

18/07/21

Home Assignment

(1) A student pulls a box of books on a smooth horizontal floor, with force 100N in direction 37° above the horizontal surface. If mass of box is 40 kg. What is acceleration of box? and what is normal force on the box by floor.

Ans) The pulling force = 100 N
mass given = 40 kg.

$$F = m \times a \Rightarrow 100 \text{ N} = 40 \text{ kg} \times a$$
$$\Rightarrow a = \frac{100 \text{ N}}{40 \text{ kg}} \Rightarrow$$

$$F \cos \theta = m \times a$$

$$100 \times \cos 37^\circ = 40 a$$

$$a = \frac{100 \times 0.7986}{40}$$

$$a = 1.99 \text{ m/s}^2$$

to find Normal force,

$$N \cdot F = mg - T \sin \theta$$

$$\Rightarrow N \cdot F = 40 \text{ kg} \times 10 \text{ m/s}^2 - \frac{100 \text{ N} \times 3}{4}$$
$$\Rightarrow 340 \text{ N}$$

Q2 @ Does earth exert a force on every particle near its surface?

Ans) Yes earth exerts a gravitational force upon objects at its surface.

(b) Is it long range force or contact force?

Ans) long range force.

(c) What is the magnitude of this force on particle of mass m . What is the direction of force?

Ans) The magnitude of the force of particle of mass m_1 and other particle of mass m_2 is $F = G \frac{m_1 m_2}{r^2}$

direction of gravitational force is downwards towards its surface.