



National University



of Computer & Emerging Sciences

Applied Physics (NS-1001)

Quiz # 4

Fall 2025

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Name:

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Section: BCS-B

CLO2

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Q.1: Q.1: What are the (a) amplitude, (b) frequency, and (c) phase constant ϕ_0 of the oscillation shown in the figure? (3+3+4)

Solution:

Solution: (a)

$$A = 10 \text{ cm} = 0.1 \text{ m}$$

$$(b) f = \frac{1}{T} = \frac{1}{4} = 0.25 \text{ Hz}$$

$$(c) \text{ at } t = 0, x = -5 \text{ cm}$$

$$x(t) = A \cos(\omega t + \phi_0) - 0$$

$$x(0) = A \cos \phi_0$$

$$-5 = +10 \cos \phi_0$$

$$\phi_0 = \cos^{-1}(-5/10) = \cos^{-1}(-1/2) = \cos^{-1}(0.5)$$

$$\phi_0 = \pm \frac{2}{3}\pi$$

As the particle is moving to the left at $t=0^+$, it is in the upper half of the circular motion diagram, & the phase constant is between $0 + \pi$.

$$\phi_0 = \frac{2}{3}\pi \text{ rad} \quad \pm 120^\circ$$

