

Assessment Questions Set 1

1. By answering A, B, C or D only, identify the correct statement;

The oscillations of a transvers wave are

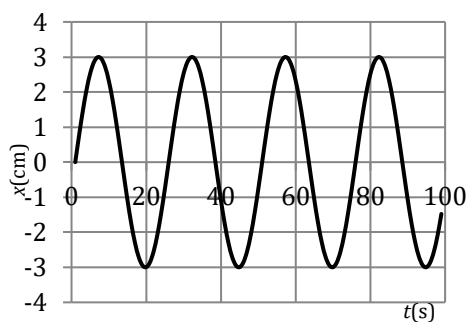
A. In the direction parallel to energy transfer

B. Longitudinal

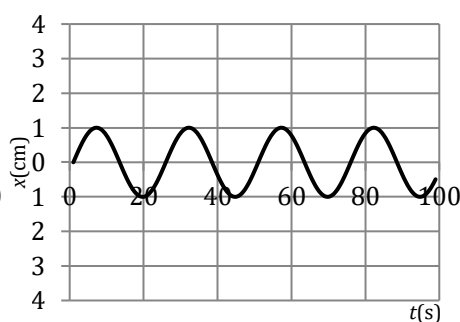
C. Perpendicular to energy transfer

D. Mechanical

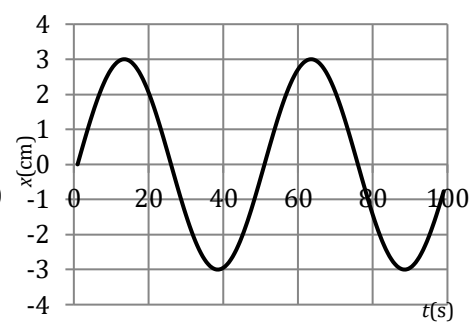
2. Consider the following diagrams showing displacement (cm) on the y -axis and time (s) on the x -axis.



(a)



(b)



(c)

By answering A, B or C,

i) Which two waves have the same amplitude?

_____ and _____ A&C

ii) Which two waves have the same frequency?

_____ and _____ A&B

iii) Which two waves have the same time period?

_____ and _____ A&B

3. A transverse wave has a frequency of 500Hz. and travels at 360m/s. Calculate the wavelength of the wave. 0.72m

4. A bat uses sound waves as echo location to find moths. Sound waves travel at 340m/s in air. If the bat uses sound waves with a wavelength of 5cm in order to locate a moth with a good degree of accuracy, what frequency will it emit?

6800Hz

5. A ship yard is constructing a new ship. They want to make the maximum length of the ship $\frac{1}{4}$ of the wavelength of the average large (40-60ft) wave. If a deep sea wave in this range has a period of 16s and travels at a velocity of 15m/s, what is the maximum possible length of the ship? 60m

6. John throws a large stone into a calm pond, creating travelling waves that travel across the pond surface. The waves have a frequency of 1Hz and travel at 3m/s. Calculate (a) the distance between adjacent wave crests and (b) the distance travelled by the wave if it took 25s to reach the edge of the pond.

(a) 3m

(b) 75m

7. A buoy 10 miles off the coast of Cornwall measures the size of waves. The buoy bobs up and down 6 times in 1 minute. Calculate the frequency of the waves. If the waves travel 32 meters in one minute calculate the wavelength of the waves.

0.1Hz and 5.3m

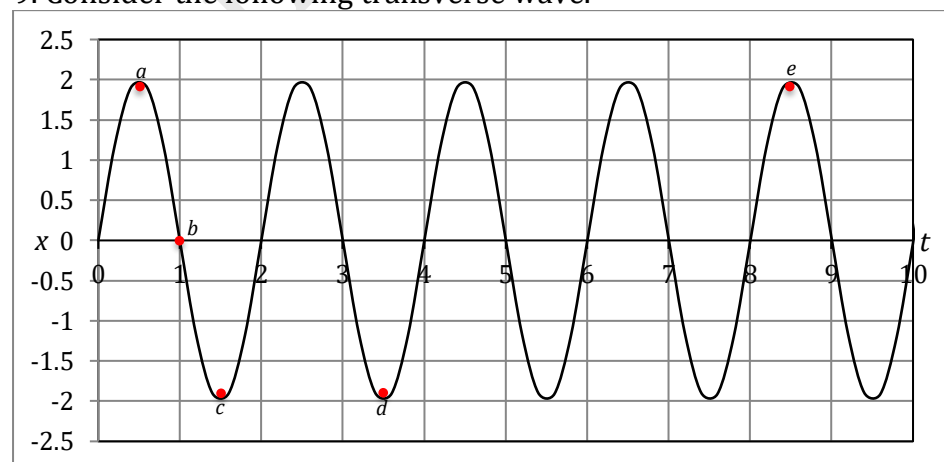
8. When a distant star explodes it emits visible light and gamma rays. Gamma rays have much greater energy than visible light. Choosing from the following, which reaches the astronomers telescope first?

(a) The gamma rays

(b) The visible light

(c) They both arrive simultaneously

9. Consider the following transverse wave.



If the phase is zero at $t = 0$, state the phase at points;

- a _____ 90°
- b _____ 180°
- c _____ 270°
- d _____ 540°
- e _____ 1530°

10. A longitudinal wave pulse passes through water. The wave has an amplitude of 2m and travels from left to right. Which of the following statements accurately describes the displacement of a water molecule?

