75000 \text{ J} = 75 \text{ kJ}$$

FIZ9_02_03_01

F9 02 03 01 01

mase, hitrosti

F9 02 03 01 02

$$W_k = \frac{1}{2} m \cdot v^2 = \frac{1}{2} \cdot 0,045 \text{ kg} \cdot (27,78 \text{ m/s})^2 = 17,36 \text{ J}$$

F9 02 03 01 03

Kinetična energija telesa je za polovico manjša.

F9 02 03 01 04

Kinetična energija se štirikrat poveča.

F9 02 03 01 05

$$m = W_k / (\frac{1}{2} v^2) = 768 \text{ J} / (\frac{1}{2} \cdot (16 \text{ m}^2/\text{s}^2)) = 6 \text{ kg}$$

F9 02 03 01 06

$$v = \sqrt{(W_k / (\frac{1}{2} \cdot m))} = \sqrt{(1417,5 \text{ J} / (\frac{1}{2} \cdot 1,4 \text{ kg}))} = 45 \text{ m/s} = 162 \text{ km/h}$$

F9 02 03 01 07

kinetična energija

F9 02 03 01 08

$$\Delta W_k = \Delta W_{\text{pot}} = 45 \text{ J}$$

F9 02 03 01 09

Štirikrat povečamo hitrost; Šestnajstkrat povečamo maso; Dvakrat povečamo hitrost in štirikrat maso

F9 02 03 01 10

$$v = 2 \pi \cdot r / t_0 = 2 \cdot \pi \cdot 6400000 \text{ m} / 86400 \text{ s} = 465,4 \text{ m/s}$$

$$W_k = \frac{1}{2} \cdot m \cdot v^2 = \frac{1}{2} \cdot 51 \text{ kg} \cdot (465,4 \text{ m/s})^2 = 5523729 \text{ J} = 5,5 \text{ MJ}$$

F9 02 03 01 11

$$v = s/t = 15 \text{ m} / 1200 \text{ s} = 0,0125 \text{ m/s}$$

$$W_k = \frac{1}{2} m \cdot v^2 = \frac{1}{2} \cdot 0,040 \text{ kg} \cdot (0,0125 \text{ m/s})^2 = 0,000003125 \text{ J} = 3,1 \cdot 10^{-6} \text{ J}$$

F9 02 03 01 12

$$v = 2 \pi \cdot r / t_0 = 2 \cdot \pi \cdot 150000000000 \text{ m} / 31557600 \text{ s} = 29865 \text{ m/s}$$

$$W_k = \frac{1}{2} m \cdot v^2 = \frac{1}{2} \cdot 6 \cdot 10^{24} \cdot (29865 \text{ m/s})^2 = 2675811866 \cdot 10^{24} \text{ J} = 2,7 \cdot 10^{33} \text{ J}$$

FIZ9_02_03_02

F9_02_03_02_01

$$\Delta W_p = m \cdot g \cdot \Delta h = 55 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 1849 \text{ m} = 1016950 \text{ J} = 1,02 \text{ MJ}$$

F9_02_03_02_02

$$\Delta W_p = m \cdot g \cdot \Delta h = 500 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 300 \text{ m} = 1500000 \text{ J} = 1,5 \text{ MJ}$$

F9_02_03_02_03

$$\Delta h_{\text{skupna}} = \Delta W_p / (m \cdot g) = 17300000000 \text{ J} / (150000 \text{ kg} \cdot 10 \text{ m/s}^2) = 11533,33 \text{ m}$$

$$\Delta h_{\text{drugi del}} = \Delta h_{\text{skupna}} - \Delta h_{\text{prvi del}} = 11533,33 \text{ m} - 9000 \text{ m} = 2533,33 \text{ m}$$

F9_02_03_02_04

hitrosti

F9_02_03_02_05

$$\Delta W_{p\text{Ana}} = m_{\text{Ana}} \cdot g \cdot \Delta h = 50 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 8 \text{ m} = 4000 \text{ J}$$

$$\Delta W_{p\text{Nik}} = m_{\text{Nik}} \cdot g \cdot \Delta h = 64 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 8 \text{ m} = 5120 \text{ J}$$

