PREVIOUS YEAR QUESTIONS
(Chapterwise)

CHAPTER NAME: SOUND

SUMMARY POINTS

Concept	Key Points & Formulae	SI Units
Production of Sound	- Sound is produced by vibrating bodies.	Frequency: Hertz (Hz)
	- Vibrations create sound waves in the surrounding medium.	Time period: Seconds (s)
Medium of Propagation	- Sound requires a medium (solid, liquid, or gas) to propagate.	
Characteristics of Sound	- Characteristics: Pitch, Loudness, Quality (Timbre).	
	- Pitch is determined by frequency: Higher frequency = higher pitch.	Frequency: Hertz (Hz)
	- Loudness is determined by amplitude of the vibration.	Amplitude: Decibels (dB)
	- Quality is determined by the waveform (overtones).	
Speed of Sound	- Speed of sound varies with medium and temperature.	Speed: m/s
	- Formula: $v = \sqrt{\frac{B}{\rho}}$ where B is the bulk modulus and ρ is density.	
Reflection of Sound	- Sound reflects off surfaces, creating echoes.	
Echo	- Time taken for an echo: $t = \frac{2d}{v}$, where d is the distance and v is the speed.	Time: Seconds (s)

Application of Echo	- Used in sonar, medical ultrasound, etc.	
Doppler Effect	- Change in frequency due to the motion of the source or observer.	Frequency: Hertz (Hz)
	- Formula: $f' = f\left(\frac{v \pm v_o}{v \pm v_s}\right)$ where f' is observed frequency.	
Intensity of Sound	- Sound intensity is proportional to the square of amplitude.	Intensity: Watts per square meter (W/m^2)
	- Formula: $I = \frac{P}{A}$ where P is power and A is area.	
Human Hearing Range	- Humans can hear frequencies between 20 Hz to 20,000 Hz.	Frequency: Hertz (Hz)
Musical Notes	- Musical notes are based on frequency and harmonics.	

Key Points & Formulas

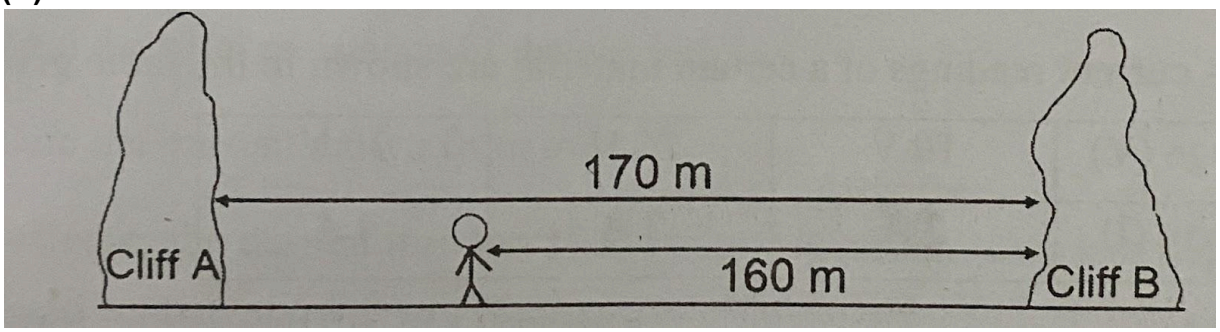
- **Sound Production**:
  - Sound is produced by vibrating objects.
  - Sound waves travel through a medium (solid, liquid, gas).
- **Characteristics of Sound**:
  - **Pitch**: Depends on frequency (high frequency = high pitch, low frequency = low pitch).
  - **Loudness**: Depends on amplitude (greater amplitude = louder sound).
  - **Quality (Timbre)**: Determines the color of sound, based on overtones.

