



A particle of mass m is attached to one end of a light inextensible string of length a . The other end of the string is attached to a fixed point O . The particle is initially held with the string taut at the point A , where OA makes an angle θ with the downward vertical through O . The particle is then projected with speed u perpendicular to OA and begins to move upwards in part of a vertical circle. The string goes slack when the particle is at the point B where angle AOB is a right angle. The speed of the particle when it is at B is $\frac{1}{2}u$ (see diagram).

Find the tension in the string at A , giving your answer in terms of m and g .

[8]