Sound DPP - 1

Select the correct option.

1. In case of longitudinal waves, the particles of the medium vibrate :
- **(a)** in the direction of wave propagation
- **(b)** opposite to the direction of wave propagation
- **(c)** at right angles to the direction of wave propagation
- **(d)** none of the above

2. The longitudinal waves can propagate only in
- **(a)** solids
- **(b)** liquids
- **(c)** gases
- **(d)** all of these

3. A part of the longitudinal wave in which particles of the medium are closer than the normal particles is called:
- **(a)** rarefaction
- **(b)** crest
- **(c)** trough
- **(d)** compression

4. A part of longitudinal wave in which particles of the medium are farther away than the normal particles is called:
- **(a)** rarefaction
- **(b)** trough
- **(c)** compression
- **(d)** crest

5. In the region of compression or rarefaction, in a longitudinal wave, the physical quantity which does not change is:
- **(a)** pressure
- **(b)** mass
- **(c)** density
- **(d)** volume

6. The wavelength is the linear distance between the :
- **(a)** two consecutive compressions
- **(b)** two consecutive rarefactions
- **(c)** one compression and one rarefaction
- **(d)** both (a) and (b)

7. The number of oscillations passing through a point in unit time is called:
- **(a)** vibration
- **(b)** frequency
- **(c)** wavelength
- **(d)** amplitude

8. If the frequency of a wave is 25 Hz, the total number of compressions and rarefactions passing through a point in 1 second is :
- **(a)** 25
- **(b)** 50
- **(c)** 100
- **(d)** none of these

9. Which of the following is an elastic wave?
- **(a)** light wave
- **(b)** radio wave
- **(c)** sound wave
- **(d)** microwave

Sound DPP - 2

1. **(a)** What do you understand by the term sound energy?

   (b) State three conditions necessary for hearing sound.

2. Describe briefly an experiment to prove that vibrating bodies produce sound.

3. **(a)** What do you understand by the term infrasonic vibrations?

   (b) What do you understand by the term sonic vibrations? State the range of sonic vibrations for the human ear.

4. **(a)** What do you understand by the term ultrasonic vibrations?

   (b) Name three animals which can hear ultrasonic vibrations.

5. How do bats locate their prey during flight?

6. What is Galton's whistle? To what use is it put?

7. State four practical uses of ultrasonic vibrations.

8. Describe an experiment to prove that material medium is necessary for the propagation of sound.

9. Why do astronauts talk to each other through radio telephone in space?

10. What are elastic waves? Name two kinds of elastic waves.

Sound DPP - 3

1. Define the terms: **(i)** wavelength, **(ii)** amplitude, **(iii)** frequency.

2. State four differences between the sound wave and the light wave.

3. What is meant by the term wave motion?

4. State the relation between the wavelength and the frequency.

5. What kinds of the waves are produced in solids, liquids and gases?

6. The sound of an explosion on the surface of lake is heard by a boatman 100 m away and a diver 100 m below the point of explosion.

(a) Of the two persons mentioned (boatman and diver), who would hear the sound first?

(b) Give reason for your answer in (a)

(c) If the sound takes 't' seconds to reach the boatman, approximately how much time it will take to reach the diver?

7. What is approximate value of speed of sound in iron as compared to that in air? Illustrate your answer with a simple experiment.

8. How does a bat avoid obstacles in its way when in flight?

9. A continuous disturbance is created on the surface of water in a ripple tank with a small piece of cork floating on it. Describe the motion of the cork. What does the motion of the cork tell about the disturbance?

