

1. What do you mean by conservative forces?

Answer

A conservative force is a force with the property that the work done in moving a particle between two points is independent of the path taken. Conservative force can be thought of as a force that conserves mechanical energy.

The gravitational force, spring force and magnetic force are examples of conservative forces, while friction and air drag are classical examples of non-conservative forces (in both cases, the energy is converted to heat and cannot be retrieved).

2. An elevator weighing 400 kg is to be lifted up at a constant velocity of 3 cm s⁻¹, what would be the minimum power of the motor to be used?

Solution

If velocity is constant and there are no additional forces, thus:

$$F = m \cdot g = 400 \cdot 9,8 = 3920 \text{ N.}$$

The work done by the motor, as the cab moves distance d is:

$$W = F \cdot d.$$

Then power is:

$$P = \frac{W}{t} = F \cdot \frac{d}{t} = F \cdot v = 3920 \cdot 3 \cdot 10^{-2} = 118 \text{ Watts.}$$

where $3 \cdot 10^{-2} \text{ m/s} = 3 \text{ cm/s}$;

$$118/746 = 0.158 \text{ hp.}$$

Answer Minimal power is $118 \text{ Watts} = 0.158 \text{ hp}$.