(a) The water molecule rise up 2m, then down 4m, then up 2m, as the wave passes through. Overall the water molecule returns to its original position.

(b) The water molecule moves to the right by 2m, then to the left by 4m, then right 2m, as the wave passes through. Overall the water molecule returns to its original position.

(c) The water molecule moves 2m to the right overall.

Assessment Questions Set 2

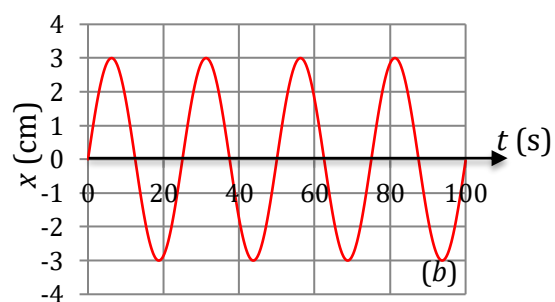
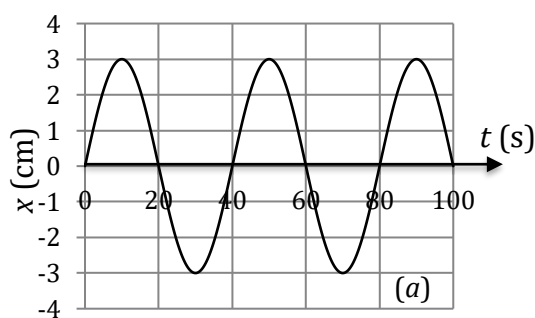
1. Complete the following table answering Y for yes and N for no.

Wave Type	Transverse	Longitudinal	Mechanical	Electromagnetic
Laser Beam	Y	N	N	Y
Sonar	N	Y	Y	N
Water Waves	Y	N	Y	N
Pressure Waves In Air	N	Y	Y	N
Waves that exhibit rarefaction and compression	N	Y	Y	N

2. A wave travels through air but cannot travel through the vacuum of space. This wave is

- A. Transverse
- B. Electromagnetic
- C. Polarised
- D. Mechanical**

Consider the following diagrams.



- 3. State the amplitude of wave b **3cm**
- 4. What is the displacement of wave a at a time $t = 40$ s? **0cm**
- 5. Calculate the frequency of waves a and b **0.025Hz and 0.04Hz**

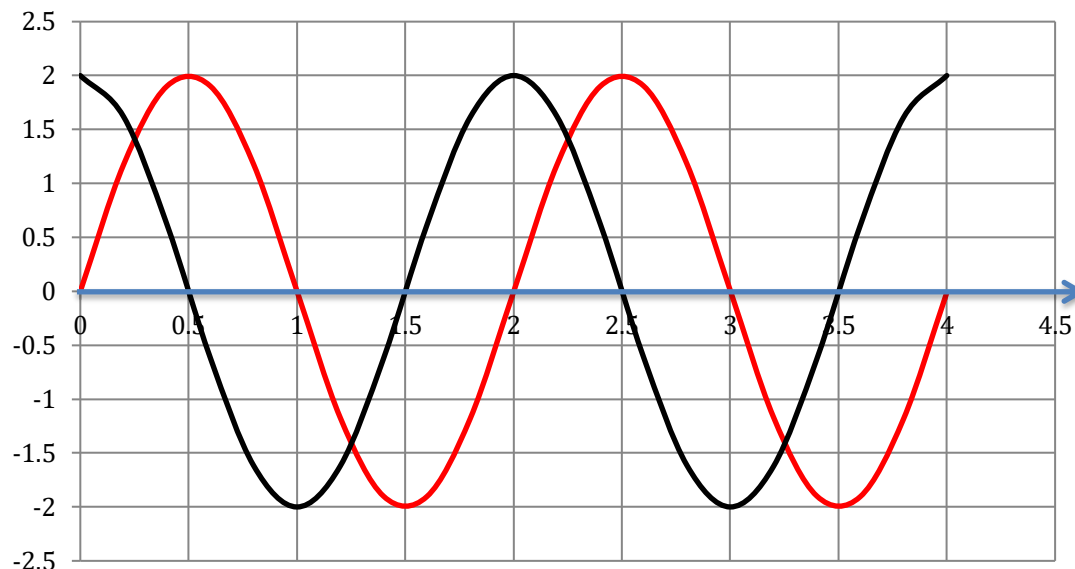
6. Radio 1 broadcasts at a frequency of 97.7MHz. What wavelength does this correspond to? **3.07m**

7. A mobile phone in the UK transmits its signal with a wavelength of 37.5cm. What frequency does the phone operate at in GHz? **0.8GHz**

8. John throws a large stone into a calm pond, creating travelling waves that travel across the pond surface. The waves have a frequency of 2Hz and a wavelength of 3m. Calculate the velocity of the waves. **6m/s**

9. Sound waves travel in air at a velocity of 340m/s. Electromagnetic waves travel at 3×10^8 m/s. Calculate the wavelength of sound waves and light if they both have a frequency of 18000Hz.
0.018m and 16666.6m

10. Consider the following diagram two transverse waves.



State the phase difference between the red and black waves. **90°**