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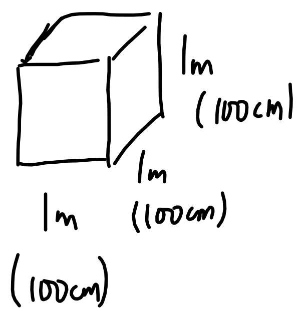
28. $E_g = mgh$



$d = 1\,kg/L$

$d = 1\,g/mL$

$d = 1\,g/cm^3$

$V = (100\,cm)^3$

$V = 1 \times 10^6\,cm^3$

$m = 1 \times 10^6\,g$ or $1 \times 10^3\,kg$

34.

a) $m = 1.35 \times 10^3\,kg$

$E_g = mgh$

$E_g = (1.35 \times 10^3\,kg)(9.81\,m/s^2)(12.0\,m)$

Elastic Potential Energy

Hooke's Law

The restoring force in a spring is directly proportional to the distance stretched or compressed from its unstretched state. The restoring force is opposite in direction to the applied force that is stretching or compressing the spring.

$$F \propto x$$

$$F = -kx$$

(the negative means that the restoring force is opposite in direction to the amount stretched or compressed)

Where F is the restoring force (N)
k is the spring constant $\left(\frac{N}{m}\right)$
x is the amount stretched (+) / compressed (−) (m)

It is often more practical to work with the applied force rather than the restoring force. The applied force is in the opposite direction so:

$$F_a = kx$$

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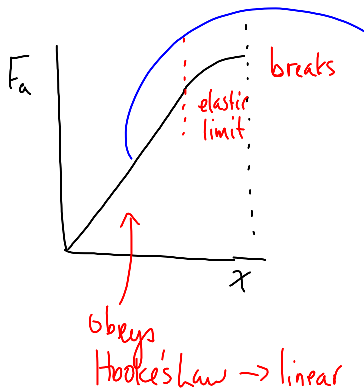
$F_a = 133N$
$x = 71cm$
$k = ??$

$$F_a = kx$$

$$k = \frac{F_a}{x}$$

$$k = \frac{133N}{0.71m}$$

$$k = 1.9 \times 10^2 \frac{N}{m}$$



→ slope = spring constant

$y = mx + b$

$$F_a = kx$$

Elastic Potential Energy

When you stretch or compress a spring, you are doing work on the spring and transferring energy to the spring. The spring now has elastic potential energy which can be transformed into kinetic energy.

$$E_e = \frac{1}{2}kx^2$$

where E_e is the elastic potential energy (J)
k is the spring constant (N/m)
x is the amount stretch(+)/compressed(-) (m)

The work-energy theorem applies to elastic potential energy. Work is done to stretch/compress a sprind and the work done is equal to the change in elastic potential energy.

$$W = \Delta E_e$$

or more generally $W = \Delta E$

TODO

1. PP|258
2. PP|261