Cambridge Assessment International Education

Cambridge IGCSE™

9: Waves – Topic questions

Paper 3

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
9	2016	June	31
8	2016	March	32
9	2016	March	32

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

9 Fig. 9.1 represents the regions of the electromagnetic spectrum.

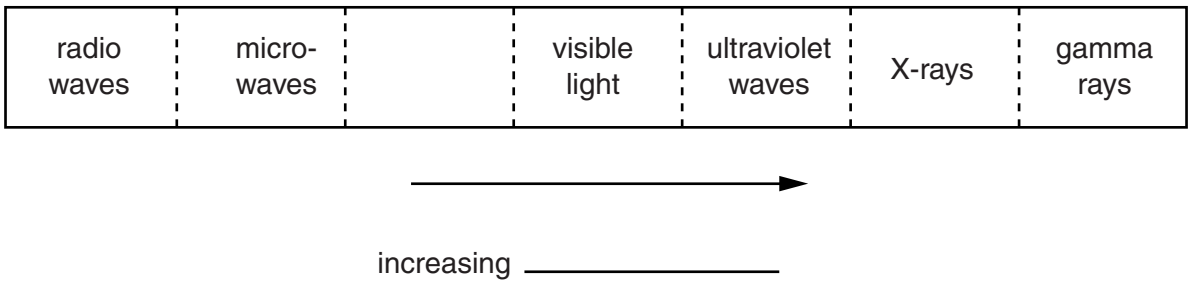

Fig. 9.1

(a) Complete Fig. 9.1:

(i) Add the label of the missing region. [1]

(ii) Complete the label under the arrow. [1]

(b) **(i)** State **two** uses of X-rays.

1. .....

2. .....
[2]

(ii) Describe **two** safety precautions taken by people using X-rays.

1. .....

2. .....
[2]

(iii) X-rays and light waves can both travel through a vacuum.

Identify the correct statement. Tick **one** box.

☐ X-rays travel at a slower speed than light waves.

☐ X-rays travel at the same speed as light waves.

☐ X-rays travel at a faster speed than light waves.

[1]

[Total: 7]

8 **(a)** Some students want to determine the speed of sound in air.

Describe a method they could use. Include the measurements they must make.

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.....[4]

(b) The graph in Fig. 8.1 represents a sound wave.

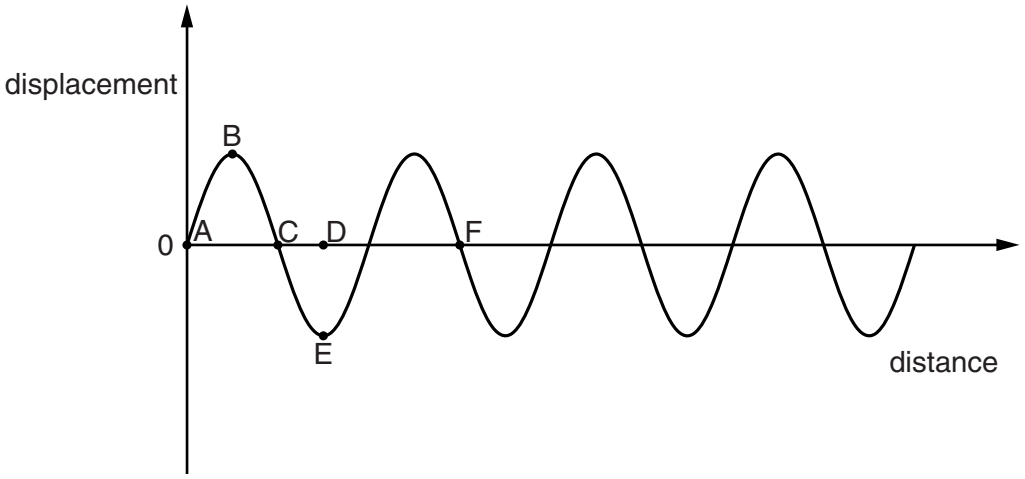

Fig. 8.1

(i) Which distance represents the amplitude of the wave? Circle your answer. [1]

AC AF BE DE CF

(ii) Which distance represents the wavelength of the wave? Circle your answer. [1]

AC AF BE DE CF

(iii) Another sound wave, of the same wavelength, is louder.

On Fig. 8.1, draw this wave. [2]

[Total: 8]

9 Waves from different regions of the electromagnetic spectrum have different uses.

(a) Draw **one** line from each type of electromagnetic wave to its use.

	household lights
microwaves	television remote control
	loudspeaker
infra-red waves	satellite communications
	security check of suitcases

[2]

(b) Many years ago, some shoe shops used X-ray machines to make images of feet, as shown in Fig. 9.1.

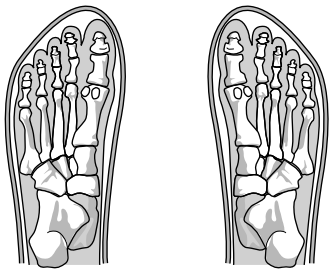

Fig. 9.1

Explain the risk to health of using these X-ray machines.

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.....[2]

[Total: 4]

Question	Answer	Mark
9 (a) (i)	infra-red	B1
9 (a) (ii)	frequency	B1
9 (b) (i)	any two different applications from: • (medical) imaging **OR** detecting fractures in bone **OR** specific example e.g. CT scan / imaging teeth at dentist • detecting faults in metal • security imaging e.g. airport security checks of bags • cancer treatment	B2
9 (b) (ii)	any two from: • behind a screen **OR** lead apron • large distance from X-ray beam • monitoring of **OR** restricting exposure • low dosage **OR** limit exposure time • monitor frequency of x-ray sessions • other people not allowed in room when X-ray being taken • avoid when pregnant	B2
9 (b) (iii)	same speed	B1
		Total: 7
8 (a)	for full marks the method described must work any four from: • means of producing sharp sound • use of suitable reflecting surface • measure total distance travelled by sound • measurement of time for sound to travel measured distance. • use of speed = distance / time	B4
8 (b) (i)	circle around DE	B1
8 (b) (ii)	circle around CF	B1
8 (b) (iii)	higher amplitude drawn line from infra-red waves to TV remote control	B1 B1
		Total: 8
9 (a)	line drawn from microwaves to satellite communications line drawn from infra-red waves to TV remote control	B1 B1
9 (b)	any two from: • X-rays may cause mutation of DNA / cells • X-rays are ionising • idea of unnecessary exposure • (sales assistants) exposed to large dose of X-rays	B2
		Total: 4

Notes about the mark scheme are available separately.