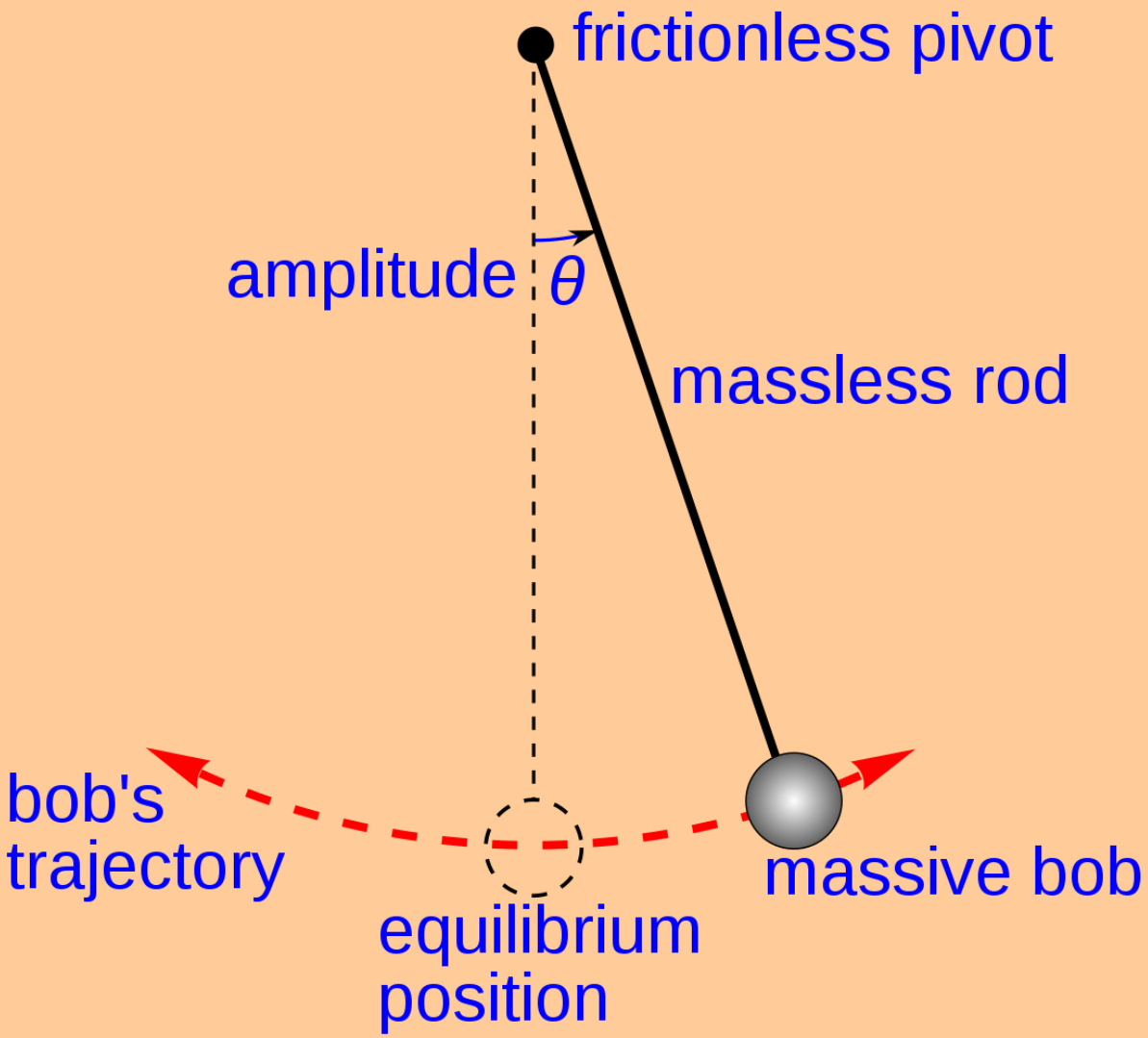
PENDULUM

Presented By
Asst.Prof.Kunal K Vinchurkar
Dr.H.N.Sinha Arts & Commerce College,Patur

