

NDA-CDS 1 2025

GS

LIVE

PHYSICS

WAVES & SOUND

MCQS



NAVJYOTI SIR

SSBCrack
EXAMS



27 Jan 2025 Live Classes Schedule

✓ 9:00AM --- 27 JANUARY 2025 DAILY DEFENCE UPDATES --- DIVYANSHU SIR

✓ 10:00AM --- 27 JANUARY 2025 DAILY CURRENT AFFAIRS --- RUBY MA'AM

SSB INTERVIEW LIVE CLASSES

✓ 9:30AM --- MOCK PERSONAL INTERVIEWS --- ANURADHA MA'AM

AFCAT 1 2025 LIVE CLASSES

✓ 12:30PM --- REASONING - FIGURE ANALOGY --- RUBY MA'AM

✓ 3:00PM --- STATIC GK - AWARDS & HONOURS --- DIVYANSHU SIR

✓ 4:30PM --- ENGLISH - SYNONYMS - CLASS 2 --- ANURADHA MA'AM

✓ 5:30PM --- MATHS - AVERAGE --- NAVJYOTI SIR

NDA 1 2025 LIVE CLASSES

✓ 10:00AM --- MATHS - COMPLEX NUMBERS --- NAVJYOTI SIR

✓ 11:30AM --- MEDIEVAL HISTORY - CLASS 2 --- RUBY MA'AM

✓ 1:00PM --- PHYSICS - WAVES & SOUND --- NAVJYOTI SIR

✓ 4:30PM --- ENGLISH - SYNONYMS - CLASS 2 --- ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

✓ 11:30AM --- MEDIEVAL HISTORY - CLASS 2 --- RUBY MA'AM

✓ 1:00PM --- PHYSICS - WAVES & SOUND --- NAVJYOTI SIR

✓ 4:30PM --- ENGLISH - SYNONYMS - CLASS 2 --- ANURADHA MA'AM

✓ 5:30PM --- MATHS - AVERAGE --- NAVJYOTI SIR




WAVES AND SOUND MCQs



Sound propagates at the maximum speed in

- A. Solids
- B. Liquids
- C. Gases
- D. All

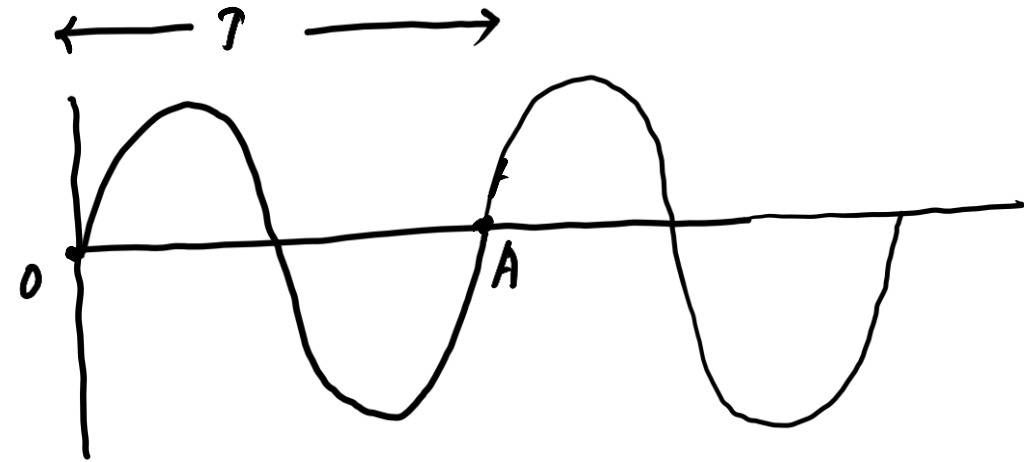

speed : solids > liquids > gases

Sound propagates at the maximum speed in

- A. Solids
- B. Liquids
- C. Gases
- D. All

The time taken to complete _____ number of oscillations is called
Time period.

