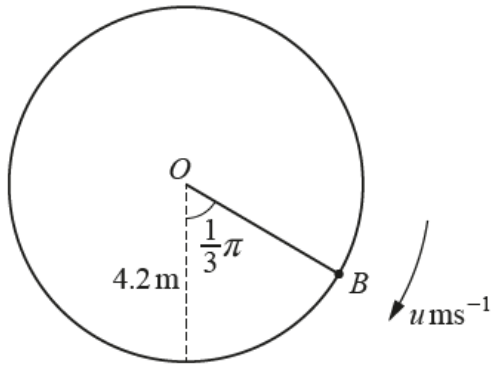


Motion in a circle – 2022 GCE AS Mechanics Further Mathematics A**1. June/2022/Paper_Y533/01/No.3**

A smooth wire is shaped into a circle of radius 4.2 m which is fixed in a vertical plane with its centre at a point O . A small bead B is threaded onto the wire. B is held so that OB makes an angle of $\frac{1}{3}\pi$ radians with the downwards vertical through O .

B is projected downwards along the wire with initial speed $u \text{ ms}^{-1}$ (see diagram). In its subsequent motion B describes complete circles about O .



Given that the lowest speed of B in its motion is 4 ms^{-1} determine the value of u .

[5]

2. June/2022/Paper_Y533/01/No.5

One end of a light inextensible string of length 3.5 m is attached to a fixed point O on a smooth horizontal plane. The other end of the string is attached to a particle P of mass 0.45 kg. P moves with constant speed in a circular path on the plane with the string taut.

The string will break if the tension in it exceeds 70 N.

Determine the minimum possible time in which P can describe a complete circle about O . [4]