Department Of Physics

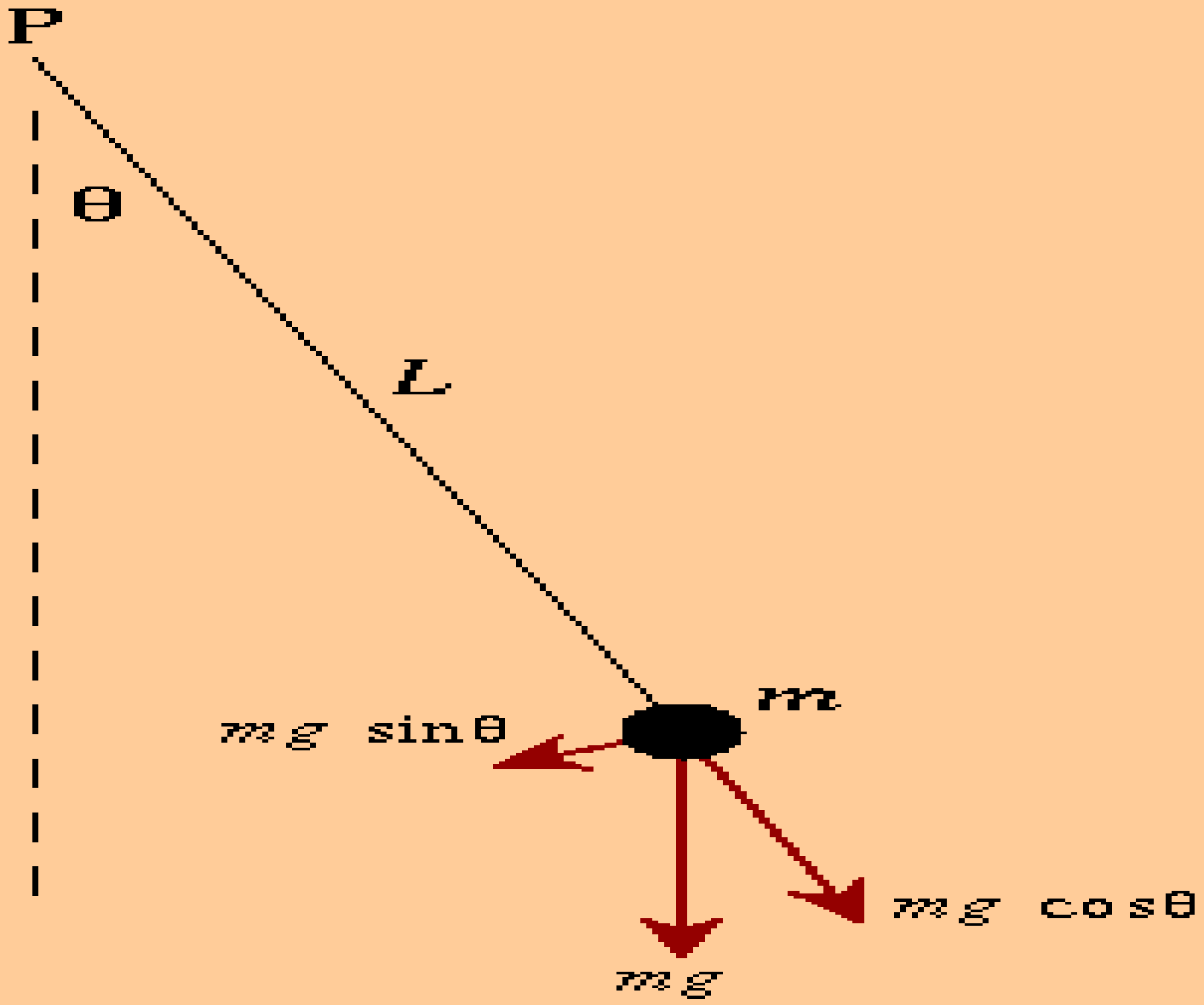
What is pendulum ?

A pendulum is a body suspended from a fixed point so that it can swing back and forth under the influence of gravity. The time interval of a pendulum's complete back-and-forth movement is constant.


frictionless pivot
amplitude
θ
massless rod
bob's
trajectory
massive bob
equilibrium
position

