

Properties of Waves

Question Paper

Level	GCSE
Subject	Physics
Exam Board	Edexcel IGCSE
Module	Double Award (Paper 1P)
Topic	Waves
Sub-Topic	Properties of Waves
Booklet	Question Paper

Time Allowed: 62 minutes

Score: /52

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

1 This question is about parts of the electromagnetic spectrum.

radio waves	A	infrared	visible light	ultraviolet	B	gamma rays
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(a) The names of two parts of the electromagnetic spectrum are missing.

Complete the table with the names of the missing parts.

(2)

	Name
A	
B	

(b) The Sun emits different types of electromagnetic waves.

(i) Which of these is the same for all the waves?

(1)

- A** amplitude
- B** frequency
- C** speed
- D** wavelength

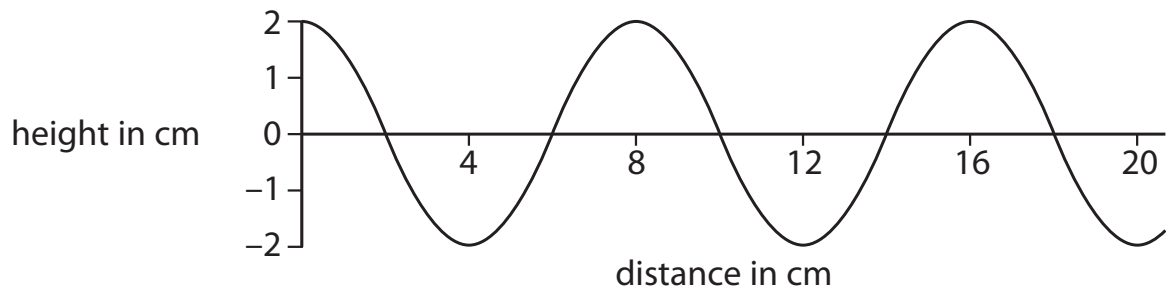
(ii) Which type of electromagnetic wave causes sunburn and snow blindness?

(1)

- A** gamma rays
- B** infrared
- C** radio waves
- D** ultraviolet

(Total for Question 1 = 4 marks)

2. The diagram shows a water wave.



(a) (i) The amplitude of the wave is

(1)

- A 1 cm
- B 2 cm
- C 4 cm
- D 8 cm

(ii) The wavelength of the wave is

(1)

- A 2 cm
- B 4 cm
- C 8 cm
- D 20 cm

(b) Describe one difference between transverse and longitudinal waves.

Draw a labelled diagram to help your answer.

(3)

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.....

.....

(c) State two properties that are the same for all electromagnetic waves.

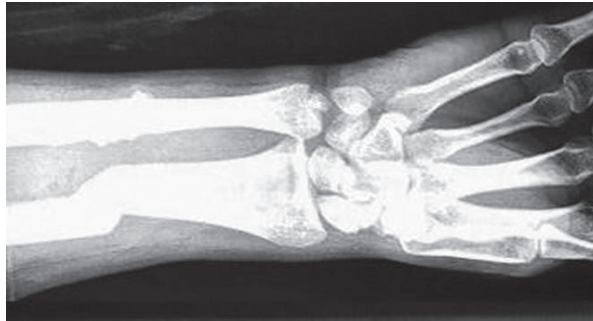
(2)

1

2

(d) Some types of wave are used in hospitals.

(i) A scanner uses one type of wave to check for broken bones.



The type of wave emitted by the scanner is

(1)

- A infrared
- B microwaves
- C sound
- D X rays

(ii) An image of the bone is seen because the waves from the scanner are

(1)

- A absorbed by the bone
- B reflected by the bone
- C refracted by the bone
- D transmitted by the bone

(iii) Name one type of wave that is used in cancer treatment and explain what it does during the treatment.