10. Draw a displacement-time graph for water wave

Sound DPP - 4

1. The frequency of a tuning fork is 500 Hz. Calculate the time period.
2. 200 waves pass through a point in one second. Calculate the time period of wave.
3. A bat emits an ultrasonic sound of frequency 0.25 MHz. Calculate the time in which one vibration is completed.
4. An electric tuning fork completes one oscillation in 0.000125 s. Calculate the frequency of tuning fork. Will the sound emitted by tuning fork be audible? Give a reason.
5. The sonic boom of an aircraft has a time period of 0.00005 s. Calculate the frequency of sound produced.
6. An electromagnetic wave has a time period of 4×10^{-8} s. Calculate its frequency in MHz.
7. The wavelength of red light is 6500 Å. If velocity of light is 3×10^{8} ms^{-1}, calculate
   (i) frequency **(ii)** time period. [$1Å = 10^{-10}$ m]
8. An ultraviolet radiation has a wavelength of 300 Å. If the velocity of electromagnetic wave is 3×10^{8} ms^{-1}. Calculate **(i)** frequency **(ii)** time period.
9. The wavelength of the vibrations produced on the surface of water is 2 cm. If the wave velocity is 16 ms^{-1}, calculate
   (i) no. of waves produced in one second
   (ii) time required to produce one wave.
10. Calculate **(i)** wavelength **(ii)** time period of a tuning fork of frequency 480 Hz, which is set to vibrate. Take velocity of sound in air 352 ms^{-1}.
11. A continuous progressive transverse wave of frequency 8 HZ moves across the surface of tank.
    (a) With reference to the frequency, describe the movement of water on the surface.
    (b) If the wavelength of transverse wave is 32 mm, calculate the speed with which wave travels across the surface of water.
12. A thin metal plate is placed against the teeth of cog wheel. Cog wheel is rotated at a speed of 120 rotations per minute and has 160 teeth. Calculate.
    a) frequency of node produced.
    b) speed of sound, if wavelength is 1.05 m.
    c) what will be the effect when speed of cog wheel is doubled?

13. The wavelength and frequency of a sound wave in a certain medium is 22 cm and 1500 Hz respectively. Keeping the medium same, if wavelength is changed to 33 cm, calculate **(i)** velocity of sound **(ii)** new frequency.

14. A sound wave of wavelength 1/3 m has a frequency 996 Hz. Keeping the medium same, if frequency changes to 1328 Hz. Calculate **(i)** velocity of sound **(i)** new wavelength.

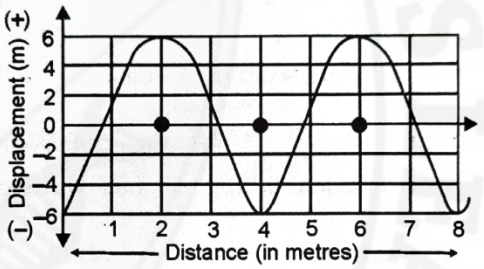
15. Two tuning forks A and B of frequencies 256 Hz and 192 Hz respectively are vibrated in air. If the wavelength of A is 1.25 m, calculate the wavelength produced by B.

16. An electric vibrator produces ripples in a ripple tank, such that distance between one crest and one trough is 4 cm. If the vibrations are produced at a rate of 4800/min. Calculate **(i)** time period **(ii)** wave velocity.

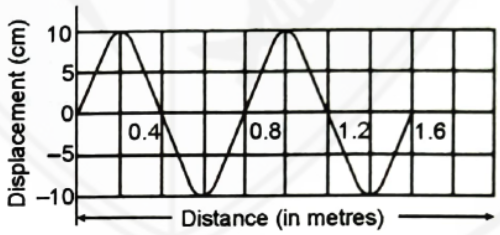
17. The distance between one crest and one trough of a sea wave is 4.5 m. If the waves are produced at the rate of 240/min, calculate **(i)** time period, **(ii)** wave velocity

18. The distance between three consecutive crests of wave is 60 cm. If the waves are produced at the rate ot 180/min, calculate **(i)** wavelength **(ii)** time period **(iii)** wave velocity.

19. The diagram above represents a wave motion, with the vertical displacement measured in centimeters. The wave travels at 16 ms^{-1}. Calculate **(i)** amplitude **(ii)** wavelength **(iii)** frequency of wave.



20. The diagram alongside shows a displacement distance graph of a wave. If the velocity of



21. From diagram alongside calculate (i) velocity of P and Q (ii) frequency of P, when frequency of Q is 512 Hz. Assume that both wave are travelling in same medium.