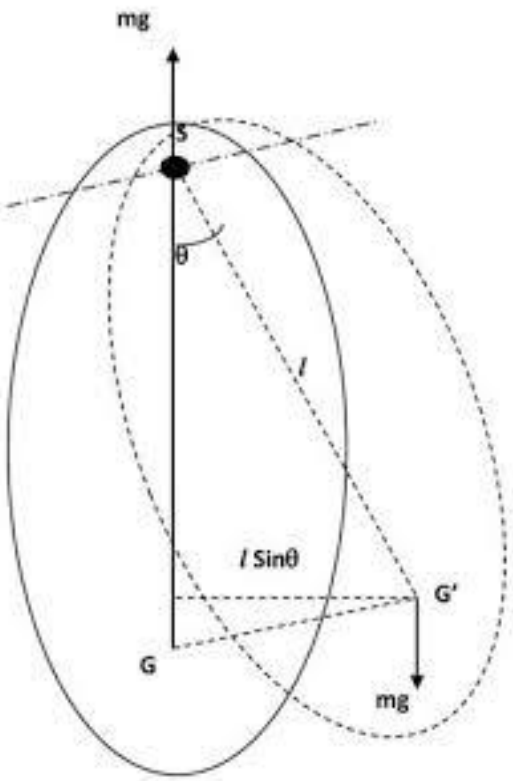
Simple Pendulum

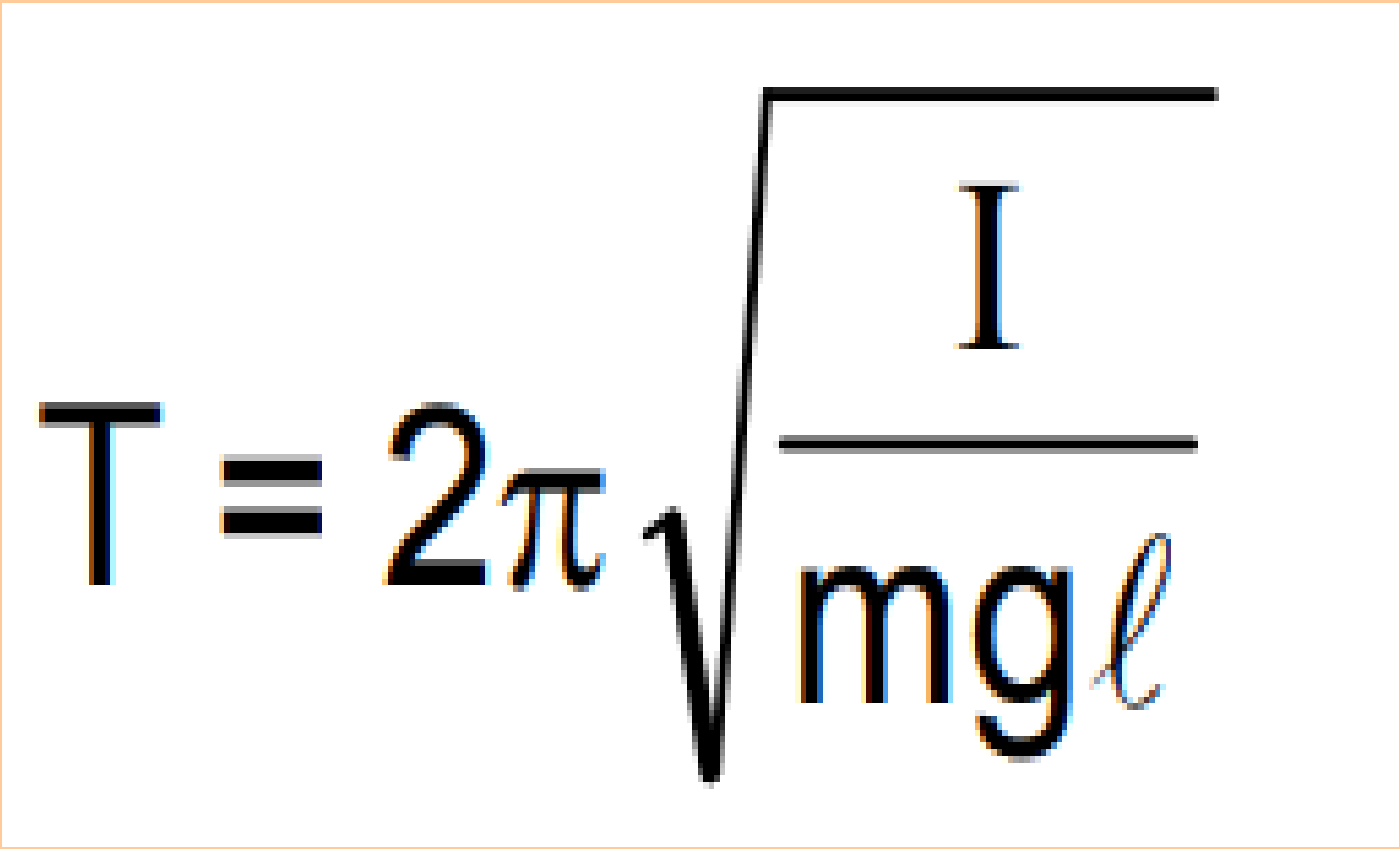
A simple pendulum consists of a mass m hanging from a string of length L and fixed at a pivot point P. When displaced to an initial angle and released, the pendulum will swing back and forth with periodic motion.
... with being the natural frequency of the motion.


P
θ
L
m
mg sinθ
mg cosθ
mg

Compound Pendulum

- **Definition:** A rigid body of any shape, capable of oscillating about a horizontal axis passing through it in a vertical plane is called a **Compound Pendulum.**
- **Centre of Suspension:** *The point through which the vertical plane passing through the centre of gravity of the pendulum meets the axis of rotation.*
- The distance between the point of suspension and the C.G. of the pendulum is called the ***length of the pendulum***.
- **Equation of motion of the compound pendulum:**
- Let an arbitrary shaped rigid body of mass m is capable of oscillating freely about a horizontal axis passing through it perpendicular to its plane.




T = 2π √(I / mgℓ)

The time period of a physical pendulum is given by $T = 2\pi\sqrt{\frac{I}{mgl}}$

. Where m= mass of the pendulum I= moment of inertia about the axis of suspension, l= distance of centre of mass of bob from the centre of suspension. Calculate the change in time period when temperature changes by ΔT. The coefficient of linear expansion of the material of pendulum is α.

Why compound pendulum is better than simple pendulum ?

A simple pendulum, the only physical property of the pendulum that affect its period is its length. The mass of the object does not affect the period. In a compound pendulum, the object's mass and how that mass is distributed both play a role in determining the period.

Thank You