

STEP III, 1998, Q9

- 9 A uniform right circular cone of mass m has base of radius a and perpendicular height h from base to apex. Show that its moment of inertia about its axis is $\frac{3}{10}ma^2$, and calculate its moment of inertia about an axis through its apex parallel to its base.
[Any theorems used should be stated clearly.]

The cone is now suspended from its apex and allowed to perform small oscillations. Show that their period is

$$2\pi\sqrt{\frac{4h^2 + a^2}{5gh}}.$$

[You may assume that the centre of mass of the cone is a distance $\frac{3}{4}h$ from its apex.]



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