WORKSHEET 1

CHAPTER 7 – SOUND

A. Tick (✓) the correct option.

1. In air, sound travels at a speed of

   a. 343 m/s. b. 643 m/s. c. 3×10^8 m/s. d. none of these.

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

   a. 34 m. b. 68 m. c. 17 m. d. 0 m.

3. Device used to measure the depth of sea is called

   a. spectrometer. b. RADAR. c. SONAR. d. none of these.

4. Ultrasonic waves have frequency greater than

   a. 20,000 Hz. b. 40,000 Hz. c. 10,000 Hz. d. none of these.

5. The time period of a simple pendulum of length l is given by

   a. $2\pi\sqrt{\frac{g}{l}}$ b. $2\pi\sqrt{\frac{l}{g}}$ c. $2\pi\sqrt{lg}$ d. $\sqrt{2\pi lg}$

B. Fill in the blanks.

1. The vibrations whose amplitude decreases gradually with time are called _____
2. In space _____ is used to detect obstacles.
3. SONAR stand for _____
4. The incident sound, reflected sound and the normal all lie in the same _____
5. Sound is produced by the _____ of a body in a medium.

C. State whether the following statements are true or false.

1. Sound persists in our ears for 0.01 second after the original sound dies off.
2. Sound travels at a speed of 343 m/s in air at 20 °C.
3. The amplitude of the forced vibrations depends on the difference between the natural frequency and the frequency of applied force.
4. Resonance has no effect during an earthquake.
5. Forced vibration is out of phase with respect to the natural vibrating body.

D. Match the following.

1. Sound	0.1 s
2. Persistence of hearing	multiple echoes

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3.	Reverberations	blind people
4.	Echocardiography	form of energy
5.	Ultrasonic spectacles	image of heart

E. Answer the following questions.

Very short answer questions

1. When does resonance take place?
2. What is the minimum distance between source of sound and reflector for a sound to echo?

Short answer questions

1. Give some examples of damped vibrations.
2. Define forced vibrations.

Long answer questions

1. A radar sends a signal to aircraft flying at a distance of 18 km away and receives it back after 1.8×10^{-3} s. What is the speed of the signal?
2. What are the conditions for the formation of echoes?

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. a
2. c
3. c
4. a
5. b

B. Fill in the blanks.

1. damped vibrations
2. RADAR
3. sound navigation and detection ranging
4. plane
5. vibrations

C. State whether the following statements are true or false.

1. F
2. T
3. T
4. F
5. T

D. Match the following.

1. Sound	form of energy
2. Persistence of hearing	0.1 s
3. Reverberations	multiple echoes
4. Echocardiography	image of heart
5. Ultrasonic spectacles	blind people

E. Answer the following questions.

Very short answer questions

1. When an external periodic force of frequency f or $2f$, $3f$, ... be applied on the vibrating body, resonance takes place.
2. 17 metre

Short answer questions

1. The examples of damped vibrations are a simple pendulum oscillating in air, sound waves in air, and shock absorbers in automobiles.
2. The vibrations produced in a body due to external periodic force acting on it, the frequency of the force being different from the natural frequency of the body are called forced vibrations.

Long answer questions

1. $$\text{Distance of aircraft} = 18 \text{ cm} = 18 \times 10^3 \text{ m}$$
$$\text{Time taken to receives signal} = 1.8 \times 10^{-4} \text{ s}$$
$$\text{Speed, } v = \frac{2d}{t}$$
$$= \frac{2 \times 18 \times 10^3}{1.8 \times 10^{-4}}$$
$$= 2 \times 10^8 \text{ m/s}$$
2. The conditions for the formation of echoes are
   i. The minimum distance between the source of sound and the reflector should be at least 17 metres.
   ii. The size of reflector must be large.
   iii. The intensity or loudness of the sound should be sufficient.