

$v/2$

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

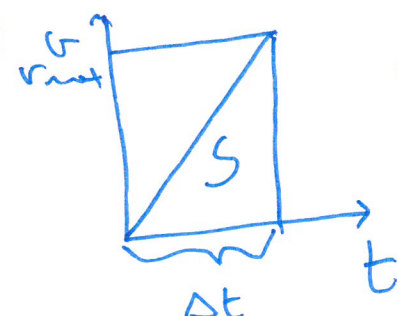
$$\Delta t = 12 \text{ s}$$

$$v_{\text{max}} = 100 \text{ km/h} = 27,8 \text{ m/s} \quad [13,6!]$$

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

\downarrow
 $\frac{\Delta v}{\Delta t}$

b.)


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

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

\downarrow
 $463,7 \text{ kJ}$

$$d) \quad P = \frac{W}{t} = \frac{463704 \text{ J}}{12 \text{ s}} = 38642 \text{ W} = 38,642 \text{ kW}$$

$$F = m \cdot a$$

\downarrow
 $\frac{\Delta v}{\Delta t}$

V/4

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

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

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

$$a.) \quad W = F \cdot s = m \cdot g \cdot h = 0,07 \text{ kg} \cdot \overbrace{9,81 \frac{\text{m}}{\text{s}^2}}^N \cdot 0,15 \text{ m} =$$

$$\quad \quad \quad \downarrow \quad \downarrow$$

$$\quad \quad \quad m \cdot g \quad h$$

$$\quad \quad \quad \underline{0,103 \text{ J}}$$

$$b.) \quad W_{\text{gyarmítás}} = E_{\text{kin}} = \frac{1}{2} \cdot m \cdot v^2 = \frac{1}{2} \cdot 0,07 \text{ kg} \cdot \left(0,3 \frac{\text{m}}{\text{s}}\right)^2 =$$

$$= 0,00315 \text{ J} = 3,15 \text{ mJ}$$

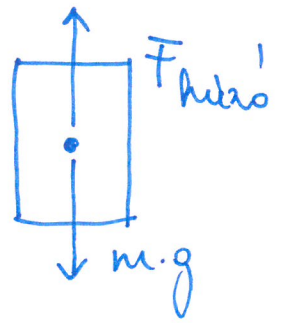
$$c.) \quad P = \frac{W}{t} = \frac{0,10615 \text{ J}}{0,2 \text{ s}} = 0,531 \text{ W}$$

$$W_{\text{teljes}} = 0,103 \text{ J} + 0,00315 \text{ J} = 0,10615 \text{ J}$$

V/5 $m = 12 \text{ kg} \rightarrow 10 \text{ kg v\ddot{a}t} + 2 \text{ kg v\ddot{o}d\ddot{a}r}$

$h = 8 \text{ m}$

$v = 50 \text{ cm/s} = 0,5 \text{ m/s}$



a.) $\sum F = m \cdot a = 0$

$a = 0$

$F_{hiss} = m \cdot g = 12 \text{ kg} \cdot 9,81 \frac{\text{m}}{\text{s}^2} = \underline{\underline{117,7 \text{ N}}}$

b.) $W = F_{hiss} \cdot s = \overset{\uparrow F_{hiss}}{\underset{\downarrow h!}{m \cdot g}} \cdot h = 117,7 \text{ N} \cdot 8 \text{ m} = \underline{\underline{941,7 \text{ J}}}$

c.) $P = \frac{W}{\underset{?}{t}}$ $t = \frac{s}{v} = \frac{h}{v} = \frac{8 \text{ m}}{0,5 \frac{\text{m}}{\text{s}}} = \underline{\underline{16 \text{ s}}}$

$P = \frac{W}{t} = \frac{941,7 \text{ J}}{16 \text{ s}} = 58,85 \text{ W}$

d.) $4,8 \text{ m}^3 \rightarrow 4800 \text{ dm}^3 = \underline{\underline{4800 \text{ l}}}$
 $1 \text{ v\ddot{o}d\ddot{a}r} = \underline{\underline{10 \text{ l}}} \rightarrow 480 \times \text{fl\ddot{a}skor!}$

$W_{\text{\ddot{o}rme}} = 941,7 \text{ J} \cdot 480 = \frac{451\,968 \text{ J}}{4,19} = 107\,868 \text{ cal}$
 \downarrow
 $107,868 \text{ kcal}$

V/9

$$m = 0,8 \text{ kg}$$

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

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

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

$$\begin{aligned} E_{\text{pot}_1} - E_{\text{pot}_2} &= m \cdot g \cdot h_1 - m \cdot g \cdot h_2 = m \cdot g \cdot \Delta h = \\ &= 0,8 \text{ kg} \cdot 9,81 \frac{\text{m}}{\text{s}^2} \cdot 0,8 \text{ m} = \underline{\underline{6,28 \text{ J}}} \end{aligned}$$

V/7

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

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

$$E_{\text{resilienz}} = \frac{1}{2} \cdot D \cdot s^2 = \frac{1}{2} \cdot 3 \cdot 10^5 \frac{\text{N}}{\text{m}} \cdot (2 \cdot 10^{-3} \text{ m})^2 =$$

$$\underline{\underline{0,6 \text{ J}}}$$

v/10.

$$m_e = 9,11 \cdot 10^{-31} \text{ kg}$$

$$c = 3 \cdot 10^8 \text{ m/s}$$

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

$$= 8,2 \cdot 10^{-14} \text{ J}$$

$$E_{\text{eV}} = \frac{8,2 \cdot 10^{-14} \text{ J}}{1,6 \cdot 10^{-19} \text{ J/eV}} = 512.438 \text{ eV} = 512,4 \text{ keV}$$