- **Speed of Sound**:
  - **Formula**: $v = \sqrt{\frac{B}{\rho}}$, where B is the bulk modulus and ρ is the density of the medium.
  - Speed of sound is higher in solids than in liquids and gases, and increases with temperature.
- **Reflection of Sound**:
  - Sound waves bounce back from obstacles, forming echoes.
- **Echo**:
  - **Formula**: Time for echo: $t = \frac{2d}{v}$, where d is distance and v is speed of sound.
- **Doppler Effect**:
  - The frequency observed changes when the source or observer moves.
  - **Formula**: $f' = f\left(\frac{v \pm v_o}{v \pm v_s}\right)$
    - f' = observed frequency,
    - f = emitted frequency,
    - v_o = velocity of the observer,
    - v_s = velocity of the source,
    - v = speed of sound in the medium.
- **Intensity of Sound**:
  - Intensity is proportional to the square of the amplitude.
  - **Formula**: $I = \frac{P}{A}$, where P is power and A is the area over which the sound spreads.

SI Units

- **Frequency**: Hertz (Hz)
- **Time Period**: Seconds (s)
- **Speed of Sound**: Meters per second (m/s)
- **Amplitude**: Decibels (dB)
- **Intensity**: Watts per square meter (W/m^2)
- **Power**: Watts (W)

Q.NO.: 1	**When the stem of vibrating tuning fork is pressed on a table, the tabletop starts vibrating. These vibrations are definitely an example of:** **(a) resonance** **(b)natural vibrations** **(c)forced vibrations** **(d) damped vibrations**	**YEAR** **[2024]**
ANS.:	**(c) forced vibrations**	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 2	**(a) Name the waves used in SONAR.** **(b)**  **In the above diagram Lata stands between two cliffs and claps her hands. Determine the time taken by her to hear the first echo.** **Speed of sound in air 320 ms^{-1}.**	**YEAR** **[2024]**
ANS.:	(a) **Ultrasonic waves** are used in SONAR.SONAR, which stands for Sound Navigation and Ranging, is a system that uses these waves to locate underwater objects by transmitting the waves and detecting the reflected impulses. **(b) Determining the Time Taken to Hear the First Echo** To determine the time it takes for Lata to hear the first echo, we need to consider the distance to the nearest cliff and the speed of sound. You have stated that Lata is 160 meters away from cliff B. You've also given the speed of sound in air as 320 m/s.	

	Here's how to calculate the time: • The formula to use is **2d = v * t**, where: ◦ **d = distance to the reflecting surface (cliff)** ◦ **v = velocity of sound** ◦ **t = time taken to hear the echo** • We can rearrange the formula to solve for t: **t = 2d / v** Now, we can plug in the values: • **d = 160 meters (distance to the nearest cliff, cliff B)** • **v = 320 m/s (speed of sound)** • **t = (2 * 160 meters) / 320 m/s** • **t = 320 / 320** • **t = 1 second** Therefore, the time taken for Lata to hear the first echo from cliff B is **1 second**.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 3	**When a body vibrates under a periodic force, the vibrations of the body are always:** **a. natural vibrations** **b. damped vibrations** **c. forced vibrations** **d. resonant vibrations**	**YEAR** **[2023]**
ANS.:	(c) Forced vibrations	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 4	**Two notes are produced from two different musical instruments, such that they have same loudness and same pitch. The produced notes differ in their:** **a. Waveform** **b. Frequency** **c. Wavelength**	**YEAR** **[2023]**
ANS.:	Quality, which is dependent on the wave form	
TOPIC:	**Page No.:**	Ref. Link

