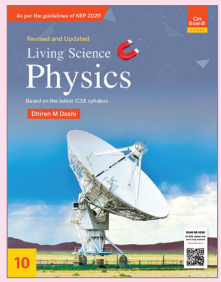
ICSE Living Science PHYSICS

Class 10



Multiple-Choice Questions

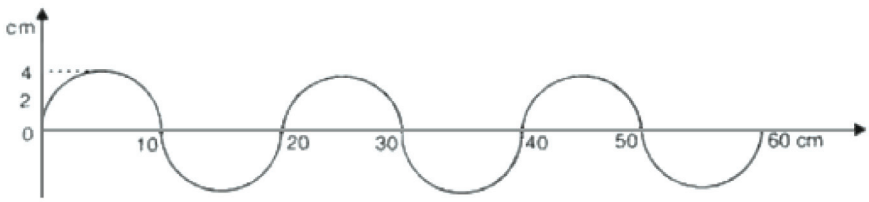
Chapter 7: SOUND

1. In which of the following devices the reflection of sound is not used?

(a) Megaphone (b) Soundboards (c) Telephone (d) Ear trumpet

Ans: (c)

2. A wave form of frequency 50 Hz in a string is shown in the diagram. The numbers in the diagram represent distance in centimetre. Based on this diagram, answer the questions given below.



(A) Wavelength of the wave motion is

(a) 10 cm (b) 20 cm (c) 30 cm (d) 40 cm

Ans: (a)

(B) The amplitude of the wave motion is equal to

(a) 3 cm (b) 4 cm (c) 5 cm (d) 6 cm

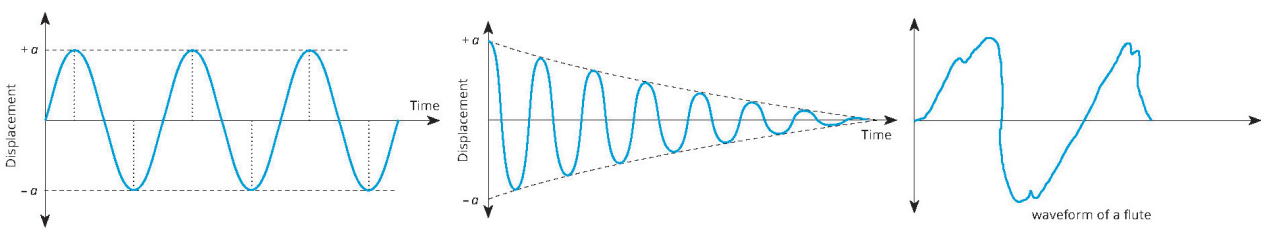
Ans: (b)

(C) Velocity of the wave of frequency 50 Hz is equal to

(a) 20 m/s (b) 15 m/s (c) 10 m/s (d) 5 m/s

Ans: (d)

3. (A) Which of the following is a displacement – time graph for damped vibrations?



(a) (i) and (ii) (b) (ii) only (c) (ii) and (iii) (d) (iii) only

Ans: (b)

(B) The vibrations whose amplitude decrease gradually with time are called

(a) free vibrations. (b) resonating vibrations. (c) forced vibrations. (d) damped vibrations.

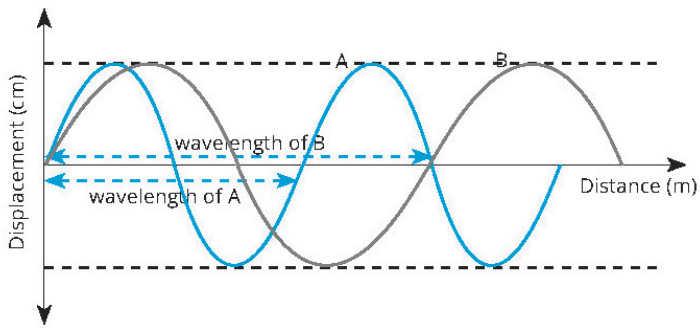
Ans: (d)

(C) Which of the following is not an example of damped vibration?

