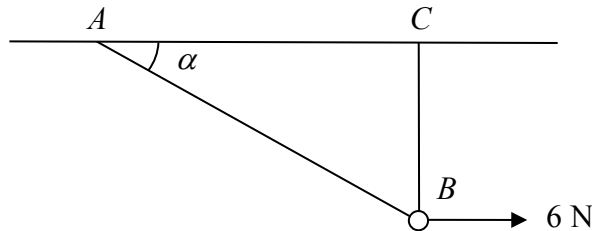


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**Modelling with Statics (without friction) - Edexcel Past Exam Questions**

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1.



A smooth bead  $B$  is threaded on a light inextensible string. The ends of the string are attached to two fixed points  $A$  and  $C$  on the same horizontal level. The bead is held in equilibrium by a horizontal force of magnitude  $6\text{ N}$  acting parallel to  $AC$ . The bead  $B$  is vertically below  $C$  and  $\angle BAC = \alpha$ , as shown in Figure 1. Given that  $\tan \alpha = \frac{3}{4}$ , find

(a) the tension in the string,

(3)

(b) the weight of the bead.

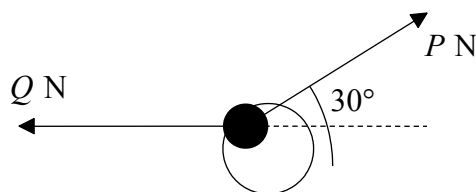
(3)

June 05 Q3

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2.

Figure 1



A particle of weight  $24\text{ N}$  is held in equilibrium by two light inextensible strings. One string is horizontal. The other string is inclined at an angle of  $30^\circ$  to the horizontal, as shown in Figure 1. The tension in the horizontal string is  $Q$  newtons and the tension in the other string is  $P$  newtons. Find

(a) the value of  $P$ ,

(3)

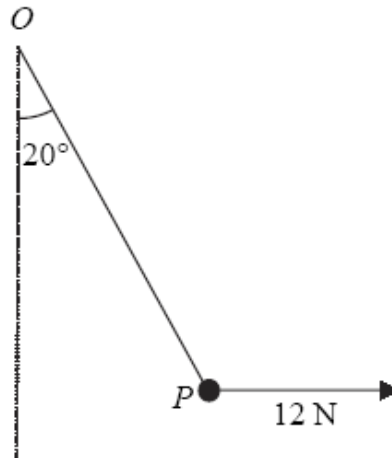
(b) the value of  $Q$ ,

(3)

Jan 07 Q1

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3.



A particle  $P$  is attached to one end of a light inextensible string. The other end of the string is attached to a fixed point  $O$ . A horizontal force of magnitude  $12\text{ N}$  is applied to  $P$ . The particle  $P$  is in equilibrium with the string taut and  $OP$  making an angle of  $20^\circ$  with the downward vertical, as shown in Figure 1.

Find

(a) the tension in the string,

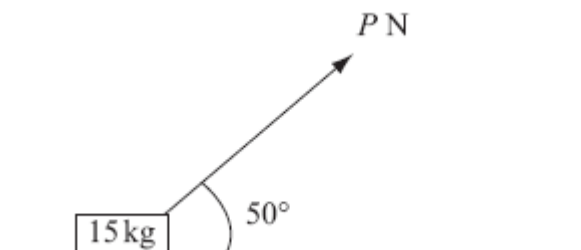
(3)

(b) the weight of  $P$ .

(4)

June 07 Q1

4.



A small box of mass  $15\text{ kg}$  rests on a rough horizontal plane. The coefficient of friction between the box and the plane is  $0.2$ . A force of magnitude  $P$  newtons is applied to the box at  $50^\circ$  to the horizontal, as shown in Figure 1. The box is on the point of sliding along the plane.

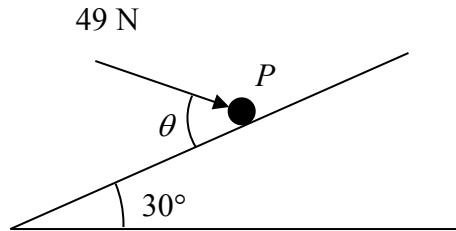
Find the value of  $P$ , giving your answer to 2 significant figures.

(9)

June 09 Q5

5.

Figure 1



A particle  $P$  of mass  $6$  kg lies on the surface of a smooth plane. The plane is inclined at an angle of  $30^\circ$  to the horizontal. The particle is held in equilibrium by a force of magnitude  $49$  N, acting at an angle  $\theta$  to the plane, as shown in Figure 1. The force acts in a vertical plane through a line of greatest slope of the plane.

(a) Show that  $\cos \theta = \frac{3}{5}$ .

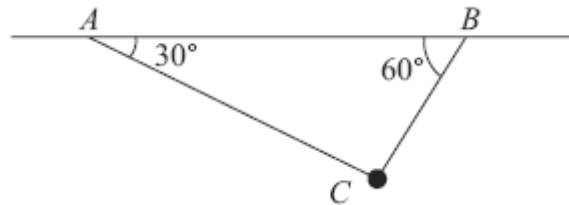
(3)

(b) Find the normal reaction between  $P$  and the plane.

(4)

Jan 08 Q4 (edited)

6.



A particle of mass  $m$  kg is attached at  $C$  to two light inextensible strings  $AC$  and  $BC$ . The other ends of the strings are attached to fixed points  $A$  and  $B$  on a horizontal ceiling. The particle hangs in equilibrium with  $AC$  and  $BC$  inclined to the horizontal at  $30^\circ$  and  $60^\circ$  respectively, as shown in Figure 1.

Given that the tension in  $AC$  is  $20$  N, find

(a) the tension in  $BC$ ,

(4)

(b) the value of  $m$ .

Jan 10 Q3