FIZ9_02_03_03

F9 02 03 03 01

ko ležiš na njej

F9 02 03 03 02

raztegnjena vzmet

F9 02 03 03 03

$$\Delta W_{\text{pr}} = \Delta W_{\text{pot}} = m \cdot g \cdot \Delta h = 55 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 2,5 \text{ m} = 1375 \text{ J}$$

F9 02 03 03 04

$$\Delta W_{\text{pr}} = \Delta W_{\text{pot}} = m \cdot g \cdot \Delta h = 0,057 \cdot 10 \text{ m/s}^2 \cdot 3 \text{ m} = 1,71 \text{ J}$$

F9 02 03 03 05

$$t = \sqrt{(s / (\frac{1}{2} \cdot a))} = \sqrt{(0,03 \text{ m} / (\frac{1}{2} \cdot 1000 \text{ m/s}^2))} = 0,00775 \text{ s}$$

$$\Delta v = a \cdot t = 1000 \text{ m/s}^2 \cdot 0,00775 \text{ s} = 7,75 \text{ m/s}$$

$$A = \Delta W_k = \frac{1}{2} \cdot m \cdot v^2 = \frac{1}{2} \cdot 0,018 \text{ kg} \cdot (7,75 \text{ m/s})^2 = 0,54 \text{ J}$$

$$\Delta W_{\text{pr}} = A = 0,54 \text{ J}$$

FIZ9_02_04_01

F9_02_04_01_01

$$\Delta W_{\text{pot}} = A = 750 \text{ J}$$

$$m = \Delta W_{\text{pot}} / (g \cdot \Delta h) = 750 \text{ J} / (10 \text{ m/s}^2 \cdot 1,5 \text{ m}) = 50 \text{ kg}$$

F9_02_04_01_02

$$A = \Delta W_k + \Delta W_{\text{pot}} =$$

$$= \left(\frac{1}{2} m \cdot v_k^2 - \frac{1}{2} m \cdot v_z^2 \right) + m \cdot g \cdot \Delta h =$$

$$= \left(\frac{1}{2} 390000 \text{ kg} \cdot (70 \text{ m/s})^2 - \frac{1}{2} 390000 \cdot (250 \text{ m/s})^2 \right) + 390000 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot (-12000 \text{ m}) =$$

$$= -5803200000 \text{ J} = -58 \text{ GJ}$$

$$A = \Delta W_{k2} = \frac{1}{2} m \cdot v_{k2}^2 - \frac{1}{2} m \cdot v_{k1}^2 =$$

$$= \frac{1}{2} \cdot 390000 \text{ kg} \cdot (0 \text{ m/s})^2 - \frac{1}{2} \cdot 390000 \text{ kg} \cdot (70 \text{ m/s})^2 = -955500000 \text{ J}$$

$$F = A/s = 955500000 \text{ J} / 1500 \text{ m} = 637000 \text{ N} = 637 \text{ kN}$$

$$a = F/m = 637000 \text{ N} / 390000 \text{ kg} = 1,63 \text{ m/s}^2$$

$$A = \Delta W_{k3} = \frac{1}{2} m \cdot v_{k2}^2 - \frac{1}{2} m \cdot v_{k3}^2 =$$

$$= \frac{1}{2} 390000 \text{ kg} \cdot (0 \text{ m/s})^2 - \frac{1}{2} 390000 \text{ kg} \cdot (100 \text{ m/s})^2 = -1950000000 \text{ J}$$

$$s = A/F = 1950000000 \text{ J} / 637000 \text{ N} = 3061 \text{ m} = 3 \text{ km}$$

