

WEEKLY TEST TYJ TEST - 34 B
SOLUTION Date 05-01-2020

[PHYSICS]

1. (a) It is given that energy remains the same.

Hence, $E_A = E_B$

Energy $\propto a^2 n^2 \Rightarrow \frac{a_B}{a_A} = \frac{n_A}{n_B}$ (\because energy is same)

$\therefore \left(\frac{a_A}{a_B}\right)^2 = \left(\frac{n_B}{n_A}\right)^2$

Given, $n_A = n$, $n_B = \frac{n}{8}$

$\therefore \frac{a_A}{a_B} = \frac{n/8}{n} = \frac{1}{8} \Rightarrow a_B = 8a_A = 8a$

2. (d) The frequency of note emitted by the wire,

$$n = \frac{1}{2l} \sqrt{\frac{T}{m}}$$

m = mass m per unit length of wire and T = tension,
and l = length of wire.

$$\frac{n_1}{n_2} = \sqrt{\frac{T_1}{T_2}}$$

Given, $T_1 = 10$ N, $n_1 = n$, and $n_2 = 2n$

$$\Rightarrow \frac{n}{2n} = \sqrt{\frac{10}{T_2}} \Rightarrow T_2 = 10 \times 4 = 40 \text{ N}$$

3. (c) Phase difference = $\frac{2\pi}{\lambda} \times$ path difference

$$\text{Path difference } \Delta = \frac{\lambda}{2\pi} \times \phi = \frac{\lambda}{2\pi} \times \frac{\pi}{3} = \frac{\lambda}{6}$$