- A. One
- B. Two
- C. Ten
- D. Hundred



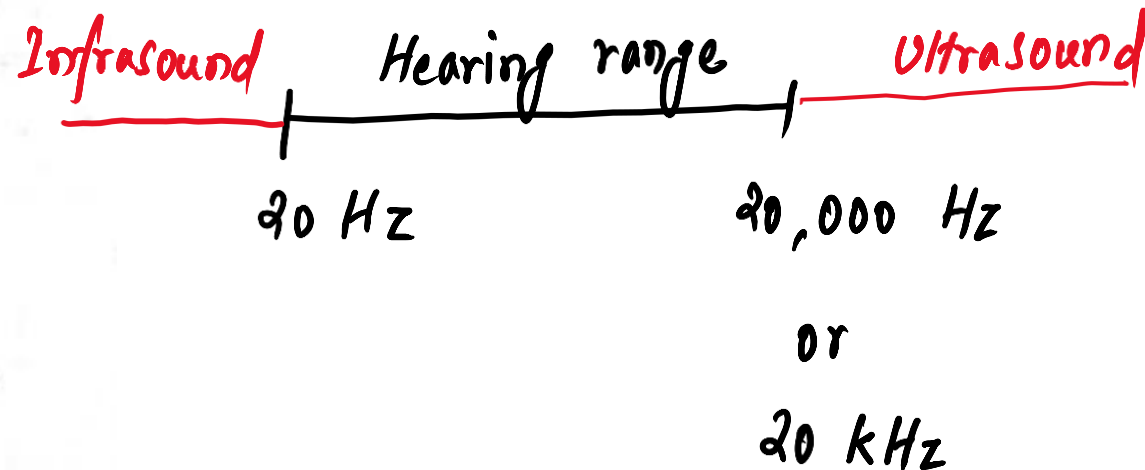
Time taken from 0 to A.

The time taken to complete _____ number of oscillations is called
Time period.

- A. One
- B. Two
- C. Ten
- D. Hundred

Which one of the following frequency ranges is sensitive to human ears ?

- (a) 0 – 200 Hz
- (b) 20 – 20,000 Hz
- (c) 200 – 20,000 Hz only
- (d) 2,000 – 20,000 Hz only



Which one of the following frequency ranges is sensitive to human ears ?

Answer: B

- (a) 0 – 200 Hz
- (b) 20 – 20,000 Hz
- (c) 200 – 20,000 Hz only
- (d) 2,000 – 20,000 Hz only

Compared to audible sound waves, ultrasound waves have

- (a) higher speed.
- (b) higher frequency.
- (c) longer wavelength.
- (d) both higher speed and frequency.

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Answer: B

Which one of the following *cannot* be the unit of frequency of a sound wave ?

- (a) dB
- (b) s^{-1}
- (c) Hz
- (d) min^{-1}

$$\text{frequency} = \frac{1}{\text{Time period}}$$

(Time) \longrightarrow sec, min, hr, day

$$\frac{1}{\text{sec}} = s^{-1} \text{ or Hertz (Hz)}$$

dB \Rightarrow unit of loudness,,

Which one of the following *cannot* be the unit of frequency of a sound wave ?

Answer: A

- (a) dB
- (b) s^{-1}
- (c) Hz
- (d) min^{-1}

The sound created in a big hall persists because of the repeated reflections. The phenomenon is called

- (a) Reverberation.
- (b) Dispersion.
- (c) Refraction.
- (d) Diffraction.

The sound created in a big hall persists because of the repeated reflections. The phenomenon is called

Answer: A

- (a) Reverberation.
- (b) Dispersion.
- (c) Refraction.
- (d) Diffraction.

Which of the following are the characteristics of electromagnetic waves ?

1. They are elastic waves. ✓
2. They can also move in vacuum. ✓
3. They have electric and magnetic components which are mutually perpendicular. ✓
4. They move with a speed equal to 3 lakh *kilo* meters per second. ✓

Select the correct answer using the code given below :

- (a) 1, 2, 3 and 4 ✓
- (b) 1, 2 and 4 only
- (c) 2 and 3 only
- (d) 3 and 4 only

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Answer: A

Select the correct answer using the code given below :

- (a) 1, 2, 3 and 4
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The flash of lightning is seen before the thunderstorm is heard. It verifies that

- (a) sound travels much faster than light
- (b) light travels much faster than sound
- (c) light and sound both travel with same speed
- (d) intensity of flash of lightning is very high during thunderstorm

The flash of lightning is seen before the thunderstorm is heard. It verifies that

Answer : B

- (a) sound travels much faster than light
- (b) light travels much faster than sound
- (c) light and sound both travel with same speed
- (d) intensity of flash of lightning is very high during thunderstorm

The part of the human ear that converts the pressure variations associated with audible sound waves to electrical signals is

- (a) auditory nerve
- (b) cochlea
- (c) eardrum
- (d) eustachian tube

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Answer: B

Which among the following is true for propagation of sound waves ?