F9_02_04_01_03

$$A = \Delta W_k + \Delta W_{\text{pot}} = \left(\frac{1}{2} m \cdot v_k^2 - \frac{1}{2} m \cdot v_z^2 \right) + m \cdot g \cdot \Delta h =$$

$$= \left(\frac{1}{2} \cdot 49 \text{ kg} \cdot (12 \text{ m/s})^2 - \frac{1}{2} \cdot 49 \text{ kg} \cdot (0 \text{ m/s})^2 \right) + 49 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot (-40 \text{ m}) =$$

$$= -16072 \text{ J}$$

$$= -16 \text{ kJ}$$

F9_02_04_01_04

$$A_{\text{max}} = F \cdot s = 0,08 \text{ N} \cdot 0,002 \text{ m} = 0,00016 \text{ J}$$

$$\Delta W_k = A_{\text{max}} = 0,00016 \text{ J}$$

Ker je zelena $v_k = 0 \text{ m/s}$, je $\Delta W_k = m \cdot v_z^2$

$$v_z = \sqrt{(\Delta W_k / (\frac{1}{2} \cdot m))} = \sqrt{(0,00016 \text{ J} / (\frac{1}{2} \cdot 0,0000214 \text{ kg}))} = 3,9 \text{ m/s}$$

F9_02_04_01_05

$$\Delta W_{k1} = \Delta W_{\text{pot}} = m \cdot g \cdot \Delta h = 50 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 140 \text{ m} = 70000 \text{ J}$$

$$W_{k1} = \Delta W_{k1} - W_{k0} = 70000 \text{ J}$$

$$W_{k2} = \frac{1}{2} m \cdot v_{\text{odprtopadalo}}^2 = \frac{1}{2} \cdot 50 \text{ kg} \cdot (7,78 \text{ m/s})^2 = 1512 \text{ J}$$

$$\Delta W_{k2} = W_{k2} - W_{k1} = 1512 \text{ J} - 70000 \text{ J} = 68487 \text{ J} = 68 \text{ kJ}$$

F9 02 04 01 06

$$\Delta W_{k1} = \frac{1}{2} m \cdot v^2 = \frac{1}{2} \cdot 5 \text{ kg} \cdot (9 \text{ m/s})^2 = 202,5 \text{ J}$$

$$\Delta W_{k2} = 14 \cdot \Delta W_{k1} = 2835 \text{ J}$$

$$A = \Delta W_k + \Delta W_{\text{pot}} = \Delta W_{k2} + m \cdot g \cdot \Delta h = 2835 \text{ J} + (5 \text{ kg} \cdot 14) \cdot 10 \text{ m/s}^2 \cdot (-500 \text{ m}) = \\ = -347165 \text{ J} = -347 \text{ kJ}$$

V rešitev vpišeš pozitivno vrednost.

F9 02 04 01 07

$$\Delta W_k = \Delta W_{\text{pot}}$$

$$\frac{1}{2} m \cdot v_k^2 - \frac{1}{2} m \cdot v_z^2 = m \cdot g \cdot \Delta h$$

$$\frac{1}{2} (v_k^2 - v_z^2) = g \cdot \Delta h$$

$$v_k^2 - v_z^2 = 2 \cdot g \cdot \Delta h$$

$$v_k^2 = 2 \cdot g \cdot \Delta h + v_z^2$$

$$v_k = \sqrt{(2 \cdot g \cdot \Delta h + v_z^2)} = \sqrt{(2 \cdot 10 \text{ m/s}^2 \cdot 80 \text{ m} + (10,4 \text{ m/s})^2)} = 41,3 \text{ m/s}$$

F9 02 04 01 08

$$\Delta W_k = \Delta W_{\text{pot}} = m \cdot g \cdot \Delta h = 0,45 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 1,25 \text{ m} = 5,625 \text{ J}$$

$$W_{k2} = W_{k1} + \Delta W_k = 0 + 5,625 \text{ J} = 5,625 \text{ J}$$

$$v_k = \sqrt{(W_{k2} / (\frac{1}{2} \cdot m))} = \sqrt{(5,625 \text{ J} / (\frac{1}{2} \cdot 0,45 \text{ kg}))} = 5 \text{ m/s}$$

