

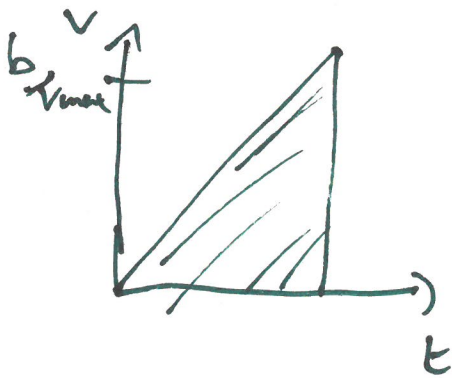
$v/2$

$$m = 1.2t = 1200 \text{ kg}$$

$$\Delta t = 12 \text{ s}$$

$$v_{\max} = 100 \text{ km/h} = 27,8 \text{ m/s}$$

$$a) F = m \cdot a = m \cdot \frac{\Delta v}{\Delta t} = 1200 \text{ kg} \cdot \frac{27,8 \text{ m/s}}{12 \text{ s}} = \underline{\underline{2780 \text{ N}}}$$



$$s = \frac{v_{\max}}{2} \cdot \Delta t = \frac{27,8 \text{ m/s}}{2} \cdot 12 \text{ s} = \underline{\underline{166,8 \text{ m}}}$$

$$c) W = F \cdot s = 2780 \text{ N} \cdot 166,8 \text{ m} = 463704 \text{ J} = 463,7 \text{ kJ}$$

$$d) P = \frac{W}{t} = \frac{463704 \text{ J}}{12 \text{ s}} = 38642 \text{ W (Watt)} = 38,6 \text{ kW}$$

e,

$$E_{kin} = \frac{1}{2} m v^2 = \frac{1}{2} \cdot 1200 \text{ kg} \cdot (27,8 \text{ m/s})^2 =$$

$$= 463704 \text{ J} = 463,7 \text{ kJ}$$

$$\textcircled{V/4.}$$

$$m = 70 \text{ g} = 0,07 \text{ kg}$$

$$h = 15 \text{ cm} = 0,15 \text{ m}$$

$$v = 30 \text{ cm/s} = 0,3 \text{ m/s}$$

$$\begin{aligned} a, W_{\text{emelési}} &= m \cdot g \cdot h = 0,07 \text{ kg} \cdot 9,81 \text{ m/s}^2 \cdot 0,15 \text{ m} = \\ &= 0,103 \text{ J} \end{aligned}$$

$$\begin{aligned} b, W_{\text{mozgási}} &= E_{\text{kin}} = \frac{1}{2} m v^2 = \frac{1}{2} \cdot 0,07 \text{ kg} \cdot (0,3 \text{ m/s})^2 = \\ &= 0,00315 \text{ J} = 3,15 \text{ mJ} \end{aligned}$$

$$c, P = \frac{W}{t}$$

$$\begin{aligned} W_{\text{teljes}} &= W_{\text{emelési}} + W_{\text{mozgási}} = 0,103 \text{ J} + 0,00315 \text{ J} = \\ &= 0,10615 \text{ J} \end{aligned}$$

$$P = \frac{W_{\text{teljes}}}{t} = \frac{0,10615 \text{ J}}{0,2 \text{ s}} = 0,531 \text{ W}$$

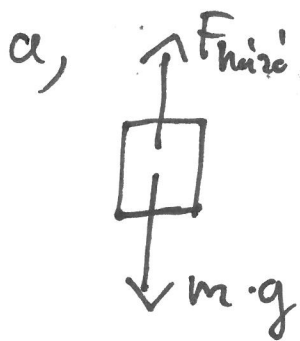
V15.

$$m = 12 \text{ kg} \rightarrow 10 \text{ kg víz} + 2 \text{ kg vödör}$$

$$h = 8 \text{ m}$$

$$v = 50 \text{ cm/s} = 0.5 \text{ m/s}$$

$$a = \emptyset$$



$$\Sigma F = m \cdot a = \emptyset$$

$$F_{\text{híze}} = m \cdot g = 12 \text{ kg} \cdot 9.81 \text{ m/s}^2 = \\ = 117.7 \text{ N}$$

$$b, W = F_{\text{híze}} \cdot s = m \cdot g \cdot h = 117.7 \text{ N} \cdot 8 \text{ m} = 941.7 \text{ J}$$

