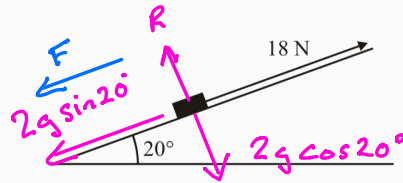


6.



$$F = \mu R$$

$$\mu = 0.6$$

A box of mass 2 kg is pulled up a rough plane face by means of a light rope. The plane is inclined at an angle of 20° to the horizontal, as shown in the diagram. The rope is parallel to a line of greatest slope of the plane. The tension in the rope is 18 N. The coefficient of friction between the box and the plane is 0.6. By modelling the box as a particle, find

(a) the normal reaction of the plane on the box,

(3)

$$\perp \text{ to slope} \quad R = 2g \cos 20^\circ$$

$$R = 18.418$$

$$R = 18.4 \text{ N}$$

(b) the acceleration of the box.

(5)
(Total 8 marks)

$$\text{Resultant Force} = ma$$

$$18 - 2g \sin 20^\circ - 0.6 \times 18.418 = 2a$$

$$\frac{18 - 2g \sin 20^\circ - 0.6 \times 18.418}{2} = a$$

$$a = 0.1228$$

$$a = 0.123 \text{ m s}^{-2}$$