F9 02 04 01 09

zunanjih; vsoti; potencialne; izrek; potencialni

F9 02 04 01 10

$$A = \Delta W_k = \frac{1}{2} m v_k^2 - \frac{1}{2} m v_z^2 = \frac{1}{2} \cdot 52 \text{ kg} \cdot (1,25 \text{ m/s})^2 - \frac{1}{2} \cdot 52 \text{ kg} \cdot (0 \text{ m/s})^2 = 40,6 \text{ J}$$

F9 02 04 01 11

$$A = \Delta W_k + \Delta W_{\text{pot}} = (\frac{1}{2} m v_k^2 - \frac{1}{2} m v_z^2) + m \cdot g \cdot \Delta h = \\ = (\frac{1}{2} \cdot 7000000 \text{ kg} \cdot (2,78 \text{ m/s})^2 - \frac{1}{2} \cdot 7000000 \text{ kg} \cdot (0 \text{ m/s})^2) + 7000000 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 200 \text{ m} \\ = 14027006173 \text{ J} = 14,0 \text{ GJ}$$

F9 02 04 01 12

V obeh primerih opravi enako dela.

F9 02 04 01 13

$$45 \text{ J}$$

FIZ9_02_04_02

F9 02 04 02 01

ne spreminja se

F9 02 04 02 02

$$\Delta W_k = A = 2,5 \text{ J}$$

$$W_{k2} = W_{k1} + \Delta W_k = 0 + 2,5 \text{ J} = 2,5 \text{ J}$$

$$v_k = \sqrt{(W_{k2} / (\frac{1}{2} m))} = \sqrt{(2,5 \text{ J} / (\frac{1}{2} \cdot 0,05 \text{ kg}))} = 10 \text{ m/s}$$

$$\Delta W_{\text{pot}} = \Delta W_k = 2,5 \text{ J}$$

$$\Delta h = \Delta W_{\text{pot}} / (m \cdot g) = 2,5 \text{ J} / (0,05 \text{ kg} \cdot 10 \text{ m/s}^2) = 5,0 \text{ m}$$

F9 02 04 02 03

$$\begin{aligned} A &= \Delta W_k + \Delta W_{\text{pot}} = (\frac{1}{2} m \cdot v_k^2 - \frac{1}{2} m \cdot v_z^2) + m \cdot g \cdot \Delta h = \\ &= (\frac{1}{2} \cdot 10 \text{ kg} \cdot (12 \text{ m/s})^2 - \frac{1}{2} \cdot 10 \text{ kg} \cdot (0 \text{ m/s}^2)) + 10 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot (-20 \text{ m}) = \\ &= -1280 \text{ J} \end{aligned}$$

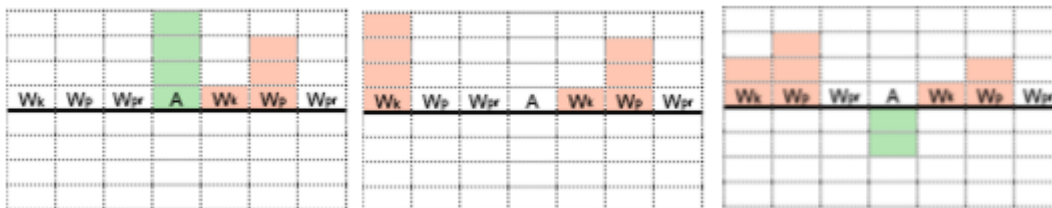
upora

$$F = A/s = 1280 \text{ J} / 12 \text{ m} = 64 \text{ N}$$

F9 02 04 02 04

Oba vozička sta pri dnu klanca enako hitra.

