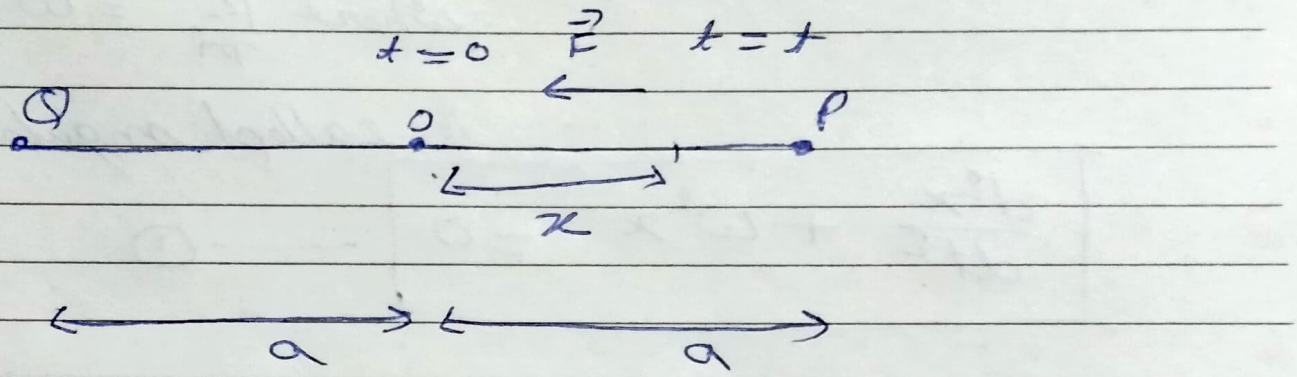
IDEA OF S·H·M

S·H·M is a type of periodic motion where the restoring force on the moving object is directly proportional to the displacement of object from its mean position



$F \propto -x$

$F = -Kx$ where K = force const

Differential equation of S·H·M

As $F = -Kx$

$mA = -Kx$

[From Newton's second law of motion

$F = mA$

$$m\frac{d^2x}{dt^2} = -Kx$$

$$\frac{d^2x}{dt^2} = -\frac{K}{m}x$$

$$\frac{d^2x}{dt^2} + \frac{K}{m}x = 0$$

where $\frac{K}{m} = \omega^2 \Rightarrow \omega = \sqrt{\frac{K}{m}}$

is called angular velocity

$$\boxed{\frac{d^2x}{dt^2} + \omega^2 x = 0} \quad \text{——} (1)$$

The above eqn represents differential eqn of S.H.M