

The mass and diameter of a planet are twice those of the earth. what will be the period of oscillation of a pendulum on this planet, if it is a second's pendulum on the earth.

Answer

The acceleration due to gravity g on the surface of a planet of radius R and mass M is $= \frac{GM}{R^2}$, where G is the gravitational constant. Therefore, the value of g on a planet of mass and radius twice those of the earth would be half its value on the earth surface. Since the time T of a pendulum varies as $\frac{1}{\sqrt{g}}$, T on the planet will be $\sqrt{2}$ times its value on the earth surface. Hence the desired period of oscillation is $2\sqrt{2}s$.