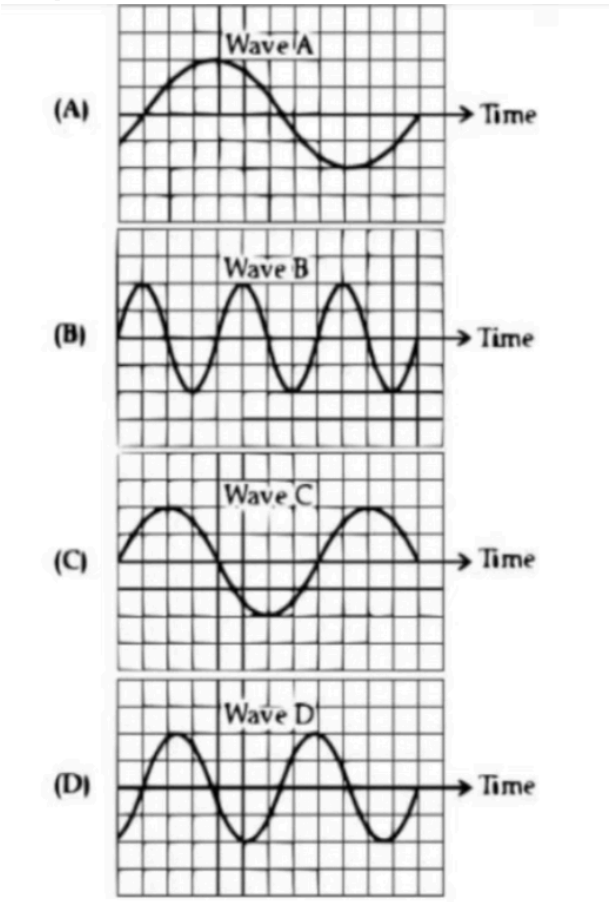
Q.NO.: 5	**A metal foot ruler is held at the edge of a table. It is pressed at its free end and then released. It vibrates.** **(a) Name the vibrations produced.** **(b) State one way to increase the frequency of these vibrations.**	**YEAR** **[2023]**
ANS.:	(a) Damped vibrations (b) Place the ruler so that a shorter length is free to vibrate; a shorter length will result in a higher frequency.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 6	**(a) Which characteristic of sound is affected due to the larger surface of a school bell?** **(b) Calculate the distance covered by the Ultrasonic wave having a velocity of 1.5 km s^{-1} in 14 s, when it is received after reflection by the receiver of the SONAR.**	**YEAR** **[2023]**
ANS.:	(a) Loudness (b) 10.5 km. The calculation is done using the formula 2d = v*t, where d = (1500 m/s*14 s) / 2 = 10500 meters or 10.5 kilometers.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 7	**We are able to see the T.V. channels clearly when we set T.V. on auto-tuning?** **(a) Which phenomenon led to the clear visibility of the channels, due to autotuning** **(b) Define the above phenomenon mentioned by you.** **(c) Give any one more example of this phenomenon.**	**YEAR** **[2023]**
ANS.:	(a) Resonance (b) When the frequency of an externally applied periodic force on a body is equal to its natural frequency, the body readily begins to vibrate with an increased amplitude. (c) The air in a sound box vibrates with a higher amplitude due to the vibrating string of a musical instrument, which is an example of resonance.	

TOPIC:	Page No.:	Ref. Link

Q.NO.: 8	**Free vibrations are:** **a. the vibrations under the influence of a periodic force.** **b. the vibrations with larger amplitude.** **c. the vibrations when the frequency continuously decreases.** **d. the vibrations with a constant frequency and constant amplitude.**	YEAR [2022]
ANS.:	(d) The vibrations with a constant frequency and constant amplitude.	
TOPIC:	Page No.:	Ref. Link

Q.NO.: 9	**The diagram below shows four sound waves. Which sound has the highest pitch?**  	YEAR [2022]

ANS.:	The sound wave with the highest frequency will have the highest pitch. Based on a visual comparison, sound wave B has the highest frequency.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 10	**Select a correct option with respect to echo depth sounding:** **(a) infrasonic waves are used** **(6) the frequency of the waves used is between 20 Hz and 20,000 Hz.** **(c) ultrasonic waves are used.** **(d) supersonic waves are used.**	**YEAR [2021]**
ANS.:	(c) Ultrasonic waves are used	
TOPIC:	**Page No.:**	Ref. Link

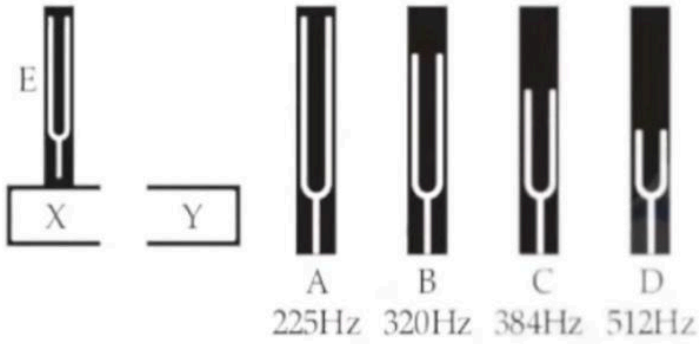
Q.NO.: 11	**Which one of the following diagnostic methods use reflection of sound?** **(a) CT scan** **(b) Electrocardiogram** **(c) Echo cardiogram** **(d) MRI**	**YEAR [2021]**
ANS.:	(c) Echocardiogram, which uses ultrasonic waves	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 12	**A boy standing in front of a wall produces two whistles per second. He notices that the sound of his whistling coincides with the echo. The echo is heard only once when whistling is stopped. Calculate the distance between the boy and the wall. (The speed of sound in air = 320 m/s)** **(i) The time in which the boy hears the echo is:** **(a) 1 s (b) 0.5 s (c) 1.5s (d) 2s** **(ii) The distance at which the boy is standing from the wall:**	**YEAR [2021]**

