

- 4 A particle P 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 and P is held with the string taut and horizontal. The particle P is projected vertically downwards with speed $\sqrt{2ag}$ so that it begins to move along a circular path. The string becomes slack when OP makes an angle θ with the upward vertical through O .

(i) Show that $\cos \theta = \frac{2}{3}$.

[5]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

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