NDA-CDS 1 2025

GS

LIVE

PHYSICS

MCQ | WAVES & SOUND

NAVJYOTI SIR

SSBCrack EXAMS

10 Dec 2024 Live Classes Schedule

8:00AM	10 DEC 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	10 DEC 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

NDA 1 2025 LIVE CLASSES

1:00PM	PHYSICS - SOUND & WAVES MCQ	NAVJYOTI SIR
5:30PM	MATHS - APPLICATIONS OF DERIVATIVES - CLASS 1	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

1:00PM	PHYSICS - SOUND & WAVES MCQ	NAVJYOTI SIR
7:00PM	MATHS - ALGEBRA - CLASS 5	NAVJYOTI SIR

WAVES AND SOUND MCQs

Sound propagates at the maximum speed in

A. Solids

B. Liquids

C. Gases

D. All

packing of molecules is greatest in solids.

Sound propagates at the maximum speed in

A. **Solids**

B. Liquids

C. Gases

D. All

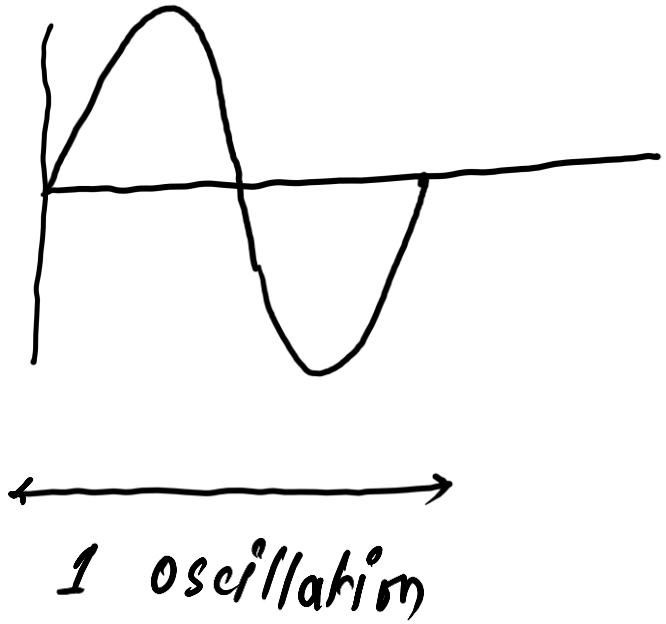
The time taken to complete _____ number of oscillations is called Time period.

A. One

B. Two

C. Ten

D. Hundred



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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

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Answer: B

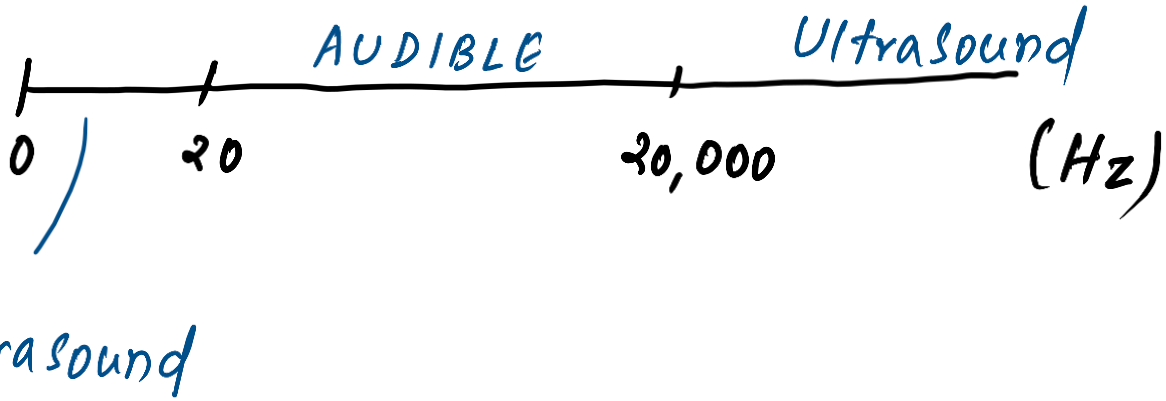
Compared to audible sound waves, ultrasound waves have

(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}

dB ⟶ Loudness

s^{-1} Hz min^{-1}

Frequency = $\frac{1}{\text{Time period}}$ } unit of frequency, (reciprocal of time's units, (s^{-1}, hr^{-1}, min^{-1} etc.)

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(a) dB

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(c) Hz

(d) min^{-1}

Answer: A

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.

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Answer: A

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

3×10^8 m/s

3×10^5 km/s = 3,00,000 km/s

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Answer: A

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

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Answer : B

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.

(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

→ longitudinal

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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. ✓

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Answer: D

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

Speed of wave = Frequency × wavelength

$= 1000\ Hz \times \frac{50}{100}\ m$

$= 500\ m/s$

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

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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

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(b) Sound waves in audible range for human beings

(c) Ultrasonic waves

(d) All of the above

Answer: C

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. ✓

$v_{solid} > v_{liquid}$

$v_{liquid} > v_{gas}$

(speed) $v \propto \sqrt{T}$ (directly proportional to square root of temperature)

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

Answer: B

Which one of the following types of radiations has the smallest wave-length ?

