

## Chapter 7 Past Paper Questions

1. (a) (i) State what is meant by a scalar quantity.

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- (ii) State **two** examples of scalar quantities.

example 1: .....

example 2: .....

(3)

- (b) An object is acted upon by two forces at right angles to each other. One of the forces has a magnitude of 5.0 N and the resultant force produced on the object is 9.5 N.  
Determine

- (i) the magnitude of the other force,

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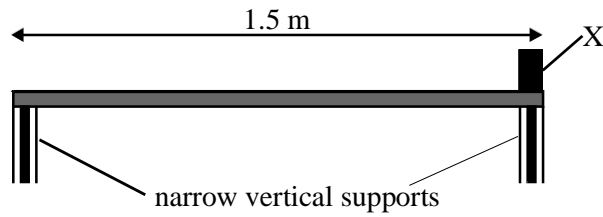
- (ii) the angle between the resultant force and the 5.0 N force.

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(4)

(Total 7 marks)

2. (a) (i) A uniform plank of length 1.5m and mass 9.0kg is placed horizontally on two narrow vertical supports as shown. A block, X, of mass 3.0 kg is placed at the end of the plank immediately above the centre of the right-hand support.



Calculate the magnitude of the downward force on

the right-hand support,.....

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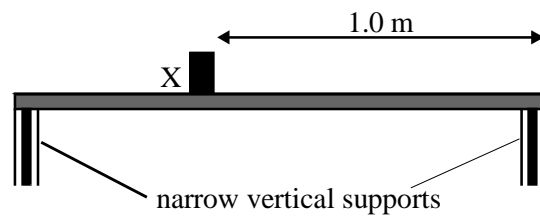
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the left-hand support.....

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- (ii) The block X is now moved so that its centre of mass is immediately above a point 1.0 m from the right hand edge of the plank.



Calculate the magnitude of the downward force on

the right-hand support,.....

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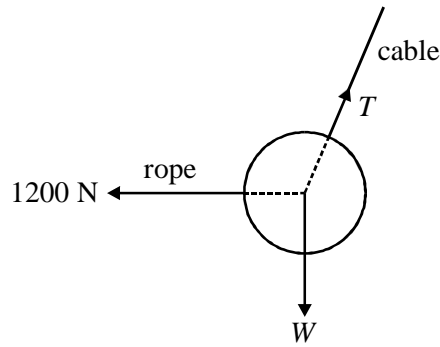
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the left-hand support.....

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3. The diagram shows a 250 kg iron ball being used on a demolition site. The ball is suspended from a cable at point A, and is pulled into the position shown by a rope that is kept horizontal. The tension in the rope is 1200 N.



(a) In the position shown the ball is in equilibrium.

(i) What balances the force of the rope on the ball?

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(ii) What balances the weight of the ball?

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(2)

(b) Determine

(i) the magnitude of the vertical component of the tension in the cable,

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(ii) the magnitude of the horizontal component of the tension in the cable,

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(iii) the magnitude of the tension in the cable,

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(iv) the angle the cable makes to the vertical.

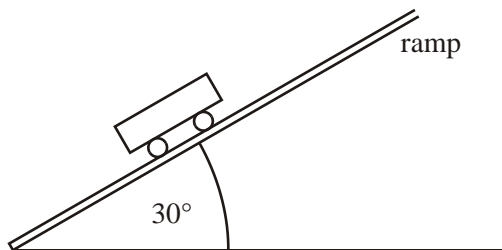
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(6)

(Total 8 marks)

4. A fairground ride ends with the car moving up a ramp at a slope of  $30^\circ$  to the horizontal as shown in the figure below.



- (a) The car and its passengers have a total weight of  $7.2 \times 10^3$  N. Show that the component of the weight parallel to the ramp is  $3.6 \times 10^3$  N.

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.....

(1)

- (b) Calculate the deceleration of the car assuming the only force causing the car to decelerate is that calculated in part (a).

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(2)

- (c) The car enters at the bottom of the ramp at  $18 \text{ m s}^{-1}$ . Calculate the minimum length of the ramp for the car to stop before it reaches the end. The length of the car should be neglected.

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(2)

- (d) Explain why the stopping distance is, in practice, shorter than the value calculated in part (c).

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(2)

(Total 7 marks)