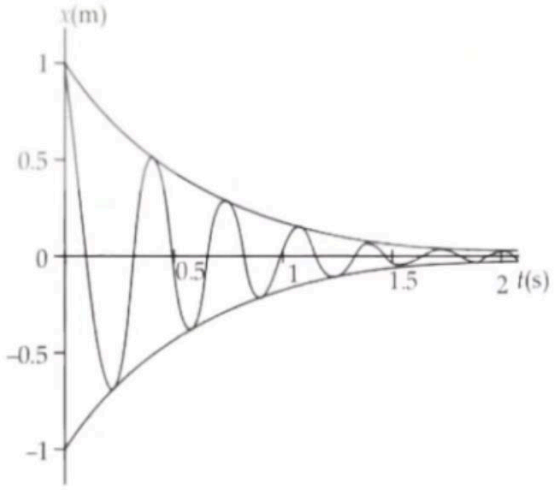
	(a) 160 m **(b) 240 m** **(c) 320 m** **(d) 80 m** **(iii) If the speed of sound is increased by 16 ms' and the boy moves 4 m away from the wall then in how much time will he hear the echo of the first whistle?** **(a) 0.525 s (b) 0.5 s (c) 0.48 s (d) 0.3 s** **(iv) In which of the following timings of reflection of the whistle, the echo cannot be heard?** **(a) 0.05 s** **(b) 0.12 s** **(c) 0.2 s** **(d) 0.11 s**	
ANS.:	(i) 0.5 seconds (ii) 80 meters using the formula d = v * t / 2, where d = 320 m/s * 0.5 s / 2 (iii) 0.5 seconds. Using the formula t = 2d/v, where the new distance is 84 meters and the new velocity is 336 m/s, t = (2 * 84)/336 (iv) (a) 0.01 seconds because an echo is heard when the sound arrives 0.1 seconds or more after the original sound.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 12	**Rohit playing a flute and Anita playing a piano emit sounds of same pitch and loudness.** **(a) Name one characteristic that is different for waves from the two different instruments.** **(b) If now the loudness of the sound from flute becomes four times that of the sound from piano, then write the value of the ratio AF : AP (AF - amplitude of sound wave from flute, AP - amplitude of sound wave from piano)** **(c) Define 'Pitch' of a sound.**	**YEAR** **[2021]**
ANS.:	(a) Quality or timbre (b) 2:1, since loudness is proportional to the square of the amplitude (c) Pitch is the characteristic of sound by which an acute note can be distinguished from a grave note of the same loudness.	

TOPIC:	Page No.:	Ref. Link

Q.NO.: 13	**The diagram below shows a vibrating tuning fork E mounted on a sound box X. When the vibrating tuning forks A, B, C and D are placed on the sound box Y one by one, it is observed that a louder sound is produced when the tuning fork B is place on Y.**  **(a) What is the frequency of tuning fork E?** **(b) Why does B produce a louder sound?**	YEAR [2021]
ANS.:	(a) 320 Hz (b) Because resonance occurs; the frequency of B matches the frequency of E.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 14	**Study the below figure and answer the following:** **(a) What type of vibration does the figure represent?** **(b) State one reason for which the amplitude of the vibration decreases with time.** **(c) Write an example of natural vibrations.**	YEAR [2021]

		
ANS.:	(a) Damped vibration (b) The surrounding medium offers resistance or friction to the motion. (c) A body clamped at one point, when disturbed slightly from its rest position, starts vibrating.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 15	**(i) Name the system which enables us to locate underwater objects by transmitting ultrasonic waves and detecting the reflecting impulse.** **(ii) What are acoustically measurable quantities related to pitch and loudness?**	**YEAR** **[2020]**
ANS.:	(i) SONAR (Sound Navigation and Ranging) (ii) Pitch is related to frequency, and loudness is related to intensity.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 16	**A sound wave travelling in water has wavelength 0.4 m. Is this wave audible in air? (The speed of sound in water = 1400 ms^{-1})**	**YEAR** **[2020]**
ANS.:	Yes, the wave is audible. The frequency is calculated as 1400 / 0.4 = 3500 Hz, which is within the audible range of 20 to 20,000 Hz.	

