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Physics Grade 10 — Chapter 4

Sound

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Independent practice MCQs from the supplied Class 10 Physics DeepSeek notes PDF. Total: 48 questions.

A. Important / Main Topics

1. The source of sound is:

(A) A vibrating object
(B) A stationary object
(C) A silent object
(D) A transparent object

Correct Answer: A

Explanation: Sound is produced by vibrating objects.

2. Sound is a:

(A) Transverse wave
(B) Longitudinal wave
(C) Electromagnetic wave
(D) Light wave

Correct Answer: B

Explanation: Sound is a mechanical longitudinal wave consisting of compressions and rarefactions.

3. For sound to propagate, a _____ is required.

(A) Vacuum
(B) Mirror
(C) Medium
(D) Lens

Correct Answer: C

Explanation: "Medium" is correct: it matches the idea asked in the question ("For sound to propagate, a _____ is required"), while the other choices do not.

4. Sound cannot travel through:

(A) Air
(B) Water
(C) Steel
(D) Vacuum

Correct Answer: D

Explanation: Sound requires a medium; a vacuum has no particles, so sound cannot propagate through it.

5. The audible range for humans is:

(A) 20–20,000 Hz
(B) 0–20 Hz
(C) 20,000–40,000 Hz
(D) 0–20,000 Hz

Correct Answer: A

Explanation: Humans can hear sounds from 20 Hz to 20,000 Hz.

6. Sound waves with frequencies below 20 Hz are called:

(A) Ultrasonic
(B) Infrasonic
(C) Audible
(D) Supersonic

Correct Answer: B

Explanation: Sound waves with frequencies below 20 Hz are called Infrasonic.

7. Sound waves with frequencies above 20,000 Hz are called:

(A) Infrasonic
(B) Audible
(C) Ultrasonic
(D) Subsonic

Correct Answer: C

Explanation: Sound waves with frequencies above 20,000 Hz are called Ultrasonic.

8. The characteristic of sound that distinguishes between grave and shrill sounds is:

(A) Loudness
(B) Quality
(C) Amplitude
(D) Pitch

Correct Answer: D

Explanation: The characteristic of sound that distinguishes between grave and shrill sounds is Pitch.

9. The characteristic of sound that distinguishes between loud and faint sounds is:

(A) Loudness
(B) Pitch
(C) Quality
(D) Frequency

Correct Answer: A

Explanation: The characteristic of sound that distinguishes between loud and faint sounds is Loudness.

10. The characteristic of sound that distinguishes two sounds with the same loudness and pitch is:

(A) Loudness
(B) Quality (timbre)
(C) Pitch
(D) Amplitude

Correct Answer: B

Explanation: Quality or timbre distinguishes sounds with the same loudness and pitch.

11. The pitch of sound depends upon:

(A) Amplitude
(B) Quality
(C) Frequency
(D) Displacement

Correct Answer: C

Explanation: Pitch is directly related to frequency.

12. The loudness of sound depends upon:

(A) Frequency
(B) Wavelength
(C) Speed
(D) Amplitude

Correct Answer: D

Explanation: Loudness is related to the amplitude of the sound wave.

13. The unit of loudness level is:

(A) Decibel
(B) Hertz
(C) Meter
(D) Second

Correct Answer: A

Explanation: Loudness level is measured in decibels (dB).

14. The speed of sound in air is approximately:

(A) 150 m/s
(B) 340 m/s
(C) 1500 m/s
(D) 5000 m/s

Correct Answer: B

Explanation: The speed of sound in air at room temperature is about 340 m/s.

15. The sensation of sound persists in our brain for about:

(A) 10 s
(B) 1 s
(C) 0.1 s
(D) 0.01 s

Correct Answer: C

Explanation: The persistence of hearing is about 0.1 s.

16. In the bell jar experiment, when air is pumped out, the sound of the bell:

(A) Becomes louder
(B) Remains the same
(C) Changes pitch
(D) Becomes fainter and eventually stops

Correct Answer: D

Explanation: As air is removed, fewer particles are available to carry the sound, so the sound fades and eventually stops.

17. The tuning fork experiment demonstrates that:

(A) Vibration produces sound
(B) Sound travels through a vacuum
(C) Sound travels faster than light
(D) Sound is an electromagnetic wave

Correct Answer: A

Explanation: The vibrating tuning fork produces sound, showing that vibration is necessary for sound production.

18. Compressions in a sound wave are regions of:

(A) Low pressure and low density
(B) High pressure and high density
(C) High pressure and low density
(D) Low pressure and high density

Correct Answer: B

Explanation: Compressions in a sound wave are regions of High pressure and high density.

19. Rarefactions in a sound wave are regions of:

(A) High pressure and high density
(B) High pressure and low density
(C) Low pressure and low density
(D) Low pressure and high density

Correct Answer: C

Explanation: Rarefactions in a sound wave are regions of Low pressure and low density.