- (a) Sound can travel in vacuum and it is a transverse wave in air. α
- (b) Sound cannot travel in vacuum and it is a longitudinal wave in air. ✓
- (c) Sound can travel in vacuum and it is a longitudinal wave in air.
- (d) Sound cannot travel in vacuum and it is a transverse wave in air.

mechanical wave

longitudinal wave

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- (c) Sound can travel in vacuum and it is a longitudinal wave in air.
- (d) Sound cannot travel in vacuum and it is a transverse wave in air.

Answer: B

'Beats' is a phenomenon that occurs when frequencies of two harmonic waves are

- (a) equal.
- (b) far apart.
- (c) multiples of each other.
- (d) nearly same.

'Beats' is a phenomenon that occurs when frequencies of two harmonic waves are

Answer: D

- (a) equal.
- (b) far apart.
- (c) multiples of each other.
- (d) nearly same.

A sound wave has a frequency of 1 kHz and wavelength 50 cm. How long will it take to travel 1 km?

- (a) 5 s
- (b) 4 s
- (c) 3 s
- (d) 2 s

$$\text{Speed of wave (v)} = \text{frequency (f)} \times \text{wavelength (\lambda)}$$

$$v = f \lambda$$

$$v = (1 \times 10^3 \text{ Hz}) \times \left(\frac{50}{100} \right) \text{ m} = \underline{500 \text{ m/s}}$$

$$\text{Time required} = \frac{1 \text{ km}}{500 \text{ m/s}} = \frac{1000 \text{ m}}{500 \text{ m/s}} = \boxed{2 \text{ s}}$$

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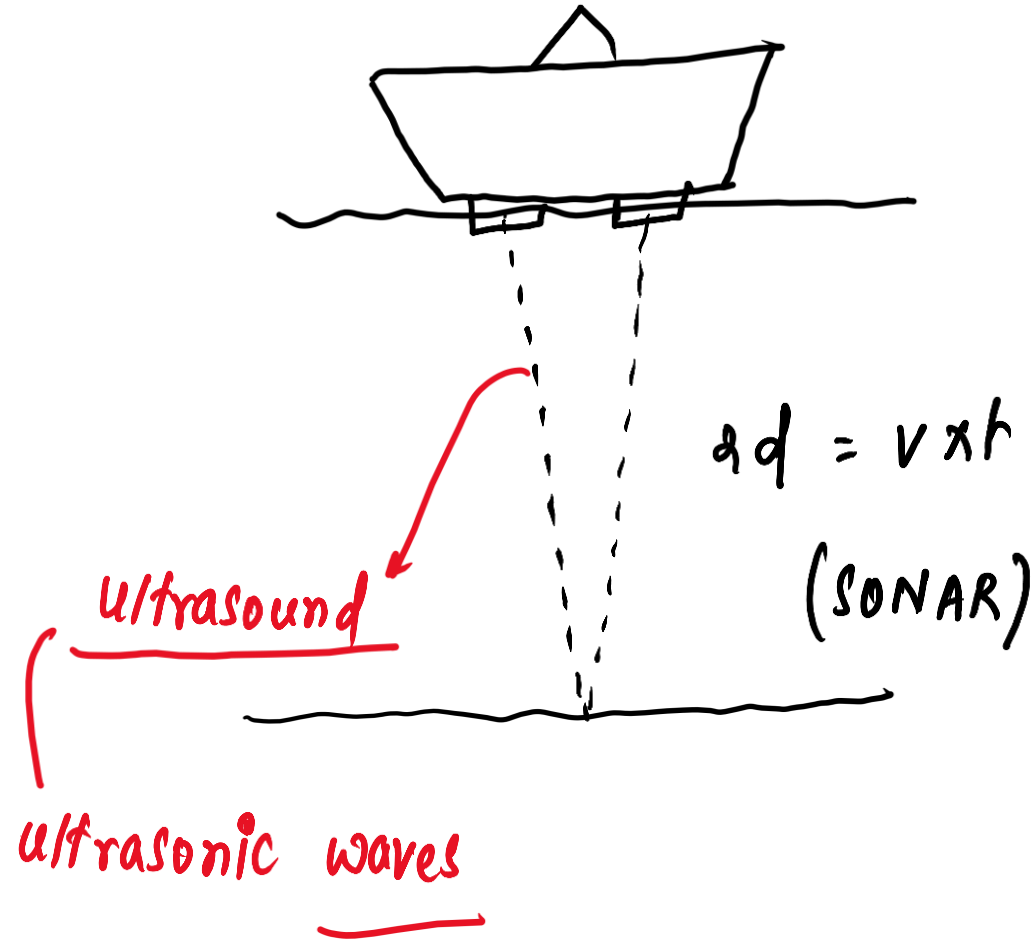
(c) 3 s