TOPIC:	Page No.:	Ref. Link

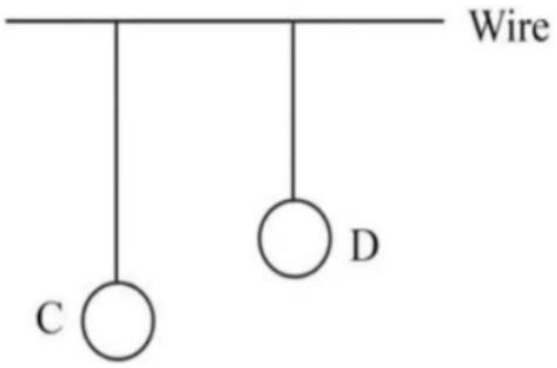
Q.NO.: 17	**(i) When a tuning fork [vibrating] is held close to ear, one hears a faint hum. The same [vibrating tuning fork] is held such that its stem is in contact with the table surface, then one hears a loud sound. Explain.** **(ii) A man standing in front of a vertical cliff fires a gun. He hears the echo after 3.5 seconds. On moving closer to the cliff by 84 m, he hears the echo after 3 seconds. Calculate the distance of the cliff from the initial position of the man.**	YEAR [2020]
ANS.:	(i) When the tuning fork is close to the ear, only a small amount of air is disturbed, causing a faint sound. When the stem touches the table, the table's surface vibrates, which causes a larger volume of air to vibrate, resulting in a louder sound. (ii) 588 meters. By using simultaneous equations based on the relationship between distance, speed, and time for the two scenarios, the initial distance can be calculated.	
TOPIC:	Page No.:	Ref. Link

Q.NO.: 18	**A man playing a flute is able to produce notes of different frequencies. If he closes the holes near his mouth, will the pitch of the note produced, increase or decrease? Give a reason.**	YEAR [2019]
ANS.:	The pitch of the sound will decrease. When the holes near the mouth are closed, the effective length of the air column increases, leading to a decrease in frequency and therefore a lower pitch.	
TOPIC:	Page No.:	Ref. Link

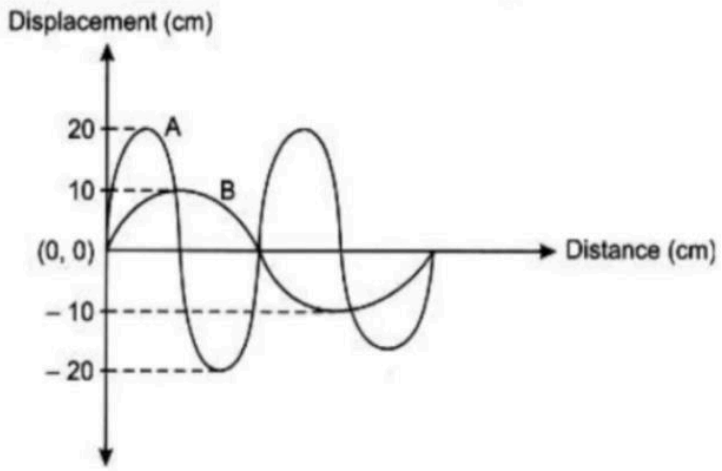
Q.NO.: 19	**It is observed that during march-past we hear a base drum distinctly from a distance compared to the side drums.** **(i) Name the characteristic of sound associated with the above observation.** **(ii) Give a reason for the above observation.**	YEAR [2019]