(2)

Type of wave

Explanation of what it does

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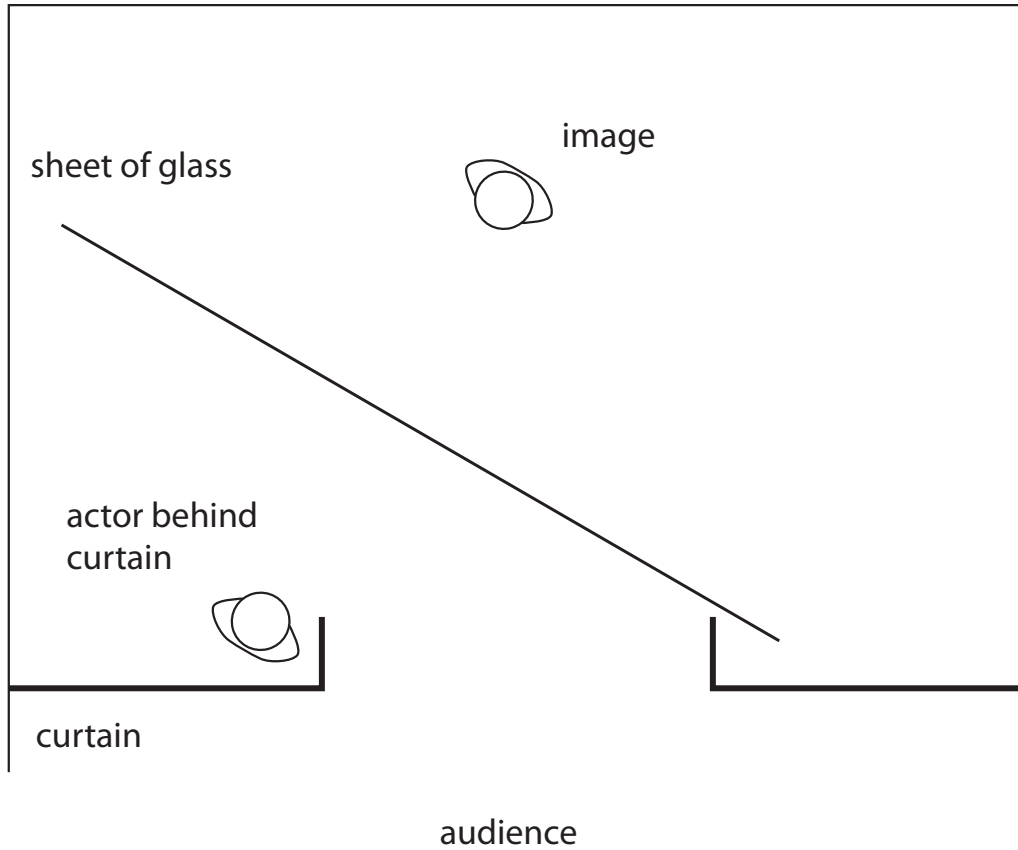
(Total for Question 2 = 11 marks)

3. Pepper's Ghost is a theatre effect used to make it appear that there is an image on stage.

The diagram shows a theatre viewed from above.

A sheet of glass is placed on the stage. A brightly lit actor stands behind a curtain at the side of the stage.

The audience sees the reflection of this actor in the glass.



(a) Add a ray diagram to show how light from the actor appears to come from the image. (3)

(b) The image formed by the glass is a virtual image.

State what is meant by the term **virtual image**.

(1)

(c) Light travels as a transverse wave.

Some waves travel as longitudinal waves.

(i) Give an example of a wave that travels as a longitudinal wave.

(1)

(ii) Describe the difference between transverse waves and longitudinal waves.

You may draw diagrams to help your answer.

(3)

(Total for Question 3 = 8 marks)

4. The table shows the main sections of the electromagnetic spectrum.

Gamma rays	X-rays	Ultraviolet	Visible	Infrared	Microwaves	Radio
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(a) (i) State two sections of the spectrum that are used for communications.

(2)

1.....

2.....

(ii) State two sections of the spectrum that are used for cooking.

(2)

1.....

2.....

(b) The arrow below the table shows the direction of

(1)

- A increasing wave amplitude
- B increasing wave frequency
- C increasing wave speed
- D increasing wavelength

(c) A radio station broadcasts at a frequency of 200 kHz.

The wavelength of the radio waves is 1500 m.

(i) State the equation linking wave speed, frequency and wavelength.

