3.1 General Properties of Waves

Question Paper

Course	CIE IGCSE Physics
Section	3. Waves
Topic	3.1 General Properties of Waves
Difficulty	Medium

Time Allowed 40

Score /32

Percentage /100

Question 1a

Fig. 8.1 represents a travelling wave at an instant in time.

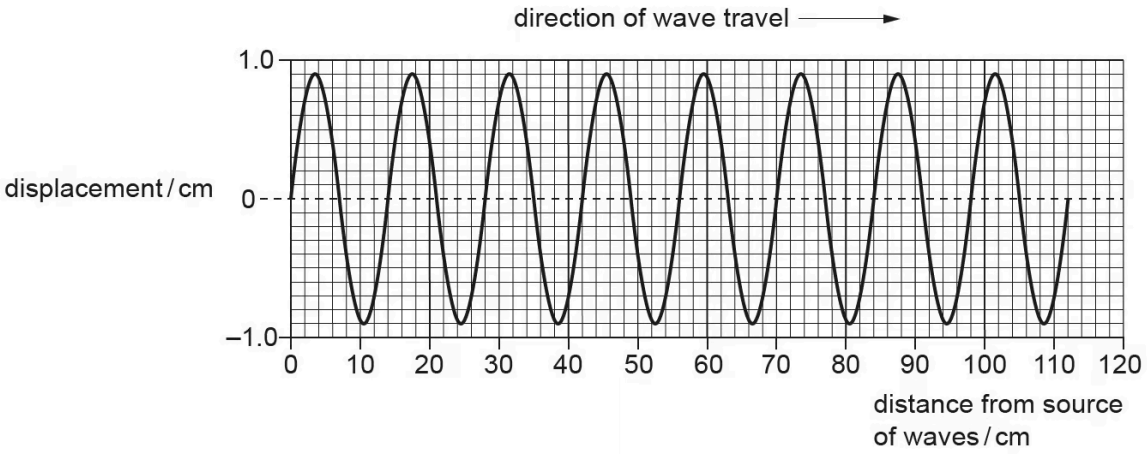

Fig. 8.1

(i) Determine the amplitude of the wave.

amplitude = ... cm [1]

(ii) Determine the wavelength of the wave.

wavelength = ... cm [2]

(ii) It takes 2.0 s for a source to emit the wave shown in Fig. 8.1.

Calculate the frequency of the wave.

frequency = ... Hz [2]

[5 marks]

Question 1b

Fig. 8.2 shows the main regions of the electromagnetic spectrum.

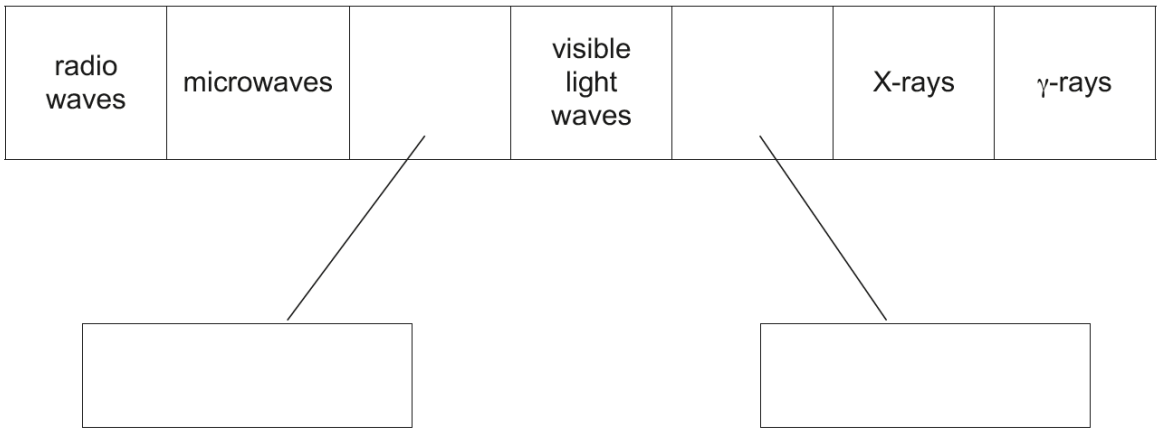

Fig. 8.2

(i) Two of the regions are not labelled.

Add the correct label to each of the unlabelled regions by writing in each box.

[2]

(ii) Describe one use of γ-rays.

[1]

[3 marks]

Question 2a

Fig. 6.1 shows crests of a water wave moving from left to right in a harbour.