ANS.:	(i) The characteristic is loudness. The reason is that the base drum has a greater surface area compared to the side drums, thus producing a greater amplitude of vibration. (ii)	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 20	**A pendulum has a frequency of 4 vibrations per second. An observer starts the pendulum and fires a gun simultaneously. He hears the echo from the cliff after 6 vibrations of the pendulum. If the velocity of sound in air is 340 m/s, find the distance between the cliff and the observer.**	**YEAR [2019]**
ANS.:	he distance is 255 meters. The time for 6 vibrations is 6/4 = 1.5 seconds. Then using the formula, d = v * t / 2, d = 340 * 1.5	
TOPIC:	**Page No.:**	Ref. Link

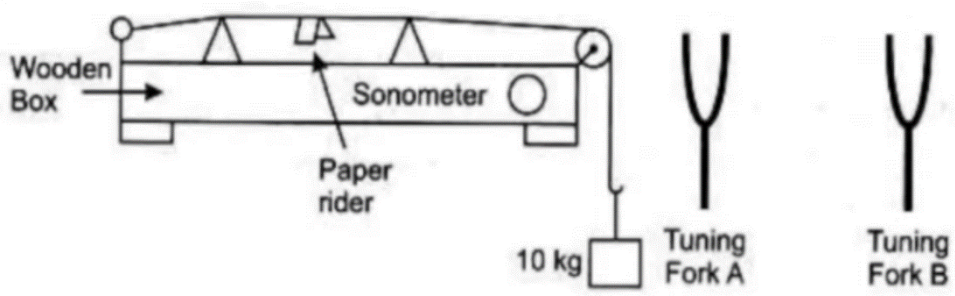
Q.NO.: 21	**Two pendulums C and D are suspended from a wire as shown in the figure given below. Pendulum C is made to oscillate by displacing it from its mean position. It is seen that D also starts oscillating.**  **(i) Name the type of oscillation, C will execute.** **(ii) Name the type of oscillation, D will execute.** **(iii) If the length of D is made equal to C then what difference will you notice in the oscillations of D?** **(iv) What is the name of the phenomenon when the length of D is made equal.**	**YEAR [2019]**

ANS.:	(i) Free vibration or damped vibration if a medium is present. (ii) Forced vibration (iii) The amplitude of vibration of pendulum D will increase (iv) Resonance	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 22	**Displacement distance graph of two sound waves A and B, travelling in a medium, are as shown in the diagram below.**  **Study the two sound waves and compare their:** **(i) Amplitudes (ii) Wavelengths**	**YEAR** **[2018]**
ANS.:	(i) The amplitude ratio of A to B is 2:1 (ii) The wavelength ratio is 1:2.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 23	**(i) What do you understand by free vibrations of a body?** **(ii) Why does the amplitude of a vibrating body continuously decrease during damped vibrations?**	**YEAR** **[2018]**
ANS.:	(i) Free vibrations are periodic vibrations of constant amplitude and frequency in the absence of any external force.	

	(ii) Because of the loss of energy against the damping forces or due to the presence of a medium.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 24	 **The diagram above shows a wire stretched over a sonometer. Stems of two vibrating tuning forks A and B are touched to the wooden box of the sonometer.** **It is observed that the paper rider (a small piece of paper folded at the centre) present on the wire flies off when the stem of vibrating tuning fork B is touched to the "wooden box but the paper just vibrates when the stem of vibrating tuning fork A is touched to the wooden box.** **(i) Name the phenomenon when the paper rider just vibrates.** **(ii) Name the phenomenon when the paper rider flies off.** **(iii) Why does the paper rider fly off when the stem of tuning fork B is touched** **to the box?**	**YEAR [2018]**
ANS.:	(i) Forced vibrations (ii) Resonance (iii) Because the frequency of the tuning fork B matches the natural frequency of the wire holding the paper rider, causing resonance.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 25	**A person is standing at the sea shore. An observer on the ship which is anchored in between a vertical cliff and the person on the shore: fires a gun. The person on the shore**	**YEAR [2018]**