20. The speed of sound in water is approximately:

(A) 340 m/s
(B) 5000 m/s
(C) 150 m/s

(D) 1500 m/s

Correct Answer: D

Explanation: The speed of sound in water is approximately 1500 m/s.

21. As temperature of air increases, the speed of sound:

(A) Increases
(B) Decreases
(C) Remains the same
(D) Becomes zero

Correct Answer: A

Explanation: Warmer air has faster-moving particles, so sound travels faster.

22. Supersonic speed means:

(A) Faster than light
(B) Faster than sound
(C) Slower than sound
(D) Equal to sound

Correct Answer: B

Explanation: Supersonic means moving faster than the speed of sound.

23. If there is a 3-second gap between lightning and thunder, the distance of the storm is approximately:

(A) 3 km
(B) 10 km
(C) 1 km
(D) 0.1 km

Correct Answer: C

Explanation: If there is a 3-second gap between lightning and thunder, the distance of the storm is approximately 1 km.

24. Which of the following is NOT a factor affecting the speed of sound?

(A) Temperature
(B) Medium
(C) Elasticity
(D) Frequency

Correct Answer: D

Explanation: The speed of sound is essentially independent of frequency.

B. Less Important / Secondary Topics

25. Sound cannot travel through a vacuum because:

(A) There are no particles to vibrate
(B) It is too fast
(C) It is too slow
(D) It requires light

Correct Answer: A

Explanation: Sound is a mechanical wave and requires a medium (particles) to propagate. A vacuum has no particles.

26. Which surface reflects sound best?

(A) Soft carpet
(B) Hard, smooth tile
(C) Rough wall
(D) Curtains

Correct Answer: B

Explanation: Hard, smooth tile — this correctly answers the question.

27. Why is sound clearer at night than during the day?

(A) It reflects more
(B) It diffracts more
(C) It refracts toward the ground
(D) It travels faster

Correct Answer: C

Explanation: It refracts toward the ground — this correctly answers the question.

28. The persistence of hearing of the human ear is about:

(A) 0.01 s
(B) 1 s
(C) 10 s
(D) 0.1 s

Correct Answer: D

Explanation: The human ear can distinguish two sounds if separated by at least 0.1 s.

29. For sound speed of 340 m/s, the minimum distance for an echo is:

(A) 17 m
(B) 34 m
(C) 340 m
(D) 3.4 m

Correct Answer: A

Explanation: For sound speed of 340 m/s, the minimum distance for an echo is 17 m.

30. Reverberation is:

(A) A clear echo
(B) Reflected sound that cannot be distinguished from the original
(C) The original sound
(D) Sound traveling through a vacuum

Correct Answer: B

Explanation: Reverberation is overlapping reflections heard before 0.1 s, so they cannot be distinguished.

31. Acoustics is the study of:

(A) Light
(B) Heat
(C) Sound
(D) Electricity

Correct Answer: C

Explanation: Acoustics is the branch of physics dealing with sound.

32. Acoustic protection uses:

(A) Hard, smooth surfaces
(B) Metallic surfaces
(C) Transparent surfaces
(D) Soft, porous surfaces

Correct Answer: D

Explanation: Acoustic protection uses Soft, porous surfaces.

33. The ossicles are located in the:

(A) Middle ear
(B) Outer ear
(C) Inner ear
(D) Cochlea d = v × t d = (v × t)/2 d = v/t d = t/v d = (v × t)/2

Correct Answer: A

Explanation: The ossicles (malleus, incus, stapes) are in the middle ear.

34. A ship sends a sound wave in the Pacific Ocean and it takes 14.7 s to return to the ship. Find the depth of the Pacific Ocean. (Speed of sound in water = 1500 m/s)

(A) 22,050 m
(B) 11,025 m
(C) 5,512.5 m
(D) 1,500 m

Correct Answer: B

Explanation: "11,025 m" is correct: it matches the idea asked in the question ("A ship sends a sound wave in the Pacific Ocean and it takes 14.7 s to return to the ship. Find the depth of the Pacific Ocean. (Speed of sound in water = 1500 m/s)"), while the other choices do not.

35. A boy hears thunder 3.0 s after seeing lightning. How far away is the lightning? (Speed of sound = 343 m/s)

(A) 2.058 km
(B) 0.514 km
(C) 1.029 km
(D) 3.430 km

Correct Answer: C

Explanation: "1.029 km" is correct: it matches the idea asked in the question ("A boy hears thunder 3.0 s after seeing lightning. How far away is the lightning? (Speed of sound = 343 m/s)"), while the other choices do not.

36. A tourist clapped his hands near a cliff and heard the echo after 5 s. What is the distance of the cliff? (Speed of sound = 344 m/s)

(A) 1720 m
(B) 430 m
(C) 344 m
(D) 860 m

Correct Answer: D

Explanation: "860 m" is correct: it matches the idea asked in the question ("A tourist clapped his hands near a cliff and heard the echo after 5 s. What is the distance of the cliff? (Speed of sound = 344 m/s)"), while the other choices do not.

