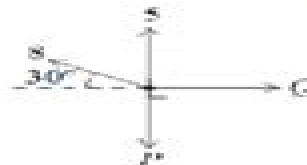


Mechanics 1 Resolving Forces Questions

- 8 A rough slope is inclined at an angle of 25° to the horizontal. A box of weight 80 newtons is on the slope. A rope is attached to the box and is parallel to the slope. The tension in the rope is of magnitude T newtons. The diagram shows the slope, the box and the rope.



- (a) The box is held in equilibrium by the rope.
- (i) Show that the normal reaction force between the box and the slope is 72.5 newtons, correct to three significant figures. *(3 marks)*
 - (ii) The coefficient of friction between the box and the slope is 0.32. Find the magnitude of the maximum value of the frictional force which can act on the box. *(2 marks)*
 - (iii) Find the least possible tension in the rope to prevent the box from moving down the slope. *(4 marks)*
 - (iv) Find the greatest possible tension in the rope. *(3 marks)*
 - (v) Show that the mass of the box is approximately 8.16 kg. *(1 mark)*
- (b) The rope is now released and the box slides down the slope. Find the acceleration of the box. *(3 marks)*
-
- 2 A particle is in equilibrium under the action of four horizontal forces of magnitudes 5 newtons, 8 newtons, P newtons and Q newtons, as shown in the diagram.



- (a) Show that $P = 9$. *(3 marks)*
- (b) Find the value of Q . *(2 marks)*

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