F9 02 04 02 05



F9 02 04 02 06

$$\Delta W_k = A = 0,144 \text{ J}$$

$$W_{k2} = W_{k1} + \Delta W_k = 0 + 0,144 \text{ J} = 0,144 \text{ J}$$

$$v = \sqrt{(W_{k2} / (\frac{1}{2} m))} = \sqrt{(0,144 \text{ J} / (\frac{1}{2} \cdot 0,03 \text{ kg}))} = 3 \text{ m/s}$$

$$\Delta W_{\text{pot}} = \Delta W_k = 0,144 \text{ J}$$

$$\Delta h = \Delta W_{\text{pot}} / (m \cdot g) = 0,144 \text{ J} / (0,03 \text{ kg} \cdot 10 \text{ m/s}^2) = 0,48 \text{ m} = 48 \text{ cm}$$

F9 02 04 02 07

$$\begin{aligned} \Delta W_{\text{pr}} = \Delta W_k &= \frac{1}{2} m \cdot v_k^2 - \frac{1}{2} m \cdot v_z^2 = \frac{1}{2} \cdot 0,08 \text{ kg} \cdot (3 \text{ m/s})^2 - \frac{1}{2} \cdot 0,08 \text{ kg} \cdot (0 \text{ m/s})^2 = 0,36 \text{ J} \\ &= 360 \text{ mJ} \end{aligned}$$

FIZ9_02_05_01

F9_02_05_01_01

$$F_1 \cdot s_1 = F_2 \cdot s_2$$

$$F_1 = m \cdot g = 300 \text{ kg} \cdot 10 \text{ m/s}^2 = 3000 \text{ N}$$

$$s_2 = F_1 \cdot s_1 / F_2 = 3000 \text{ N} \cdot 1,5 \text{ m} / 1500 \text{ N} = 3 \text{ m}$$

F9_02_05_01_02

$$F = A/s = 750 \text{ J} / 5 \text{ m} = 150 \text{ N}$$

F9_02_05_01_03

pot; sila; delo

F9_02_05_01_04

$$F_g = m \cdot g = 90 \text{ kg} \cdot 10 \text{ m/s}^2 = 900 \text{ N}$$

$$A_1 = F_g \cdot s = 900 \text{ N} \cdot 1 \text{ m} = 900 \text{ J}$$

$$A_2 = A_1 = 900 \text{ J}$$

F9_02_05_01_05

$$F_{\text{Jan}} = m_{\text{Jan}} \cdot g = 30 \text{ kg} \cdot 10 \text{ m/s}^2 = 300 \text{ N}$$

$$F_{\text{ŽanBrez}} = m_{\text{Žan}} \cdot g = 60 \text{ kg} \cdot 10 \text{ m/s}^2 = 600 \text{ N}$$

$$F_{\text{ŽanBrez}} \cdot s_{\text{Brez}} = F_{\text{ŽanzOrodjem}} \cdot s_{\text{sklanca}}$$

$$F_{\text{ŽanzOrodjem}} = F_{\text{ŽanBrez}} \cdot s_{\text{Brez}} / s_{\text{sklanca}} = 600 \text{ N} \cdot 1,5 \text{ m} / 3 \text{ m} = 300 \text{ N}$$

Oba sta uporabila enako silo.

FIZ9_02_05_02

F9_02_05_02_01

$$F_M \cdot d_M = F_B \cdot d_B$$

$$d_M = F_B \cdot d_B / F_M = 200 \text{ N} \cdot 3 \text{ m} / 300 \text{ N} = 2 \text{ m od sredine} = 1 \text{ meter od skrajnega roba}$$

F9_02_05_02_02

$$F_{\text{utež}} \cdot d_{\text{utež}} = F_{\text{gajbica}} \cdot d_{\text{gajbica}}$$

$$d_{\text{gajbica}} = F_{\text{utež}} \cdot d_{\text{utež}} / F_{\text{gajbica}} = 60 \text{ N} \cdot 2 \text{ m} / 150 \text{ N} = 0,8 \text{ m} = 80 \text{ cm od opore} = 280 \text{ cm od začetka deske}$$

$$F_{\text{dvig}} \cdot s_{\text{dvig}} = F_{\text{klanec}} \cdot s_{\text{klanec}}$$

$$F_{\text{klanec}} = F_{\text{dvig}} \cdot s_{\text{dvig}} / s_{\text{klanec}} = 150 \text{ N} \cdot 1 \text{ m} / 4 \text{ m} = 37,5 \text{ N}$$

$$F_{\text{lztok}} = F_{\text{klanec}} + F_{\text{trenje}} = 37,5 \text{ N} + 8 \text{ N} = 45,5 \text{ N}$$

