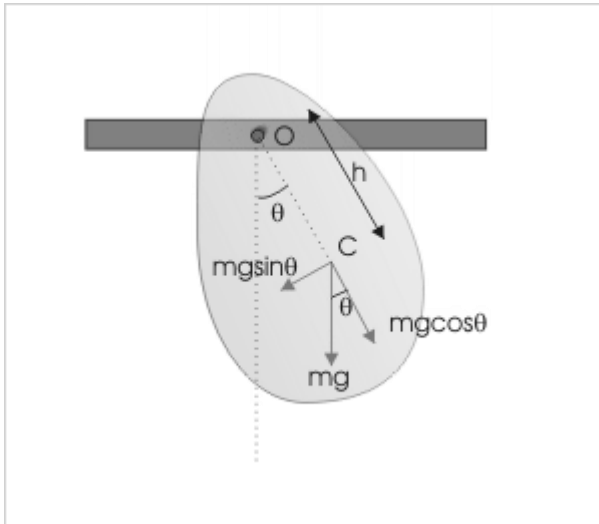


Answer on Question #64276-Physics-Other

$$T = 2\pi \sqrt{\frac{I}{mgL}}$$

Answer

The period of a physical pendulum



Gravity acts through the center of mass of the rigid body. Hence, the length of the pendulum used in equations is equal to the linear distance between the pivot and the center of mass (h).

The equation of torque gives:

$$\tau = I\alpha,$$

where α is the angular acceleration, τ is the torque, and I is the moment of inertia.

The torque is generated by gravity so:

$$\tau = mgh \sin\theta,$$

where h is the distance from the center of mass to the pivot point and θ is the angle from the vertical.

Hence, under the small-angle approximation $\sin\theta \approx \theta$,

$$\alpha \approx -mgh\theta/I.$$

This is of the same form as the conventional simple pendulum and this gives a period of:

$$T = 2\pi \sqrt{\frac{I}{mgL}}$$

Answer provided by <https://www.AssignmentExpert.com>