SHIKSHA CLASSES

BOARD QUESTION PAPER

Subject : Physics **Topic: 6. Superposition of Waves** **Total Marks : 20**
Class : XII **Time : 1 Hr.**

Section (A)

Q. 1 : Select and write the most appropriate answer from given alternatives in each sub-question. **5**

i) Two tuning fork of frequencies n_1 and n_2 produces n beats per second, if n_2 and n are known, n_1 may be given by.

a) $n_2/n+n_2$ b) $n_2 \pm n$ c) $n_2 n$ d) $n_2/n-n_2$

ii) Two waves having the intensities in the ratio of 9:1 produce interference. The ratio of maximum and minimum intensities is equal to.

a) 2:1 b) 4:1 c) 9:1 d) 10:8

iii) A pipe of length 85 cm is closed from one end. Find the number of possible natural oscillation of air column in the pipe whose frequencies lie below 1250 Hz. The velocity of the sound in the air is 340 m/s.

a) 12 b) 8 c) 4 d) 6

iv) An empty vessels is partially filled with water, the frequency of vibration of air column in the vessel.

a) Remains same b) Decreases
c) Increases d) First increases then decreases

v) When temperature increases, the frequency of tuning fork..

a) Increases b) Decreases
c) Remains same d) Increase or decreases depending on material

Q2 : Very short answers type questions. **2**

i) What are the harmonics and overtones?

ii) What are the beats? State its types.

Section (B)

: Attempt any THREE. **6**

Q.3 : Define free and forced vibrations. With example.

Q.4 : Find the distance between two successive nodes in stationary wave on a string vibrating with frequency 75 Hz. The velocity of progressive wave that resulted in the stationary wave is 150 m/s.

Q.5 : Two organ pipes of the same length, open at both ends produces sound of different frequencies, if their radii are different. Why?

Q.6 : Two tuning fork of frequencies 340 Hz and 360 Hz produces sound waves of wavelength differing by 6 cm in medium. Find the velocity of sound in the medium?

Section (C)

: Attempt any one of following. **3**

Q.7 : Prove that only odd harmonics are present in the vibration of the air column in a pipe closed at one end.

Q.8 : The length of sonometer wire between two fixed ends is 99 cm. Where should be the two bridges are placed so as to divide the wire into three segments, whose fundamental frequencies are in the ratio 1:2:3?

Section (D)

: Attempt any one. **4**

Q.9 : i) Show that even as well as odd harmonics are present as overtones in modes of vibration of string.

ii) The speed of transverse wave along a uniform metal wire, when it is under the tension of 1000 g-wt is 68 m/s. if the density of metal is 7900kg/m^3,find the area of cross section of the wire.

Q.10: i) Derive analytical method to determine beat frequency.

ii) Two sound waves of the wavelength 1m and 1.01 m produce 6 beats in two second when sounded together in air. Find the velocity of sound in air.

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