

$$1. \quad T \rightarrow 4A \quad \therefore \frac{I}{2} \rightarrow 2A$$

$$2. \quad E \propto A^2 \quad \therefore E \rightarrow \frac{E}{3} \Rightarrow A \rightarrow \frac{A}{\sqrt{3}}$$

$$3. \quad \text{first diffraction min.} : \sin \theta = \frac{\lambda}{a}$$

$$\text{interference max.} : \sin \theta = \frac{m\lambda}{d}$$

$$\therefore \frac{\lambda}{a} = \frac{m\lambda}{d} \Rightarrow m = \frac{d}{a} = 4 \quad (\text{order of fringe "under" 1st diffraction min.})$$

\Rightarrow within central diffraction maximum:

$$1 + 2 \cdot 3 = 7 \text{ bright fringes.}$$

$$4. \quad \text{in equilibrium, with } M : \quad k \cdot \Delta l = mg \quad \text{--- (1)}$$

$$\text{period of oscillation : } T = \frac{2\pi}{\omega} = 2\pi \sqrt{\frac{M}{k}} \quad \text{--- (2)}$$

(measured: $\Delta l, T$)

$$\cdot \text{ from (2) : } \frac{M}{k} = \frac{T^2}{4\pi^2}$$

$$\cdot \text{ sub this in (1) : } \frac{T^2}{4\pi^2} = \frac{\Delta l}{g} \Rightarrow g = \frac{4\pi^2 \Delta l}{T^2}$$

$$5. \quad (a) \quad \left. \begin{array}{l} 5 \text{ cm} \\ \lambda \end{array} \right\} \begin{array}{l} \text{--- } \frac{\pi}{6} \\ \text{--- } 2\pi \end{array} \quad \rightarrow \lambda = \frac{6}{\pi} \cdot 10\pi = 60 \text{ cm}$$

$$(b) \quad \left. \begin{array}{l} 5 \text{ ms} \\ T \end{array} \right\} \begin{array}{l} \text{--- } \Delta\phi \\ \text{--- } 2\pi \end{array} \quad \rightarrow \Delta\phi = 2\pi(5 \times 10^{-3})\left(\frac{1}{T}\right) = 2\pi(5 \times 10^{-3})(40) \\ = 0.4\pi \text{ radians.}$$

$$(c) \quad V = \lambda \cdot F = 60 \text{ cm} \cdot 40 \text{ s}^{-1} = 24 \text{ m/s}$$

FAMPAID