(a) Microwaves

(b) Infra-red

(c) Visible light

(d) X-rays ✓

G X U V I M R

⟶ wavelength

⟵ frequency

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(c) Visible light

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Answer: D

The sound above _____ is physically painful.

A. 10 dB

B. 20 dB

C. 60 dB

D. 80 dB ✓

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B. 20 dB

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

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

shown for both longitudinal as well as transverse.

only shown by transverse wave.

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

(a) Refraction

(b) Diffraction

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(d) Polarization

Answer: D

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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B. 0°

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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 ?

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

Select the correct answer using the code given below :

(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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Select the correct answer using the code given below :

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(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 ✓

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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

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

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

$$\text{Speed} = \text{wavelength} \times \text{frequency}$$

$$= \frac{35}{100}\ \text{m} \times 2 \times 1000\ \text{Hz}$$

$$= 700\ \text{m/s}$$

$$\text{Time} = \frac{1.4\ \text{km}}{700\ \text{m/s}}$$

$$= \frac{1400\ \text{km}}{700\ \text{m/s}}$$

$$= 2\ \text{s}$$

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(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

(c) to have better aeration in the hall

(d) as any sound from outside can not pass through a curved ceiling

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(a) because they reflect the sound to the audience

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

✓✓ Speed of both waves will be same,

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

$$v = \lambda \times f$$

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

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

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

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

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

Answer: A

NDA-CDS 1 2025

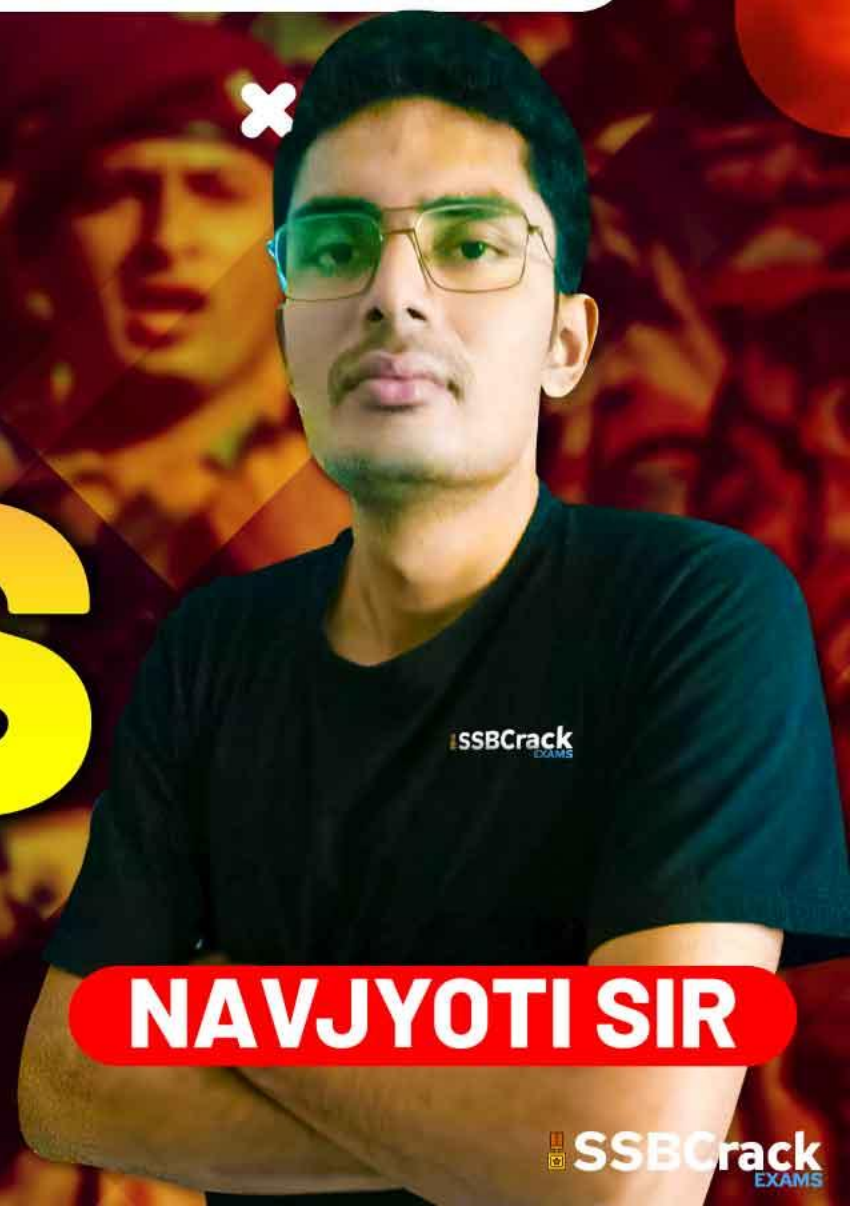
GS

LIVE

PHYSICS

MOTION

CLASS 1



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