NAME - PRINCE MAURYA

ROLL NO - 21D80005

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(5)

$$T = 2\pi\sqrt{\frac{M}{K}}$$

$$\frac{5T}{3} = 2\pi\sqrt{\frac{M+m}{K}}$$

$$\frac{5}{3} = \sqrt{\frac{M+m}{M}}$$

$$1 + \frac{m}{M} = \frac{25}{9}$$

$$\frac{m}{M} = \frac{16}{9}$$

(7)

Maximum $V = A\omega$

$$\omega = \sqrt{\frac{K}{m}}$$

Now, $A_1 \times \sqrt{\frac{K_1}{m_1}} = A_2 \times \sqrt{\frac{K_2}{m_2}}$

As, $m_1 = m_2 \Rightarrow \frac{A_1}{A_2} = \frac{\sqrt{K_2}}{\sqrt{K_1}}$

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(3) $y_1 = 0.1 \sin\left(100\pi t + \frac{\pi}{3}\right)$

$y_2 = 0.1 \cos(\pi t)$

$y_2 = 0.1 \sin\left(\pi t + \frac{\pi}{2}\right)$

$\phi_1 - \phi_2 = \frac{\pi}{3} - \frac{\pi}{2} = -\frac{\pi}{6}$

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(4) $x = 4\cos(\pi t) + \sin(\pi t)$

$x = 4\sqrt{2} \sin\left(\pi t + \frac{\pi}{4}\right)$.

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(12) $(\mu - 1)t = n\lambda$

$n = \frac{(\mu-1)t}{\lambda}$

$= \frac{0.5 \times 2 \times 10^{-6}}{0.5 \times 5000 \times 10^{-10}} = \frac{10^{-6}}{5 \times 10^{3} \times 10^{-10}}$

$n = 2$

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(1) Damped oscillations

(2) 2π

(3) $-\frac{\pi}{6}$

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(6) K.E. is maximum when x is 0

(8) $\frac{\pi V_{max}}{a_{max}}$

(9) position of eye and angle of refraction

(10) $2\mu t \cos\theta = n\lambda$

(11) 13.42 μm

(13) Narrow

(14) $(na)^2$

(15) all of the above