$$c, P = \frac{W}{t} = \frac{941.77}{16 \text{ s}} = 58.85 \text{ W}$$

$$t = \frac{s}{v} = \frac{h}{v} = \frac{8 \text{ m}}{0.5 \text{ m/s}} = 16 \text{ s}$$

$$d, 4.8 \text{ m}^3 = 4.8 \cdot 10^3 \text{ dm}^3 = 4800 \text{ l}$$

1 vödör \rightarrow 10 l \Rightarrow 480 felhúzás

$$W_{\text{total}} = 480 \cdot 941.7 \text{ J} = 451968 \text{ J} = 107868 \text{ cal} \approx 107.9 \text{ kcal}$$

$$\textcircled{V/g.}$$

$$m = 0.8 \text{ kg}$$

$$h_1 = 2 \text{ m}$$

$$h_2 = 1,2 \text{ m}$$

$$\Delta h = h_1 - h_2 = 2 \text{ m} - 1,2 \text{ m} = 0,8 \text{ m}$$

$$\begin{aligned} E_{\text{pot}1} - E_{\text{pot}2} &= m \cdot g \cdot h_1 - m \cdot g \cdot h_2 = m \cdot g \cdot \Delta h = \\ &= 0,8 \text{ kg} \cdot 9,81 \text{ m/s}^2 \cdot 0,8 \text{ m} = 6,287 \end{aligned}$$

V/7.

$$D = k = 3 \cdot 10^5 \text{ N/m}$$

$$s = x = 2 \text{ mm} = 2 \cdot 10^{-3} \text{ m}$$

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$$E_{\text{regulans}} = \frac{1}{2} D \cdot s^2 = \frac{1}{2} \cdot 3 \cdot 10^5 \text{ N/m} \cdot (2 \cdot 10^{-3} \text{ m})^2 =$$
$$= 0,6 \text{ J}$$

V/10.

$$E = m \cdot c^2 = 9,11 \cdot 10^{-31} \text{ kg} \cdot \left(3 \cdot 10^8 \text{ m/s} \right)^2 =$$
$$= 8,2 \cdot 10^{-14} \text{ J}$$

$$1 \text{ eV} = 1,6 \cdot 10^{-19} \text{ J}$$

$$E[\text{eV}] = \frac{8,2 \cdot 10^{-14} \text{ J}}{1,6 \cdot 10^{-19} \text{ J/eV}} = 512438 \text{ eV} \approx 512,4 \text{ keV}$$
$$= 512,4 \text{ keV}$$

V1/2.

$$P = \frac{F}{A} = \frac{100 \text{ N}}{10^{-6} \text{ m}^2} = 10^8 \text{ Pa} = 100 \text{ MPa}$$

$$A = 1 \text{ mm}^2 = (10^{-3})^2 \text{ m}^2 = 10^{-6} \text{ m}^2$$

V1/3.

$$a, m = 70 \text{ kg}$$

$$A = 200 \text{ cm}^2 = 200 \cdot 10^{-4} \text{ m}^2 = 0,02 \text{ m}^2$$

$$P = \frac{F}{A} = \frac{m \cdot g}{A} = \frac{70 \text{ kg} \cdot 9,81 \text{ m/s}^2}{0,02 \text{ m}^2} = 34335 \text{ Pa} = 34,3 \text{ kPa}$$

$$b, A = 4 \text{ cm}^2 = 4 \cdot 10^{-4} \text{ m}^2$$

$$P = \frac{70 \text{ kg} \cdot 9,81 \text{ m/s}^2}{4 \cdot 10^{-4} \text{ m}^2} = 1,72 \cdot 10^6 \text{ Pa} = 1,72 \text{ MPa}$$

V1/5.

$$x = 10 \text{ cm} = 0,1 \text{ m}$$

$$m = \rho \cdot V$$

$$V = x^3 = (0,1 \text{ m})^3 = 10^{-3} \text{ m}^3$$

$$\rho = 19,3 \text{ g/cm}^3 = 19\,300 \text{ kg/m}^3$$

$$m = \rho \cdot V = 19\,300 \text{ kg/m}^3 \cdot 10^{-3} \text{ m}^3 = 19,3 \text{ kg}$$

$$b, A = x^2 = (0,1 \text{ m})^2 = 0,01 \text{ m}^2$$

$$p = \frac{F}{A} = \frac{m \cdot g}{A} = \frac{19,3 \text{ kg} \cdot 9,81 \text{ m/s}^2}{0,01 \text{ m}^2} = 18\,933 \text{ Pa} = 18,9 \text{ kPa}$$