Answer on Question #49804, Physics, Mechanics | Kinematics | Dynamics |

Question:

There is a pendulum with a length of 5m and a mass on the end of 120kg, the gravity is 10m/s2. Can the pendulum reach one side to the other in three seconds?

Solution:

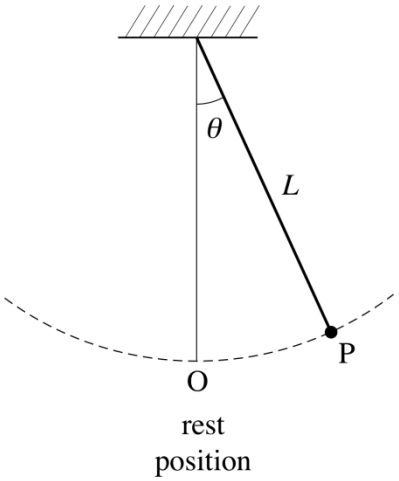

Fig.1

If deviation from the equilibrium position small ($\theta << 1$), the period of the motion, the time for a complete oscillation is T given by Eq. (1) (see Fig. 1).

$$T = 2\pi\sqrt{\frac{L}{g}}, \tag{1}$$

where g is acceleration due to gravity, L is the length of the pendulum.

The time needed for pendulum to reach from one side to the other is given by Eq.(2).

$$t = T/2 = \pi\sqrt{\frac{L}{g}} = 3.14\sqrt{\frac{5m}{10m/s^2}} = 2.22s \tag{2}$$

$t = 2.22s < 3s$

Answer:

The pendulum can reach from one side to the other in three seconds.