(d) 2 s

Answer: D

SONAR is a device that is used to measure the distance of underwater objects by a ship. Which of the following types of waves does it use for this purpose?

- (a) Infrasonic waves
- (b) Sound waves in audible range for human beings
- (c) Ultrasonic waves
- (d) All of the above



SONAR is a device that is used to measure the distance of underwater objects by a ship. Which of the following types of waves does it use for this purpose?

Answer: C

- (a) Infrasonic waves
- (b) Sound waves in audible range for human beings
- (c) Ultrasonic waves
- (d) All of the above

Which one of the following statements about the speed of sound waves is **not** correct?

(a) The speed of sound waves in steel is higher than that in water. ✓

(b) The speed of sound waves in air decreases with increase in temperature. ✗

(c) The speed of sound waves in air increases with increase in temperature. ✓

(d) The speed of sound waves in water is higher than that in air.

$$v_{\text{solids}} > v_{\text{liquid}}$$

$$v \propto \sqrt{T} \text{ (directly proportional)}$$

$$v_{\text{solid}} > v_{\text{liquid}} > v_{\text{gas}}$$

$$v_{\text{liquid}} > v_{\text{gas}}$$

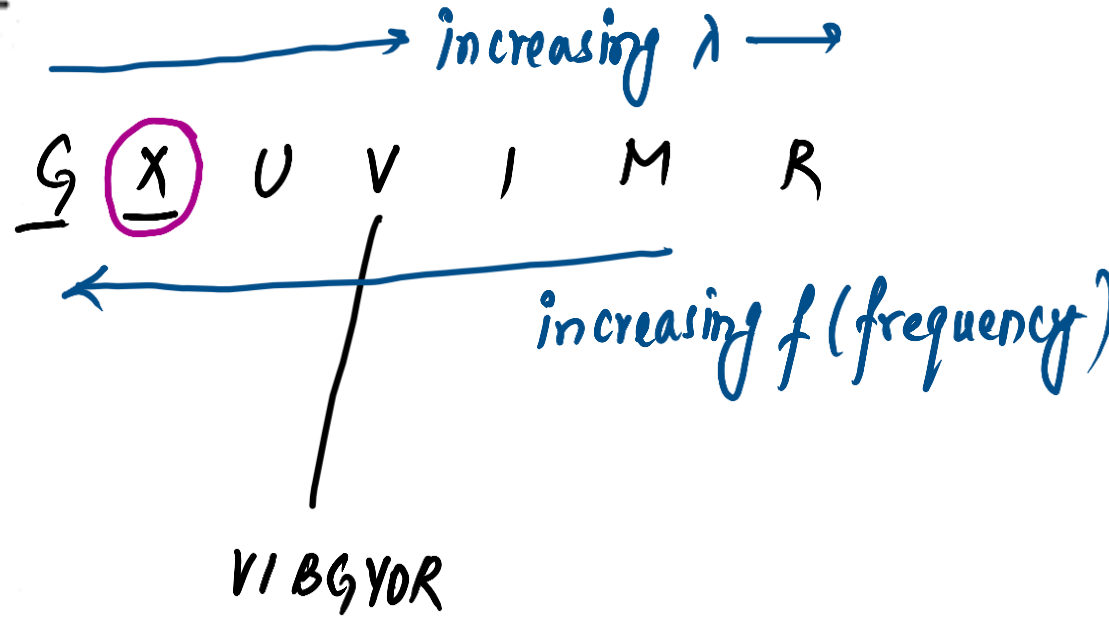
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Answer: B

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- (b) The speed of sound waves in air decreases with increase in temperature.
- (c) The speed of sound waves in air increases with increase in temperature.
- (d) The speed of sound waves in water is higher than that in air.