(a) Sound waves in air
(b) Sound wave produced by a musical instrument
(c) Vibrations of a tuning fork in air
(d) A simple pendulum oscillating in air

Ans: (b)

4. The graph shows two different waves A and B having same amplitude but different wavelengths.



Which conclusion by observing this graph is not correct?

(a) The wave A is of shorter wavelength than wave B.
(b) Wave A has higher frequency than that of wave B.
(c) Wave B has lower pitch than wave A.
(d) Wave B has higher pitch but shorter wavelength.

Ans: (d)

5. A wire stretched between two fixed supports, is plucked exactly in the middle and then released. It executes

(a) resonant vibrations with decreasing amplitude.
(b) free vibrations.
(c) damped vibrations.
(d) forced vibrations.

Ans: (b)

6. When a body vibrates with its natural frequency, the force acting on the body is

(a) zero.
(b) proportional to its velocity.
(c) proportional to its displacement.
(d) a constant force.

Ans: (c)

7. The voice of children and women is shrill because

(a) children and women have short vocal cords.
(b) vocal cords vibrate with high frequency.
(c) they produce a high-pitched voice.
(d) all of these.

Ans: (d)

8. Loudness of sound is measured in units of

(a) decibel (dB).
(b) hertz (Hz).
(c) metre (m).
(d) metre/second (m/s).

Ans: (a)

9. The distance between a crest and an adjacent trough is equal to

(a) the wavelength.
(b) half the wavelength.
(c) one-fourth the wavelength.
(d) twice the wavelength.

Ans: (b)

10. The minimum distance from a sound–reflecting surface to hear an echo is

(a) 15 m
(b) 16.4 m
(c) 17 m
(d) 18 m

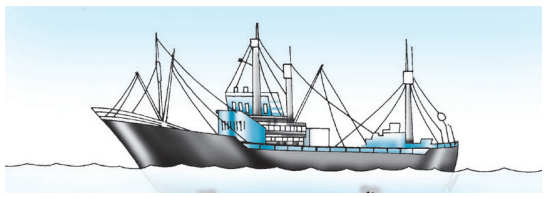
Ans: (c)

11. The loudness of sound depends on

(a) its amplitude. (b) its frequency. (c) its time period. (d) its speed.

Ans: (a)

12. A SONAR device on a submarine sends out a signal and receives an echo 5 seconds later. Calculate the speed of sound in water if the distance of the object from the submarine is 3625 m.



(a) 1250 m/s (b) 1450 m/s (c) 1400 m/s (d) 1500 m/s

Ans: (b)

[Hint: $2d = vt$ $\therefore v = 2d/t = (2 \times 3625)/5 = 1450$ m/s]

13. Which of the following is not necessary to produce an echo?

(a) The minimum distance between the source of sound and the reflector should be at least 17 metres.

(b) The size of the reflector must be large.

(c) The intensity or the loudness of the sound should be sufficient.

(d) The sound produced should have high frequency.

Ans: (d)

14. A boy hears an echo of his own voice from a distant hill after one second. The distance of the hill from the boy is (if the speed of sound in air is 340 m/s.)

(a) 680 m (b) 170 m (c) 340 m (d) 510 m

Ans: (b)

[Hint: $2d$ = Speed × time = 340 × 1

$d = (340 \times 1)/2 = 170$ m]

15. A submarine emits a sonar pulse which returns from an underwater cliff in 1.02 second. If the speed of sound in salt water is 1531 m/s, then distance of the cliff from submarine is

(a) 1560 m (b) 390 m (c) 780 m (d) 750 m

Ans: (c)

[Hint: $2d$ = Speed × time = 1531 × 1.02

$d = (1531 \times 1.02)/2 = 780$ m]

16. A man standing 48 m away from a wall fires a gun. The echo is heard after 0.3 second. What is the speed of the sound?

(a) 320 m/s (b) 310 m/s (c) 330 m/s (d) 340 m/s

Ans: (a)

[Hint: Total distance travelled by the sound = 48 × 2 = 96 m

Time taken = 0.3 s

Speed of sound = 96/0.3 = 320 m/s]

17. Bats detect the obstacles in their path by receiving the reflected

(a) infrasonic waves. (b) electromagnetic waves. (c) radio waves. (d) ultrasonic waves.

