6.

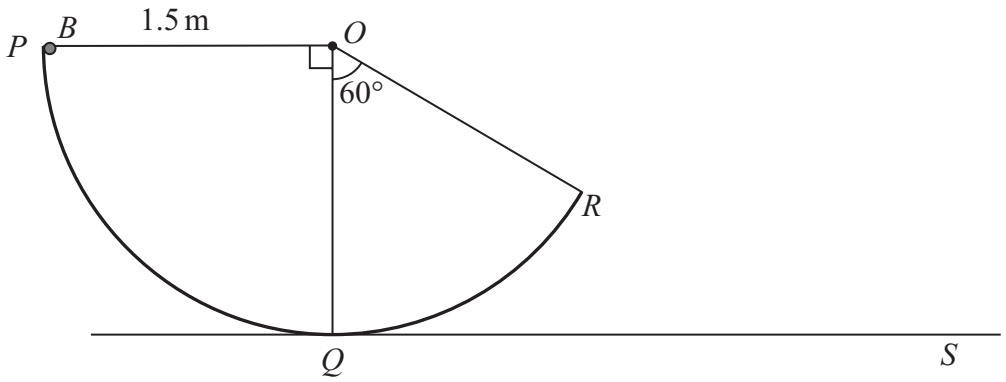


Figure 5

Figure 5 shows a smooth track PQR which is part of a circle.
The track is fixed in a **vertical** plane.

The circle has centre O and radius $OP = 1.5\,\text{m}$.

The highest point of the track is P and PO is horizontal.

The lowest point of the track Q is on horizontal ground.

A small ball B, of mass $0.2\,\text{kg}$, is released from rest at P and moves on the track until it leaves the track at R, where angle $QOR = 60°$

The ball is modelled as a particle.

(a) Find the magnitude of the normal reaction between the ball and the track when the ball is at Q.

(5)

After leaving the track, the ball moves freely under gravity and first lands on the ground at the point S.

(b) Find the distance QS.

(8)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 6 continued

Question 6 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 6 continued

(Total for Question 6 is 13 marks)