	hears two sounds, 2 seconds and 3 seconds after seeing the smoke of the fired gum If the speed of sound in the air is 320 ms^{-1} then calculate: **(i) The distance between the observer on the ship and the person on the shore.** **(ii) The distance between the cliff and the observer on the ship.**	
ANS.:	(i) 640 meters; calculated by d = v*t = 320 m/s*2 s (ii) 160 meters. By calculating the difference in time, the echo arrives to the ship in 1 second. Then using d = v * t / 2, d = 320 * 1 / 2	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 26	**The human ear can detect continuous sounds in the frequency range from** **20 Hz to 20,000 Hz. Assuming that the speed of sound in air is 330 ms^{-1} for all frequencies, calculate the wavelengths corresponding to the given extreme frequencies of the audible range.**	**YEAR** **[2017]**
ANS.:	The wavelengths range from 16.5 millimeters to 16.5 meters.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 27	**An enemy plane is at a distance of 300 km from a radar. In how much time the radar will be able to detect the plane? Take velocity of radio waves as 3 x 10^8 ms^{-1}**	**YEAR** **[2017]**
ANS.:	$2x10^{-3}$ seconds. Using t = 2d / v, with d = 300,000 meters, t = 2 * 300,000/($3x10^8$)	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 28	**How is the frequency of a stretched string related to:** **(i) its length ?**	**YEAR** **[2017]**

	(ii) its tension?	
ANS.:	(i) The frequency is inversely proportional to the length (ii) Directly proportional to the square root of the tension.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 29	**Name the factor that determines** **(i) Loudness of the sound heard.** **(ii) Quality of the note.** **(iii) Pitch of the note.**	**YEAR** **[2017]**
ANS.:	(i) Amplitude (ii) Waveform (iii) Frequency	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 30	**(i) What are damped vibrations?** **(ii) Give one example of damped vibrations.** **(iii)Name the phenomenon that causes a loud sound when the stem of a vibrating tuning fork is kept pressed on the surface of a table.**	**YEAR** **[2017]**
ANS.:	(i) Damped vibrations are periodic vibrations of a body with decreasing amplitude in the presence of a resistive force. (ii) A slim branch of a tree pulled and then released. (iii) Resonance	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 31	**(i) A wire of length 80 cm has a frequency of 256 Hz Calculate the length of a similar wire under similar tension, which will have frequency 1024 Hz.** **(ii) A certain sound has a frequency of 256 hertz and a wavelength of 1.3 m.**	**YEAR** **[2017]**

	a. Calculate the speed with which this sound travels. **b. What difference would be felt by a listener between the above sound and another sound travelling at the same speed, but of wavelength 2.6 m?**	
ANS.:	(i) 20 cm, using the inverse relationship between frequency and length: f1l1 = f2l2. (ii) (a) 332.8 m/s. using v = f * λ (b) The second sound will have a lower frequency (128 Hz) and be less shrill. The first frequency is 256 Hz and the second frequency is 128 Hz.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 32	**The ratio of amplitude of two waves is 3 : 4. What is the ratio of their:** **(i) loudness?** **(ii) frequencies?**	**YEAR** **[2016]**
ANS.:	(i) Loudness ratio is 9:16, as loudness is proportional to the square of amplitude. (ii) The frequency ratio is 1:1 because the frequency of waves is independent of amplitude.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 33	**State ways by which the frequency of transverse vibrations of a stretched string can be increased.**	**YEAR** **[2016]**
ANS.:	By increasing the tension or by decreasing the length of the string.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 34	**(i) What is meant by noise pollution?** **(ii)Name one source of sound causing noise pollution.**	**YEAR** **[2016]**

ANS.:	(i) Noise pollution refers to disturbances produced in the environment due to undesirable, loud, and harsh sounds of a level above 120 decibels. (ii) Loud speakers, vehicle horns, sirens.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 35	**(i) Name the waves used for echo depth sounding.** **(ii) Give one reason for their use for the above purpose.** **(iii) Why are the waves mentioned by you not audible to us?**	**YEAR** **[2016]**
ANS.:	(i) Ultrasonic waves (ii) They can travel long distances without deviation and are not audible to humans.	
TOPIC:	**Page No.:**	Ref. Link