Ans: (d)

18. Two sounds of same loudness and same pitch produced by two different instruments differ in their

(a) amplitudes. (b) frequencies. (c) wave forms. (d) all of these.

Ans: (c)

19. The sound from a mosquito is produced when it vibrates its wings at an average rate of 500 vibrations per second. The time period of the vibration is

(a) 2 s **(b)** 0.2 s

(c) 0.02 s **(d)** 0.002 s

Ans: **(d)**

[Hint: Frequency = 500 Hz; Time period = 1/Frequency = 1/500 = 0.002 s]

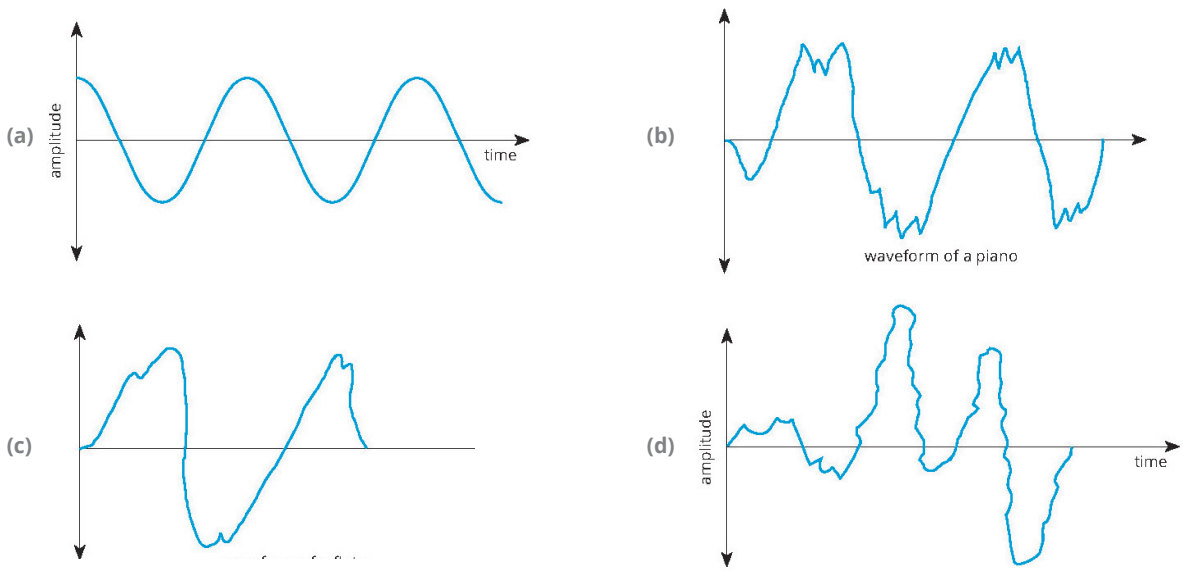
20. Two sounds A and B are of frequencies f and $2f$ respectively. Then

(a) both sounds are identical. **(b)** B is grave and, A is shrill.

(c) B is shrill, A is grave. **(d)** B is louder than A.

Ans: **(c)**

21. (A) Which of the following graphs represents an irregular, non-periodic and non-continuous vibrations characteristic of a waveform of noise?



Ans: **(a)**

(B) Which of the following is not a characteristic of a musical sound?

(a) Pitch **(b)** Quality

(c) Wavelength **(d)** Loudness

Ans: **(a)**

22. A statement of assertion is followed by a statement of reason given below. Mark the correct choice.

Assertion: The note heard in the vibration of 30 cm ruler is louder when flicked with large amplitude.

Reason: Loudness of a sound depends on the amplitude of vibrations.

(a) Both the statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

(b) Both the statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.

(c) Statement 1 is true and statement 2 is false.

(d) Both statements 1 and 2 are false.

Ans: **(a)**