

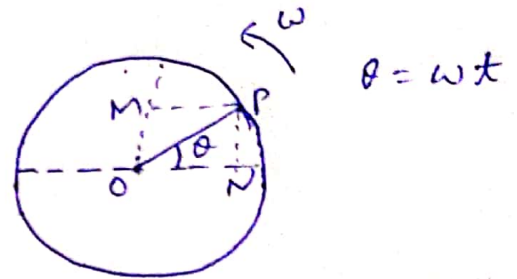
Simple Harmonic motion (SHM):

- * A periodic motion of a particle whose acceleration is always directed towards the mean position and is proportional to its distance from the mean position.
- * The motion of projection of a particle moving round a circle with uniform angular velocity on a diameter

$$OM = PN$$
$$= OP \sin \theta$$

$$OM = A \sin \theta = A \sin \omega t$$

$$ON = A \cos \theta = A \cos \omega t$$



$$y = A \sin \omega t$$

$$\dot{y} = \frac{dy}{dt} = A \omega \cos \omega t$$

$$\ddot{y} = \frac{d\dot{y}}{dt} = -\omega^2 A \sin \omega t$$

$$\ddot{y} = -\omega^2 y$$

$$\frac{d^2 y}{dt^2} + \omega^2 y = 0 \rightarrow \text{Standard eqn of SHM}$$