F9_02_05_02_03

$$d_{\text{daljša}} = F_{\text{kleščice}} \cdot d_{\text{krajša}} / F_{\text{roke}} = 1000 \text{ N} \cdot 0,04 \text{ m} / 200 \text{ N} = 0,2 \text{ m} = 20 \text{ cm}$$

F9_02_05_02_04

$$F_{\text{utež}} = F_{\text{beton}} \cdot d_{\text{beton}} / d_{\text{utež}} = 5000 \text{ N} \cdot 8 \text{ m} / 2 \text{ m} = 20000 \text{ N}$$

$$m_{\text{utež}} = F_{\text{utež}} / g = 2000 \text{ kg}$$

F9_02_05_02_05

$$d_{\text{večje}} = F_{\text{manjše}} \cdot d_{\text{manjše}} / F_{\text{večje}} = 70 \text{ N} \cdot 1 \text{ m} / 120 \text{ N} = 0,6 \text{ m}$$

F9_02_05_02_06

$$d_{\text{vojaki}} = F_{\text{skala}} \cdot d_{\text{skala}} / F_{\text{vojaki}} = 9000 \text{ N} \cdot 1 \text{ m} / 3000 \text{ N} = 3 \text{ m}$$

F9_02_05_02_07

Oba opravita enako dela.

FIZ9_02_05_03

F9 02 05 03 01

$$F_{\text{gibljivi škripec}} = F_g / 2 = 300 \text{ N} / 2 = 150 \text{ N}$$

F9 02 05 03 02

$$F_{\text{škripečje}} = F_g / 2 = 500 \text{ N} / 2 = 250 \text{ N} \text{ (ker imamo en gibljiv škripec)}$$

F9 02 05 03 03

$$F_{\text{gibljivi škripec}} = F_g / 2 = 620 \text{ N} / 2 = 310 \text{ N}$$

F9 02 05 03 04

$$F_{\text{kratek}} = F_{\text{dolg}} \cdot d_{\text{dolg}} / d_{\text{kratek}} = 700 \text{ N} \cdot 4 / 1 = 2800 \text{ N}$$

$$F_g = m \cdot g = 4000 \text{ N}$$

$$F_{\text{škripec}} = F_g - F_{\text{kratek}} = 4000 \text{ N} - 2800 \text{ N} = 1200 \text{ N}$$

$$F_{\text{vlečna}} = F_{\text{škripec}} / 2 = 600 \text{ N}$$

F9 02 05 03 05

$$A_{\text{vlečne}} = F \cdot s = 205 \text{ N} \cdot 12 \text{ m} = 2460 \text{ J} = 2,5 \text{ kJ}$$

$$F_{\text{vlečna}} = F_g / 2 = 102,5 \text{ N} = 103 \text{ N} \text{ (ker imamo en gibljivi škripec)}$$

$$A_{\text{Zemlje}} = A_{\text{vlečne}} = 2,5 \text{ kJ}$$

F9 02 05 03 06

$$F_{\text{škripec}} = 2 \cdot F_{\text{vlečna}} = 220 \text{ N} \text{ (ker imamo en gibljivi škripec)}$$

$$a = (F_{\text{škripec}} - F_g) / m = (220 \text{ N} - 200 \text{ N}) / 20 \text{ kg} = 1 \text{ m/s}^2$$

F9 02 05 03 07

Oba opravita enako dela.

