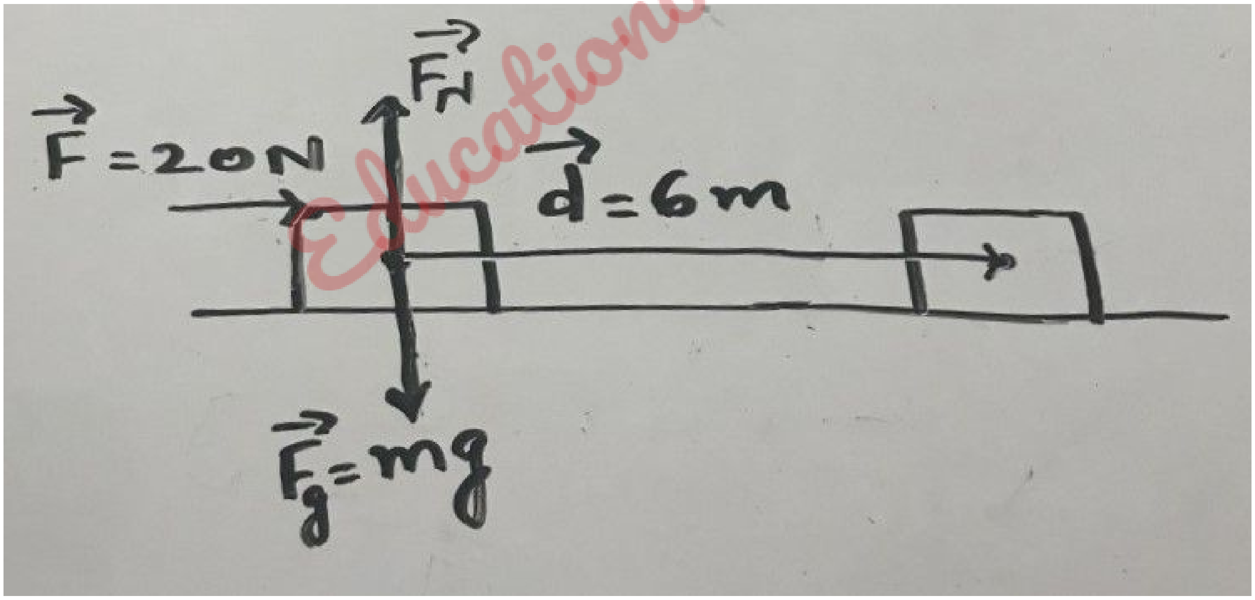
A block has a mass of 4 kg. It is displaced 6m on a frictionless, horizontal surface by a constant applied force of magnitude 20 N directed parallel to the horizontal direction as shown in figure below.



a) What is the work done on the block by the applied force?

Given:

Mass of the block:	m = 4 kg
Magnitude of horizontal force:	F = 20 N
Distance moved by the object:	d = 6 m
Angle between applied force and displacement:	$\theta = 0^o$

Determine: work done by applied force: W

Use formula:

$$W = \boldsymbol{F} \cdot \boldsymbol{d} = F \times d \times (\cos\theta) \text{ -------------------------- } (1)$$

(***F.d*** is the scalar product of force vector ***F*** and displacement vector ***d***)

Substituting for F, d and θ in (1):

$$\mathbf{W = 20 \times 6 \times (\cos 0^o) = 120\ J}$$

b) What is the work done on the block by the normal force?

Use formula:

$$W = \boldsymbol{F_N} \cdot \boldsymbol{d} = F_N \times d \times (\cos\theta) \text{ -------------------------- } (2)$$

Angle between the normal force vector and displacement vector is 90º.

Then:

$$\mathbf{W = F_N \times d \times (\cos 90^o) = F_N \times d \times (0) = 0\ J}$$

c) What is the work done on the block by the gravitational force?

Use formula:

$$W = \boldsymbol{F_g} \cdot \boldsymbol{d} = m\times g\times d \times(\cos\theta) \text{ -------------------------- } (3)$$

Angle between the gravitational force vector and displacement vector is 90º.

Then:

$$\mathbf{W = m \times g \times d \times (\cos 90^o) = m \times g \times d \times (0) = 0\ J}$$