Which one of the following types of radiations has the smallest wavelength ?

- (a) Microwaves
- (b) Infra-red
- (c) Visible light
- (d) X-rays



Which one of the following types of radiations has the smallest wavelength ?

Answer: D

- (a) Microwaves
- (b) Infra-red
- (c) Visible light
- (d) X-rays

The sound above _____ is physically painful.

A. 10 dB

B. 20 dB

C. 60 dB

D. 80 dB

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D. 80 dB

Which one of the following optical phenomena supports that the light is a transverse wave?

- (a) Refraction
 - (b) Diffraction
 - (c) Interference
 - (d) Polarization
- } both longitudinal & transverse waves can show.
- } → only for transverse wave,

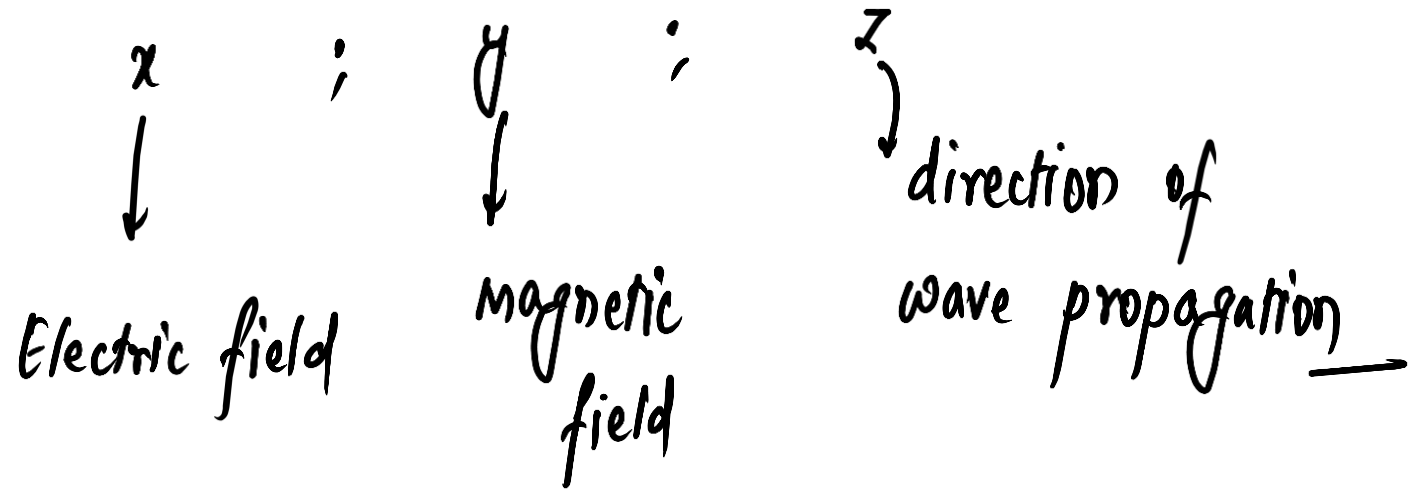
Which one of the following optical phenomena supports that the light is a transverse wave ?

Answer: D

- (a) Refraction
- (b) Diffraction
- (c) Interference
- (d) Polarization

In electromagnetic waves , angle between electric and magnetic field vectors are at _____ to each other.

- A. 180°
- B. 0°
- C. 90°
- D. None of these



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- A. 180°
- B. 0°
- C. 90°**
- D. None of these

Which one of the following statements is true for sound waves propagating in air ?

- (a) Sound is an electromagnetic wave and transverse in nature
- (b) Sound is a mechanical wave and longitudinal in nature
- (c) Sound is a mechanical wave and transverse in nature
- (d) Sound is an electromagnetic wave and longitudinal in nature

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- (c) Sound is a mechanical wave and transverse in nature
- (d) Sound is an electromagnetic wave and longitudinal in nature

Answer: B

Which of the following statements about electromagnetic waves, sound waves and water waves is/are correct?