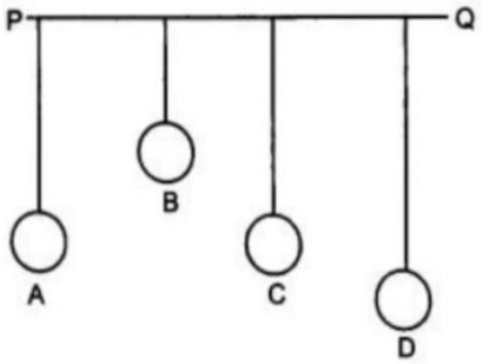
Q.NO.: 36	**(i) What is an echo?** **(ii) State two conditions for an echo to take place.**	**YEAR** **[2016]**
ANS.:	(i) An echo is the sound heard after reflection from a distant obstacle. (ii) The minimum distance between the source of sound. The reflector must be 17 meters and the size of the reflector must be large enough.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 37	**(i) Name the phenomenon involved in tuning a radio set to a particular station.** **(ii) Define the phenomenon named by you in part above.** **(iii) What do you understand by loudness of sound?** **(iv) In which unit is the loudness of sound measured?**	**YEAR** **[2016]**
ANS.:	(i) Resonance (ii) Resonance occurs when the frequency of an externally applied periodic force on a body is equal to its natural frequency, causing the body to vibrate with increased amplitude. (iii) Loudness is the characteristic by which a loud sound can be distinguished from a faint one, both having the same pitch and quality.	

	(iv) The unit of loudness is the phon but the level of sound is expressed in decibels.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 38	**(i) Draw a graph between displacement and the time for a body executing free vibrations.** **(ii) Where can a body execute free vibrations?**	**YEAR [2015]**
ANS.:	(i) A graph should show a sine wave with a constant amplitude. (ii) Free vibrations occur in a vacuum where there is no resistance.	
TOPIC:	**Page No.:**	Ref. Link

Q.NO.: 39	**(a)** **(i) State the safe limit of sound level in terms of decibel for human hearing.** **(ii) Name the characteristic of sound in relation to its waveform.** **(b) A person standing between two vertical cliffs and 480 m from the nearest cliff shouts. He hears the first echo after 3s and the second echo 2s later.** **Calculate:** **(i) The speed of sound.** **ii) The distance of the other cliff from the person.** **(c) In the diagram below, A, B, C, D are four pendulums suspended from the same elastic string PQ. The length of A and C are equal to each other while the length of pendulum B is smaller than that of D. Pendulum A is set into a mode of vibrations.**	**YEAR [2015]**



(i) Name the type of vibrations taking place in pendulums B and D?
(i) What is the state of pendulum C?
(iii) State the reason for the type of vibrations in pendulums B and C.

ANS.:

(a)
(i) 0 to 80 decibels
(ii) Quality or timbre

(b)
(i) 320 m/s; using 2d = v * t
(ii) 720 meters

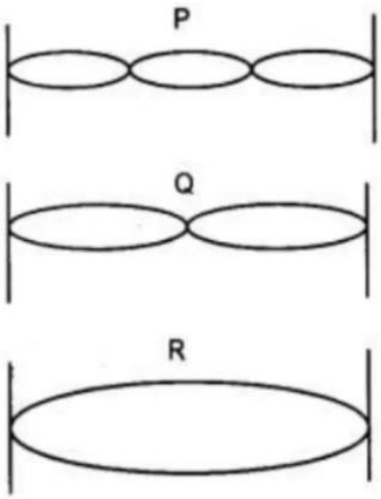
(c)
(i) Forced vibrations
(ii) Resonance
(iii) C is the same length as A so they will have resonance. B will vibrate with a smaller amplitude.

TOPIC: **Page No.:** Ref. Link

Q.NO.: 40

(a) The adjacent diagram shows three different modes of vibrations P, Q and R of the same string.

YEAR
[2014]



(i) Which vibrations will produce a louder sound and why?
(ii) The sound of which string will have maximum shrillness?
(iii) State the ratio of wavelengths of P and R.

(b)
(i) State one important property of waves used for echo depth sounding.
(ii) A radar sends a signal to an aircraft at a distance of 30 km away and receives it back after 2 x 10^4 second. What is the speed of the signal?

ANS.:

(a)
(i) R, because it has the maximum amplitude.
(ii) P, because it has the maximum frequency.
(iii) 1:3

(b)
(i) They travel without deviation.
(ii) 3*10^8 m/s, calculated by using 2d/t

TOPIC: **Page No.:** Ref. Link