



Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 35

1 Key words**[4]**

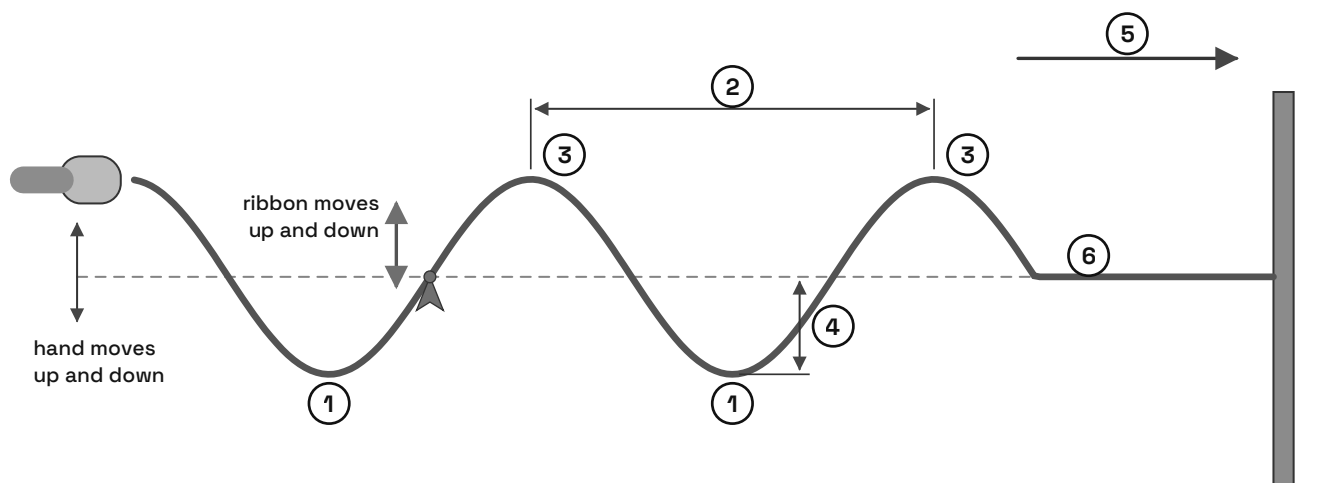
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

amplitude compressions crests echolocation energy frequency hertz longitudinal
mechanical X-rays

A wave is a periodic disturbance that carries _____ from one place to another without carrying the medium along. Sound needs a medium to travel, so it is a _____ wave. In sound, the particles vibrate along the direction the wave travels, so it is a _____ wave, made of _____ and rarefactions. On a rope, the particles vibrate at right angles to the direction of travel, forming _____ and troughs. The number of complete waves passing a point in one second is the _____, measured in _____. Bats find their prey in the dark from the echoes of their own ultrasound: this is called _____.

2 Label the diagram**[3]**

The diagram shows a transverse wave on a rope. Name the parts and directions numbered 1 to 6. Each carries 0.5 mark.



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____



[5]

Choose the correct option for each of the following questions.

- i. Which is an example of a longitudinal wave? [1]
 - a. sound wave
 - b. the wave produced on the surface of water
 - c. light wave
 - d. radio wave
- ii. Which statement is true for a wave of higher frequency (in the same medium)? [1]
 - a. It has a lower speed.
 - b. It has a shorter wavelength.
 - c. It has a larger amplitude.
 - d. It has a longer time period.
- iii. Which of these groups of waves is arranged in order of increasing wavelength? [1]
 - a. X-ray, ultraviolet ray, red light, violet light
 - b. violet light, red light, ultraviolet ray, X-ray
 - c. ultraviolet ray, violet light, red light, infrared ray
 - d. violet light, red light, infrared ray, ultraviolet ray
- iv. Hari slipped on the stairs. His head shows only small injuries from outside. Which technology is used for a detailed check of his brain for injury? [1]
 - a. ordinary X-ray photography
 - b. CT scan
 - c. echocardiography
 - d. ultrasonography
- v. Which statement correctly compares ultrasonography and X-ray imaging? [1]
 - a. One is more reliable, and the other is less reliable.
 - b. One uses computer technology, the other a simpler technology.
 - c. One uses a transverse wave, the other a longitudinal wave.
 - d. One is used only for bones, the other only for soft organs.

[3]

Write very short answers to the following questions.

- a. What is the electromagnetic spectrum? [1]
-
-
- b. What is ultrasound? [1]
-
-
- c. When a fathometer finds the depth of the sea, why is the echo time divided by 2? [1]



5 Short answers

[8]

Write short answers to the following questions.

- a. Write any two differences between a longitudinal wave and a transverse wave.

[2]

- b. Give a reason: during an earthquake, the shaking is felt less and less the farther you are from the epicenter.

[2]

- c. Give a reason: although a CT scan gives a detailed 3D report of the inside of the body, ultrasonography is used to check a baby in the womb.

[2]

- d. What is acoustic protection? Write one use of it.

[2]

6 Long answer

[4]

Write a long answer to the following question.

What is ultrasonography? Describe its procedure and uses.



[6]

Solve the following problems. Show your working.

- a. A tuning fork makes a sound of frequency 500 Hz. Sound travels in air at 340 m/s. Find (i) the wavelength of the sound, and (ii) its time period.

Answer:

- b. A ship's fathometer sends a pulse of ultrasound of frequency 50,000 Hz straight down, and receives the echo from the sea bed 2.4 s later. Sound travels in sea water at 1,500 m/s.
- How deep is the sea there? (2)
 - What is the wavelength of the ultrasound in sea water? (1)
 - Farther on, the sea is 600 m deep. How long after sending a pulse will the echo be received? (1)

[illegible]

Answer:

[2]

Think, then answer.

Why does your voice sound louder and fuller when you sing in a bathroom with tiled walls than in a room with curtains and a carpet?

(not marked)

Tie a thread to a ring near the middle of a slinky laid along a tape. With a friend holding the far end, push and pull your end along the slinky; then move it from side to side.

Quantity	Push and pull	Side to side
Time for 10 swings of the thread (s)		
Frequency, $f = 10 \div \text{time}$ (Hz)		
Wavelength, λ (m)		
Velocity, $v = f \times \lambda$ (m/s)		

Which way does the thread move in each wave? Which wave is longitudinal?