Select the correct answer using the code given below :

1. They exhibit reflection ✓
2. They carry energy ✓
3. They exert pressure ✓
4. They can travel in vacuum ✗

-
- (a) 1, 2 and 3 ✓
 - (b) 2 and 4
 - (c) 1 and 3 only
 - (d) 1 only

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1. They exhibit reflection
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4. They can travel in vacuum

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- (a) 1, 2 and 3
 - (b) 2 and 4
 - (c) 1 and 3 only
 - (d) 1 only

Answer : A

Which one of the following does *not* apply to sound waves in fluids ?

- (a) They transport energy ✓
- (b) They need a medium to travel ✓
- (c) They are transverse ✗
- (d) They travel faster in liquids than in gases

$$v_{\text{liquids}} > v_{\text{gases}}$$

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- (a) They transport energy
- (b) They need a medium to travel
- (c) They are transverse
- (d) They travel faster in liquids than in gases

Answer : C

Which one among the following waves bats use to detect the obstacles in their flying path?

- (a) Infrared waves
- (b) Electromagnetic waves
- (c) Ultrasonic waves
- (d) Radio waves

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- (a) Infrared waves
- (b) Electromagnetic waves
- (c) Ultrasonic waves
- (d) Radio waves

Answer: C

A sound wave has frequency of 2 kHz and wavelength of 35 cm. If an observer is 1.4 km away from the source, then after what time interval could the observer hear the sound?

- (a) 2 s (b) 20 s (c) 0.5 s (d) 4 s

$$\begin{aligned} \text{Speed of sound wave} &= \text{wavelength} \times \text{frequency} \\ &= \frac{35}{100} \text{ m} \times 2 \times 1000 \text{ Hz} = \underline{700 \text{ ms}^{-1}} \end{aligned}$$

$$\text{Time interval} = \frac{1.4 \text{ km}}{700 \text{ ms}^{-1}} = \frac{1.4 \times 1000}{700} = \frac{14}{7} = \text{2 Sec}$$

A sound wave has frequency of 2 kHz and wavelength of 35 cm. If an observer is 1.4 km away from the source, then after what time interval could the observer hear the sound?

- (a) 2 s (b) 20 s (c) 0.5 s (d) 4 s

Answer: A

The ceilings of a concert hall are generally curved

- (a) because they reflect the sound to the audience
- (b) because they can absorb noise α
- (c) to have better aeration in the hall α
- (d) as any sound from outside can not pass through a curved ceiling α

The ceilings of a concert hall are generally curved

- (a) because they reflect the sound to the audience
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- (d) as any sound from outside can not pass through a curved ceiling

Answer: A

Two sound waves passing through air have their wavelengths in the ratio 4 : 5. Their frequencies are in the ratio

- (a) 4 : 5
(c) 5 : 4

- (b) 3 : 4
(d) 1 : 1

$$v = \lambda f$$

$$\lambda = \frac{v}{f}$$

$$\frac{\lambda_1}{\lambda_2} = \frac{4}{5}$$

$$\frac{\frac{v}{f_1}}{\frac{v}{f_2}} = \frac{4}{5}$$

(As speeds of the two waves will be same)

$$\Rightarrow \frac{f_2}{f_1} = \frac{4}{5} \Rightarrow \frac{f_1}{f_2} = \frac{5}{4}$$

5 : 4

Two sound waves passing through air have their wavelengths in the ratio 4 : 5. Their frequencies are in the ratio

- (a) 4 : 5 (b) 3 : 4
(c) 5 : 4 (d) 1 : 1

Answer: C

The pitch of sound depends upon

- (a) frequency and amplitude
- (b) frequency alone
- (c) amplitude alone
- (d) the difference in frequencies from two sources

pitch is directly related to frequency.
(p) (f)
$$p \propto f$$

Loudness \propto (Amplitude)²

The pitch of sound depends upon

- (a) frequency and amplitude
- (b) frequency alone
- (c) amplitude alone
- (d) the difference in frequencies from two sources

Answer: B

Sound travels in gases in the form of

- (a) longitudinal waves only
- (b) transverse waves only
- (c) longitudinal as well as transverse waves
- (d) stationary waves only

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- (a) longitudinal waves only
- (b) transverse waves only
- (c) longitudinal as well as transverse waves
- (d) stationary waves only

Answer: A

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