37. A teacher took students to a nearby hill. Abdullah shouted and heard his echo after 1.2 s. If the speed of sound is 346 m/s, how far is the cliff?

(A) 207.6 m
(B) 415.2 m
(C) 103.8 m
(D) 346 m

Correct Answer: A

Explanation: 207.6 m — this correctly answers the question.

38. Speed of sound in seawater is 1500 m/s. If its wavelength is 45 cm, find the frequency of these sound waves.

(A) 666.7 Hz
(B) 3,333.3 Hz
(C) 1,500 Hz
(D) 33,333 Hz

Correct Answer: B

Explanation: "3,333.3 Hz" is correct: it matches the idea asked in the question ("Speed of sound in seawater is 1500 m/s. If its wavelength is 45 cm, find the frequency of these sound waves"), while the other choices do not.

39. A sound wave in seawater travels at 1500 m/s. It is sent and detected back after reflection from the seabed in 8.5 s. Find the distance from surface to the bottom of the sea.

(A) 12,750 m
(B) 3,187.5 m

(C) 6,375 m
(D) 1,500 m

Correct Answer: C

Explanation: "6,375 m" is correct: it matches the idea asked in the question ("A sound wave in seawater travels at 1500 m/s. It is sent and detected back after reflection from the seabed in 8.5 s. Find the distance from surface to the bottom of the sea"), while the other choices do not.

40. A physician counts 69 heartbeats in 1 min. Calculate the frequency of the heartbeats.

(A) 69 Hz d = (346 × 1.2)/2 = 207.6 m f = v/λ = 1500/0.45 = 3333.3 Hz d = (v × t)/2 = (1500 × 8.5)/2 = 6375 m
(B) 0.8696 Hz
(C) 1.5 Hz
(D) 1.15 Hz

Correct Answer: D

Explanation: "1.15 Hz" is correct: it matches the idea asked in the question ("A physician counts 69 heartbeats in 1 min. Calculate the frequency of the heartbeats"), while the other choices do not.

41. Find the range of wavelengths at speed 343 m/s for the audible frequency range (20 Hz to 20 kHz).

(A) 17.15 m and 0.01715 m
(B) 0.01715 m and 17.15 m
(C) 343 m and 0.343 m
(D) 6.86 m and 0.00686 m

Correct Answer: A

Explanation: "17.15 m and 0.01715 m" is correct: it matches the idea asked in the question ("Find the range of wavelengths at speed 343 m/s for the audible frequency range (20 Hz to 20 kHz)"), while the other choices do not.

42. SONAR sends an ultrasound signal towards the seabed. It is received back after 5.3 s. If speed of sound in seawater is 1550 m/s, find the depth of the sea.

(A) 8,215 m
(B) 4,107.5 m
(C) 2,053.75 m
(D) 1,550 m

Correct Answer: B

Explanation: "4,107.5 m" is correct: it matches the idea asked in the question ("SONAR sends an ultrasound signal towards the seabed. It is received back after 5.3 s. If speed of sound in seawater is 1550 m/s, find the depth of the sea"), while the other choices do not.

43. The ossicles amplify vibrations because:

(A) They are the smallest bones in the body
(B) They are filled with fluid
(C) They act as a lever system to increase the force of vibrations
(D) They are located in the inner ear

Correct Answer: C

Explanation: The ossicles (malleus, incus, stapes) amplify vibrations and transmit them to the cochlea, as stated in the textbook.

44. f = 69/60 = 1.15 Hz λ = 1 343/20 = 17.15 m λ = 2 343/20000 = 0.01715 m d = (v × t)/2 = (1550 × 5.3)/2 = 4107.5 m The cochlea is filled with:

(A) Air
(B) Bone
(C) Cartilage
(D) Fluid

Correct Answer: D

Explanation: The cochlea is a fluid-filled spiral structure.

45. Hair cells generate electrical signals when they:

(A) Bend

(B) Vibrate
(C) Heat up
(D) Cool down

Correct Answer: A

Explanation: Hair cells generate electrical signals when they Bend.

46. The electrical signals from the ear travel to the brain via the:

(A) Eardrum
(B) Auditory nerve
(C) Ossicles
(D) Cochlea

Correct Answer: B

Explanation: The electrical signals from the ear travel to the brain via the Auditory nerve.

47. The 60/60 rule for hearing protection recommends:

(A) 60 dB for 60 seconds
(B) 60 Hz for 60 minutes
(C) 60% volume for 60 minutes
(D) 60 minutes of silence every 60 minutes

Correct Answer: C

Explanation: The 60/60 rule is no more than 60% volume for 60 minutes.

48. The smallest bone in the human body is the:

(A) Malleus
(B) Incus
(C) Cochlea
(D) Stapes

Correct Answer: D

Explanation: The stapes is the smallest bone in the human body, located in the middle ear. Answer.