National University

of Computer & Emerging Sciences

Applied Physics (NS-1001) **Quiz # 4** **Fall 2025**

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Section: BCS-A **CLO2** **Date: 03-11-2025**

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

Solution:

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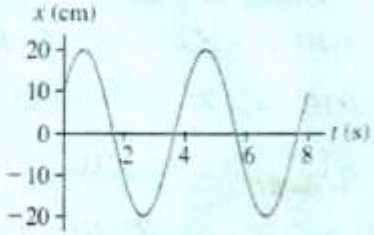
(a) $A = x_m = 20\,cm = 0.2\,m$

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



(c) $x(t) = A\cos(\omega t + \phi_o) - (1)$

at $t = 0$, $x(0) = 10\,cm$.

(1) becomes

$x(0) = (20\,cm)\cos\phi_o$

$\phi_o = \cos^{-1}(10/20) = \cos^{-1}(1/2) = \cos^{-1}(0.5)$

$\phi_o = \pm\frac{\pi}{3}$

As the object is moving to the right at $t = 0s$, it is in the lower half of the circular motion diagram and thus must have a phase constant between π & 2π radians.

$\phi_o = -\frac{\pi}{3}\,rad$