

Ans to the Qn No: 16

(i)

$$f = \frac{25}{10} = 2.5 \text{ Hz}$$

$$T = \frac{1}{f} = \frac{1}{2.5} = 0.4 \text{ s}$$

$$\begin{aligned}\omega &= \frac{2\pi}{T} = 2\pi f \\ &= 2\pi (2.5) \\ &= 15.708 \text{ rad/s}\end{aligned}$$

$$\begin{aligned}\text{ii) } v_{\text{ax}} &= \frac{2\pi A}{T} = \frac{2\pi (0.10 \text{ m})}{0.4} \\ &= 1.571 \text{ m/s}\end{aligned}$$

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iii)

$$a_{\max} = A\omega^2$$

$$= 0.10 \times (15.708)^2$$

$$= 24.674 \text{ m/s}^2$$

iv)  $m = 250 \text{ g}$

$$= 0.25 \text{ kg}$$

$$x = 10 \text{ cm} = 10 \times 10^{-2} \text{ m}$$

$$a = 24.674 \text{ m/s}^2$$

vi)

$$k = ?$$

$$F = -kx = kx$$

$$ma = kx$$

$$k = \frac{ma}{x}$$

$$= \frac{0.25 \times 24.674}{10 \times 10^{-2}}$$

$$= 0.00618 \text{ N/m}$$



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(ii)

(iii)

$$V = \frac{dy}{dt}$$

$$n = 5$$

(v)

$$0.1 \cdot 0 =$$

$$E = \frac{1}{2} k A^2$$

$$= \frac{1}{2} \times 0.00618 \times (0.10)^2$$

$$= 0.0000618 \text{ J}$$

(vi)

$$n = 5$$

$$v = \omega \sqrt{A^2 - \frac{n^2}{\omega^2}}$$

$$= 15.708 \sqrt{(0.10)^2 - (5)^2}$$

$$= 15.708 \sqrt{-24.99} \text{ m/s}$$

Qn 5

$$u = A \cos \omega t$$

$$u = \frac{1}{4} A$$

$$= A \cos \frac{2\pi t}{T}$$

$$t = \frac{T}{2\pi} \cos^{-1} \left( \frac{1}{4} \right)$$

$$= \frac{T}{2\pi} (75.52)$$

$$= 12.019 T$$

Ans



Sub:

Qm 3.1.3

$$u = -A\omega^2 \cos(-\omega^2 t - \delta)$$

Now, Velocity.

~~$$u = -A\omega^2 \cos(-\omega^2 t - \delta)$$~~

$$\frac{du}{dt} = -A\omega^2 \cos(-\omega^2 t - \delta)$$

$$v = A\omega^4 \sin(-\omega^2 t)$$

Now acceleration

$$v = \frac{du}{dt}$$

$$= A\omega^4 \sin(\omega^2 t)$$

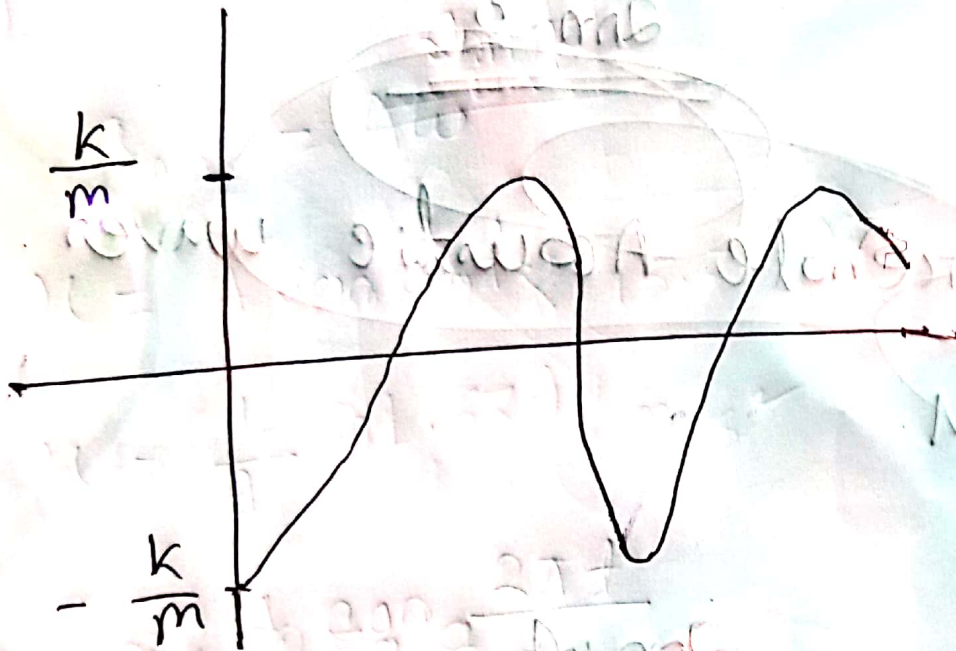
$$a = \frac{d^2u}{dt^2} = A\omega^8 \cos(\omega^4 t)$$

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Qn: 3

A leading B, C, D, E

B leading C, D, E

C leading D, E

D leading E

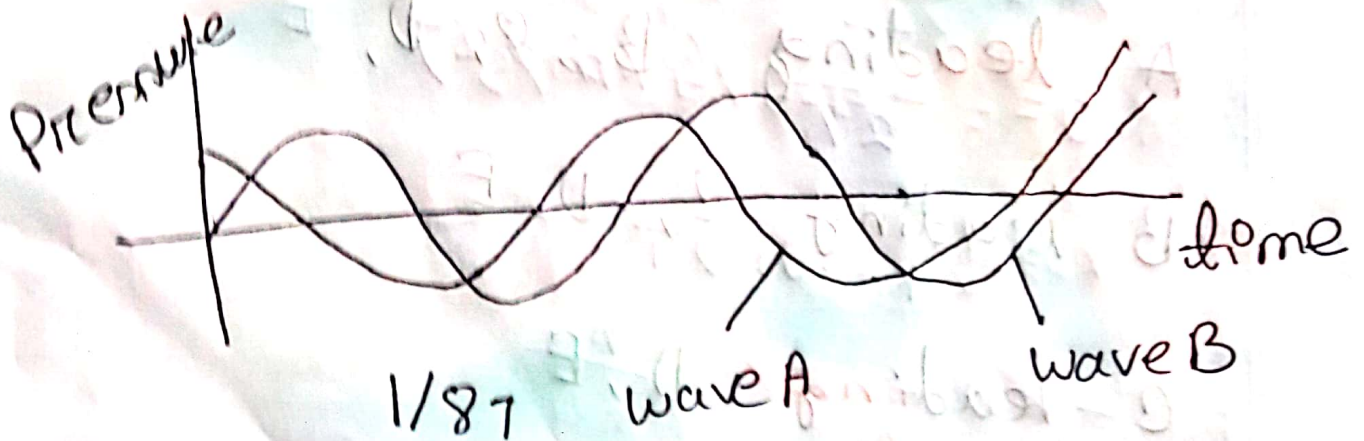


Qm: 2

- i) Borehole Acoustic waves.
- ii) SHM.

Qm: 4

i)  $\delta = 45^\circ$



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Qn : 2

i) rotational ~~eg~~

ii) SHM.

Qn : 4:

ii

$$\phi = 0^\circ$$

