

One end of a light inextensible string of length  $a$  is attached to a fixed point  $O$ . The other end of the string is attached to a particle of mass  $m$ . The string is taut and makes an angle  $\theta$  with the downward vertical through  $O$ , where  $\cos \theta = \frac{2}{3}$ . The particle moves in a horizontal circle with speed  $v$ .

Find  $v$  in terms of  $a$  and  $g$ .

[4]