SHORT QUESTION:-

Q 8.1 :- What features do the longitudinal waves have in Common with transverse waves :-

Ans # Following are the main Common features between longitudinal wave and transverse wave.

(i) They produce disturbances inside the medium through which they are passing.

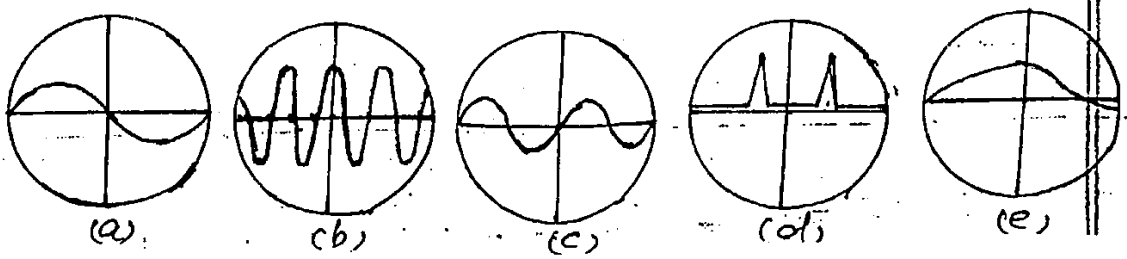
(ii) Both transport energy from one place to the other.

(iii) The equation $v = f\lambda$ is valid for transverse as well as longitudinal waves.

Q 8.2 :- The five possible waveforms obtained, when the output from a microphone is fed into the Y-input of Cathode Ray Oscilloscope, with the time base on, are shown in the fig These waveforms are obtained under the same adjustment of the cathode ray Oscilloscope Controls. Indicate the wave form,

(a) Which trace represent the loudest note?

(b) Which trace represent the highest frequency?



Ans # (a) As the loudness of sound depends upon the intensity of sound which is directly related with the square of amplitude of sound waves. Hence the waves in fig (b) having large amplitude will represent the loudest sound.

(b) Trace (b) has the highest frequency as waves are very closed possessing very short wavelength comparative to the other traces.

Q 8.3 :- Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary waves.

Ans # No, There is no possibility for the production of stationary waves for the case mentioned in the statement above. These waves can only be produced by the superposition of two identical waves travelling in opposite direction.

Q 8.4 A wave is produced along a stretched string but some of its particles permanently show zero displacement. What type of wave is it?

Ans # The wave in which some points of the medium are stationary

is called Stationary wave and such points possessing zero amplitude and maximum tension are called nodes.

Q 8.5 :- Explain the terms crest, trough, node and anti node.

Ans # CREST :-

The portion of a wave (disturbance) above the mean level in transverse wave is called crest.

TROGH :-

The portion of a wave below the mean level is called trough.

NODE :-

A point having zero displacement in transverse stationary wave is called node.

ANTINODE :-

A point inside transverse stationary wave vibrating with maximum amplitude is called antinode.

Q 8.6 :- Why does sound travel faster in solids than in gases?

Ans # From the equation of velocity of sound

$$V = \sqrt{\frac{E}{\rho}}$$

it is clear that velocity of sound

is directly proportional to the elasticity of the medium. As solids are more elastic as well as denser than gases. but the ratio of E/ρ for solid is much higher than gases. That is why sound travels faster in solids than in gases.

Q 8.7 :- How are beats useful in tuning musical instruments?

Ans # when a faulty instrument is played along with a standard source of known frequency, beats are produced which gives a clear indication that the frequencies of both the instruments are not matching. The length and tension of the string is adjusted by tightening the peg at the neck of the instrument in such a way that no beat is heard. At this instant the faulty device is said to be tuned at desired frequency.

Q 8.8 :- When two notes of frequencies f_1 and f_2 are sounded together, beats are formed. If $f_1 > f_2$, what will be the frequency of the beat?

(i) f_1+f_2 (ii) $\frac{1}{2}(f_1+f_2)$ (iii) f_1-f_2 (iv) $\frac{1}{2}(f_1-f_2)$

Ans # Since we know that the beat frequency is equal to the difference of frequencies of two notes. Hence the option (iii) f_1-f_2 is correct.

Q 8.9 :- As a result of distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.

Ans # The time difference occurs due to the fact that the sound waves produced during explosion travel much faster through ground than in air as ground material is more elastic than air and hence respond more quickly.

Q 8.10 :- Explain why sound travels faster in warm air than in cold air?

Ans # According to the equation of speed of sound in air

$$V = \sqrt{\frac{\gamma P}{\rho}}$$

The equation indicates that the speed of sound is inversly proportional to the square root of density of the medium. As the density of warm air is less than that of cold air. That is why sound travels faster in warm air.

Q 8.11 How should the sound source move with respect to an observer so that the frequency of its sound does not change?

Ans # Both the source and the observer should move with uniform velocity so that their relative velocity is zero.