F9 02 05 03 08

$$F_{\text{vlečna}} = F_g = 650 \text{ N}$$

FIZ9_02_06_00

F9 02 06 00 01

$$P = A/t = 200000 \text{ J} / 10 \text{ s} = 20000 \text{ W}$$

F9 02 06 00 02

$$P = A/t = 12000 \text{ J} / 1800 \text{ s} = 6,67 \text{ W}$$

F9 02 06 00 03

$$A = F \cdot s = 800 \text{ N} \cdot 25 \text{ m} = 20000 \text{ J}$$

$$t = A/P = 20000 \text{ J} / 1000 \text{ W} = 20 \text{ s}$$

F9 02 06 00 04

$$P = A/t = F \cdot s / t = F \cdot v = 15250 \text{ N} \cdot 2,5 \text{ m/s} = 38125 \text{ W} = 38,1 \text{ kW}$$

F9 02 06 00 05

$$a = \Delta v/t = 44,7 \text{ m/s} / 8 \text{ s} = 5,59 \text{ m/s}^2$$

$$F_{\text{motorjev}} - F_g = m \cdot a$$

$$F_{\text{motorjev}} = m \cdot a + F_g = 2000000 \text{ kg} \cdot 5,59 \text{ m/s}^2 + 2000000 \text{ kg} \cdot 10 \text{ m/s}^2 = 31180000 \text{ N}$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 5,59 \text{ m/s}^2 \cdot (8 \text{ s})^2 = 178,88 \text{ m}$$

$$A = F \cdot s = 31180000 \text{ N} \cdot 178,88 \text{ m} = 5577478400 \text{ J}$$

$$P = A/t = 5577478400 \text{ J} / 8 \text{ s} = 697184800 \text{ W} = 0,7 \text{ GW}$$

F9 02 06 00 06

$$F = P/v = 4800000 \text{ W} / 33,33 \text{ m/s} = 144000 \text{ N} = 144 \text{ kN}$$

F9 02 06 00 07

$$a = \Delta v/t = 6 \text{ m/s} / 120 \text{ s} = 0,05 \text{ m/s}^2$$

$$F = m \cdot a = 498 \text{ kg} \cdot 0,05 \text{ m/s}^2 = 24,9 \text{ N}$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 0,05 \text{ m/s}^2 \cdot (120 \text{ s})^2 = 360 \text{ m}$$

$$A = F \cdot s = 24,9 \text{ N} \cdot 360 \text{ m} = 8964 \text{ J}$$

$$P = A/t = 8964 \text{ J} / 120 \text{ s} = 74,7 \text{ W}$$

F9 02 06 00 08

$$A = \Delta W_k + \Delta W_{\text{pot}} = (\frac{1}{2} \cdot m \cdot v_k^2 - \frac{1}{2} \cdot m \cdot v_z^2) + m \cdot g \cdot \Delta h =$$

$$= (\frac{1}{2} \cdot 25000 \text{ kg} \cdot (100 \text{ m/s})^2 - \frac{1}{2} \cdot 25000 \text{ kg} \cdot (50 \text{ m/s})^2) + 25000 \text{ kg} \cdot 10 \text{ m/s}^2 \cdot 3000 \text{ m} =$$

$$= 843750000 \text{ J}$$

$$P = A/t = 843750000 \text{ J} / 300 \text{ s} = 2812500 \text{ W} = 2,8 \text{ MW}$$

F9 02 06 00 09

Ko dviguje vse knjige naenkrat.

F9 02 06 00 10

$$a = \Delta v / t = 13,9 \text{ m/s} / 10 \text{ s} = 1,39 \text{ m/s}^2$$

$$F = m \cdot a = 1800 \text{ kg} \cdot 1,39 \text{ m/s}^2 = 2502 \text{ N}$$

$$s = \frac{1}{2} a \cdot t^2 = \frac{1}{2} \cdot 1,39 \text{ m/s}^2 \cdot (10 \text{ s})^2 = 69,5 \text{ m}$$

$$A = F \cdot s = 2502 \text{ N} \cdot 69,5 \text{ m} = 173889 \text{ J}$$

$$P = A / t = 173889 \text{ J} / 10 \text{ s} = 17389 \text{ W} = 17 \text{ kW}$$