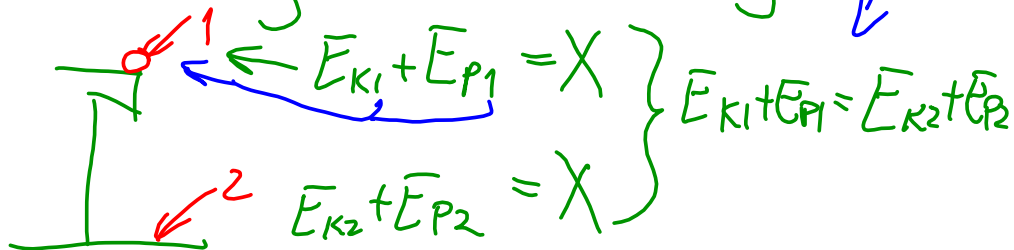


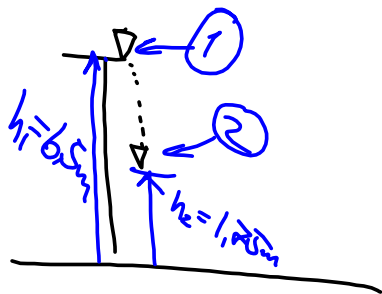
Mekanisk energi:

$$E_m = E_K + E_P$$

Bevaring av mekanisk energi



4.12



$$E_{P1} + E_{K1} = E_{P2} + E_{K2}$$

$$m \cdot g \cdot h_1 = m \cdot g \cdot h_2 + \frac{1}{2} m v^2$$

$$(h_1 - h_2)g = \frac{1}{2} v^2$$

$$v^2 = 2(h_1 - h_2)g$$

$$v = \sqrt{2 \cdot (h_1 - h_2)g} = \sqrt{2 \cdot (6,5 - 1,75) \cdot 9,81} = 9,7 \text{ [m/s]}$$

b) $h_1 - h_2$ blir mindre $\Rightarrow v$ mindre

c) $F = m \cdot g$

F blir mindre da m er mindre

4.23

a) Arbeid : Joule $\Rightarrow [J] = [N \cdot m]$

b) Effekt : Watt $\Rightarrow [W] = \frac{[J]}{[s]}$

$$\frac{J}{s} = \frac{N \cdot m}{s} = \frac{kg \cdot \frac{m}{s^2} \cdot m}{s} = kg \cdot \frac{m^2}{s^3}$$

c) $J = W \cdot s = N \cdot m$
 $\frac{J}{s} = W = \frac{Nm}{s}$

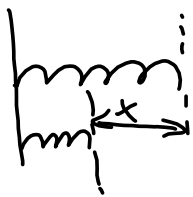
$$1 kWh = 10^3 W \cdot h = 10^3 \cdot 3,6 \cdot 10^3 W \cdot s = 3,6 \cdot 10^6 W \cdot s$$

$$F = m \cdot a$$

↑ ↑
 $[kg]$ $[\frac{m}{s^2}]$

$F = 2 [N]$
 ↑ ↑
 symbol Benomsel
 for kraft

Potensiell energi i en fjær



$$E_p = \frac{1}{2} k x^2$$

4.10

$$a) E_{p4} = \frac{1}{2} \cdot k \cdot (0,04)^2 \left[\frac{N}{m} \cdot m^2 \right] = \frac{1}{2} \cdot 25 \cdot 0,04^2 = 0,02 \text{ J}$$

$$E_{p8} = \frac{1}{2} k (0,08)^2 = 0,08 \text{ J}$$

$$b) E_p = 0,06 \text{ [J]} = \frac{1}{2} \cdot 25 \cdot x^2 \left[\frac{N}{m} \cdot m^2 \right]$$

$$0,12 \text{ [J]} = 25 x^2$$

$$x^2 = \frac{0,12}{25} \Rightarrow x = \sqrt{\frac{0,12}{25}} = 6,9 \text{ cm}$$

$$4.26 \quad a) E_n = mgh = 1150 \cdot 10^9 \cdot 9,81 \cdot 316 \text{ [kg} \cdot \frac{\text{m}}{\text{s}^2} \cdot \text{m]}$$

$$m = 1150 \cdot 10^6 \text{ [m}^3] = 1150 \cdot 10^9 \text{ kg}$$

↑
1000 kg

$$E_p = 3,6 \cdot 10^{15} \text{ J}$$

$$b) E = P \cdot t = \underbrace{220 \cdot 10^6 \text{ [W]}}_{220 \text{ MW}} \cdot \underbrace{24 \text{ [h]}}_{\text{et døgn}} = 5280 \cdot 10^6 \text{ [Wh]} \\ 5,28 \cdot 10^6 \text{ [kWh]}$$