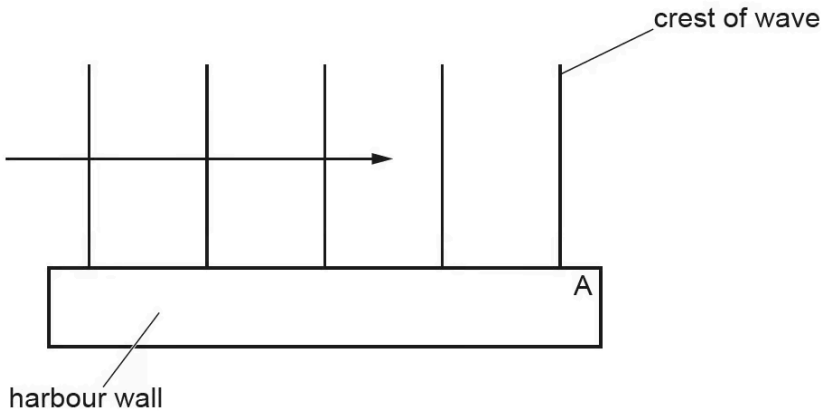

Fig. 6.1

(i) On Fig. 6.1, draw three more crests to the right of point A.

[2]

(ii) State the name of the wave process that occurs as the wave passes point A.

[1]

[3 marks]

Question 2b

Fig. 6.2 shows the crests of another wave moving from left to right in a different part of the harbour. This wave moves from deep water to shallow water.

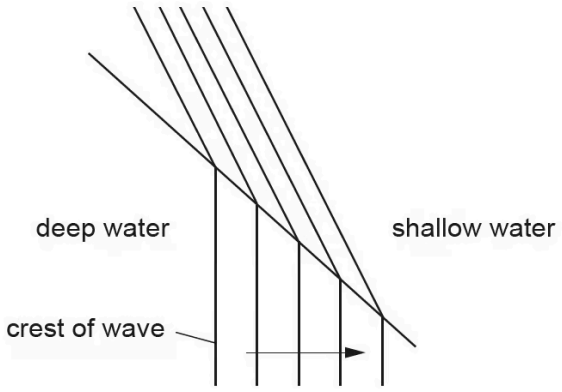

Fig. 6.2

(i) On Fig. 6.2, draw an arrow to show the direction of movement of the wave after it has passed into the shallow water.

[1]

(ii) State the name of the process that occurs as the wave passes into the shallow water.

[1]

(iii) Complete Table 6.1 to state whether each of the properties of the wave increases, decreases or stays the same as the wave passes into the shallow water.

Table 6.1

property	effect
wavelength	
frequency	
speed	

[3]

[5 marks]

Question 3a

Fig. 6.1 represents a transverse wave drawn full size. Point X represents a point on the wave.

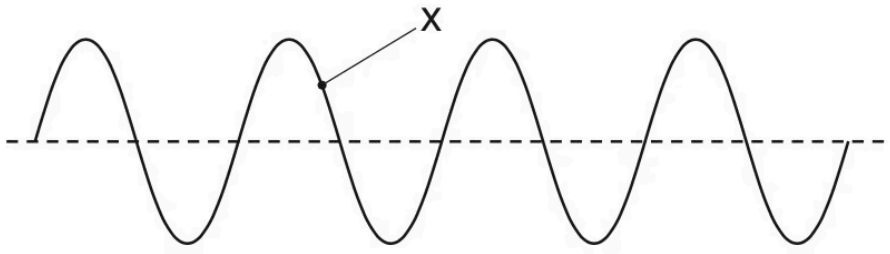

Fig. 6.1

(i) On Fig. 6.1, mark clearly the directions in which point X moves.

[1]

(ii) Use Fig. 6.1 to measure the wavelength of the wave.

wavelength = ... cm [1]

(iii) The frequency of the wave is increased. Describe how the wave pattern in Fig. 6.1 would be different.

[1]

[3 marks]

Question 3b

(i) Place a tick in a box next to any transverse wave.

- ☐ light
- ☐ sound
- ☐ radio

[1]

(ii) State a type of wave that **cannot** travel in a vacuum.

[1]

[2 marks]

Question 4a

Sound is a longitudinal wave.

Sketch a representation of a longitudinal wave. On your sketch

- indicate and label a distance to show the wavelength,
- mark and label the centre of one compression,
- mark and label the centre of one rarefaction.

[3 marks]

Question 4b

A longitudinal wave passes from one medium into another medium. The speed of the wave is slower in the second medium.

State what happens to

(i) the frequency of the wave,

[1]

(ii) the wavelength of the wave.

[1]

[2 marks]

Question 4c

State a typical value for the speed of sound in air.

[1 mark]

Question 5a

A ray of light travelling in air strikes a glass block at an angle of 30° to the normal. The light slows down as it enters the glass block.

State and explain, in terms of wavefronts, what happens to the light.

[3 marks]

Question 5b

Extended

The speed of light in this block of glass is 1.9×10^8 m/s.

Calculate the refractive index of the glass.

refractive index = ...

[2 marks]