Metropolitan University
PHY 111: Physics I
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MID ASSIGNMENT-02

CSE 54

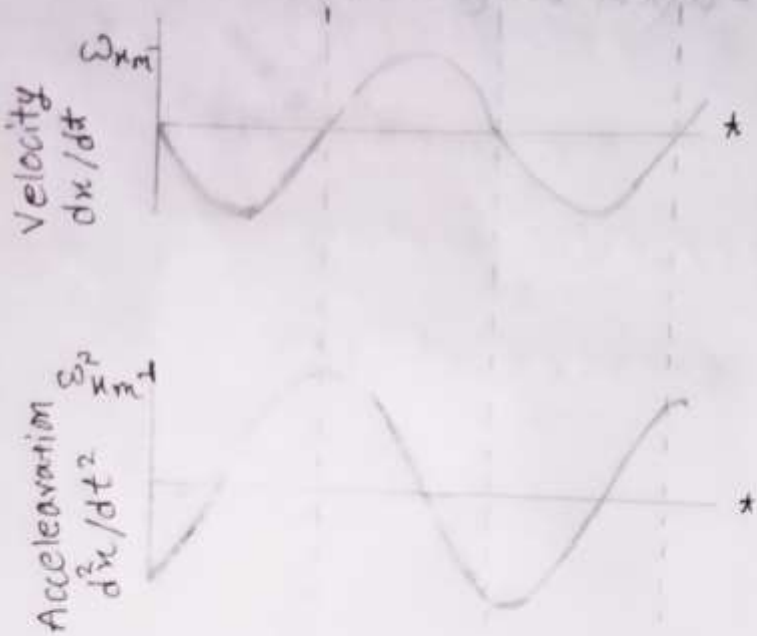
① The motion of a particle moving along a straight line with an acceleration whose direction is always towards a fixed point on the line and whose magnitude is proportional to the distance from the fixed point is called simple harmonic motion.

3 real-life example of SHM:

1. Pendulum.
2. Swing.
3. Guitar.

(3) we know that,

$$V_x = \frac{dx}{dt} = -\omega x_m \sin(\omega t + \phi) \quad \text{---} \quad (1)$$



The velocity and acceleration of a simple harmonic oscillator according to Eqs:- 1.

(4) We know that,

$F = -kx$, and potential energy,

$$U = -\int_{x=0}^{x} F\,dx$$

$$= k\int_{0}^{x} x\,dx$$

$$= k\left[\frac{x^2}{2}\right]_0^x$$

$$= \frac{1}{2}k(x^2 - 0^2)$$

$$\therefore U = \frac{1}{2}kx^2 \quad \text{---} \quad (1)$$

By using Eqs. 1 we can easily find the the potential energy of a simple harmonic motion.