Exercise-8(B)

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1. **What do you mean by the audible range of frequency?**
   Solution:
   Audible range of frequency is the range of frequency within which the sound can be heard by a human being.

2. **What is the audible range of frequency for humans?**
   Solution:
   The audible range of frequency in humans is 20Hz to 20kHz

3. **For which range of frequencies, human ears are most sensitive?**
   Solution:
   Human ears are most sensitive to sound in the frequency range of 2000Hz to 3000Hz.

4. **Which has the higher frequency – ultrasonic sound or infrasonic sound?**
   Solution:
   Ultrasonic sound has the higher frequency.

5. **Complete the following sentences:**
   (a) An average person can hear sound of frequencies in the range _____ to _____
   (b) Ultrasound is of frequency _____
   (c) Infrasonic sound is of frequency _____
   (d) Bats can produce and hear _____sound
   (e) Elephants produce _____sound
   Solution:
   (a) 20 Hz to 20 kHz
   (b) Above 20 kHz
   (c) Below 20 Hz
   (d) Ultrasonic
   (e) Infrasonic

6. **Name the sounds of the frequencies given below:**
   (a) 10 Hz
   (b) 100 Hz
   (c) 1000 Hz
   (d) 40 kHz
   Solution:
   (a) 10 Hz - Infrasonic
   (b) 100 Hz - Audible
   (c) 1000 Hz - Audible
   (d) 40 Hz - Ultrasonic

7. **Can you hear the sound produced due to vibrations of a seconds' pendulum? Give reason.**

Solution:
No, we cannot hear the sound produced due to vibrations of a seconds' pendulum. This is because the frequency of sound produced as a result of vibrations of seconds' pendulum is 0.5Hz which is infrasonic sound.

8. **What is ultrasound?**
Solution:
Ultrasound is the sound in the frequency range of above 20 kHz.

9. **State the approximate speed of ultrasound in air.**
Solution:
The approximate speed of ultrasound in air is 330 m/s.

10. **State two properties of ultrasound that make it useful to us.**
Solution:
Listed below are the two properties of ultrasound:
    - It has high directivity
    - It has high energy content

11. **Explain how do bats locate the obstacles and prey in their way.**
Solution:
Bats have an innate ability to produce and hear ultrasound (range of frequency above 20 kHz). Once they emit these ultrasounds, it returns after striking an obstacle on the way. Thus, they analyze the direction of the obstacle by hearing the reflected sound, and gauge the time interval to judge the distance of the obstacle.

12. **State two applications of ultrasound.**
Solution:
The two applications of ultrasound are as follows:
    - It is used to drill holes or make cuts of desired shape in materials such as glass
    - It is used to detect defects in metals. Ultrasound passes through the object if there is no defect in the object. But if there is some defect, a part of ultrasound gets reflected back

Multiple choice type:

1. **A man can hear the sound of frequency:**
(a) 1 Hz
(b) 1000 Hz
(c) 200 kHz
(d) 5 MHz
Solution:
(b) 1000 Hz
Humans can hear in the frequency range of 20 Hz to 20 kHz.

2. The properties of ultrasound that make it useful, are:

(a) High power and high school

(b) High power and good directivity

(c) High frequency and high speed

(d) High frequency and bending around the objects

Solution:

(b) High power and good directivity

Ultrasound is the sound in the frequency range of above 20 kHz.

3. Sonar makes use of:

(a) Infrasonic sound

(b) Ultrasound

(c) Ordinary sound

(d) Light

Solution:

(b) Ultrasound

SONAR – Sound navigation and ranging, detects and finds the distance of objects under water and uses ultrasound.