

2.

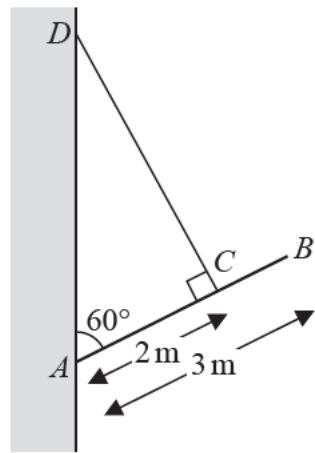


Figure 1

- A beam AB has weight 40 N and length 3 m .
The beam is freely hinged at the end A to a vertical wall.
The beam is held in equilibrium at an angle of 60° to the wall by a rope.
- One end of the rope is attached to the point C on the beam, where $AC = 2\text{ m}$.
The other end of the rope is attached to a point D on the wall, where D is vertically above A .
The rope is perpendicular to the beam, as shown in Figure 1.
The rope and the beam lie in a vertical plane that is perpendicular to the wall.
- The beam is modelled as a uniform rod and the rope as a light inextensible string.
- Using the model, find
- (a) the tension in the rope, (3)
 - (b) the magnitude of the resultant force acting on the beam at A . (6)
- If the rope was not modelled as being light,
- (c) state how this would affect the tension along the rope, explaining your answer. (2)