(1)

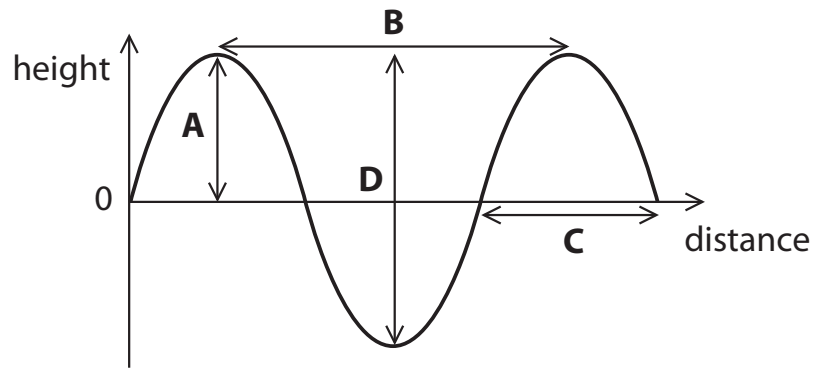
(ii) Calculate the speed of these radio waves and give the unit.

(3)

speed = unit

(Total for Question 4 = 9 marks)

5. The diagram shows part of a water wave.



(a) (i) Which letter represents the wavelength?

(1)

- A
- B
- C
- D

(ii) Which letter represents the amplitude?

(1)

- A
- B
- C
- D

(iii) This water wave is transverse. Other waves can be longitudinal.

State a similarity and a difference between a transverse wave and a longitudinal wave.

(2)

similarity

difference

(b) A student writes some sentences about electromagnetic waves.

His teacher circles a mistake in each sentence.

In the table, write a suitable correction for each mistake.

The first one has been done for you.

(5)

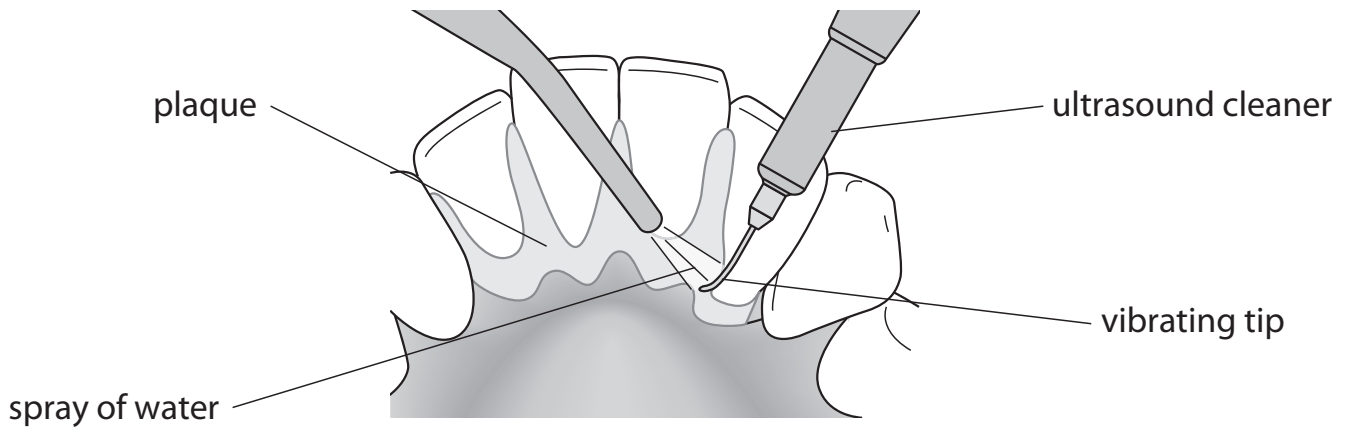
Sentence	Correction
Electromagnetic waves travel at 3×10^2 m/s in a vacuum.	10^8
Sound waves are electromagnetic.	
Infra-red waves are the most harmful to people.	
Gamma waves are used for heating up food.	
Radio waves have the highest frequency.	
Gamma waves have a very long wavelength.	

(Total for Question 5 = 9 marks)

6. Ultrasound waves are sound waves with a very high frequency. They are often used for medical purposes.

(a) Dentists use ultrasound waves to clean patients' teeth.

The diagram shows an ultrasound cleaner removing plaque from teeth.



The tip of the ultrasound cleaner vibrates 96 million times per second and is sprayed with water.

(i) State the frequency of the ultrasound emitted by the cleaner and give the unit. (2)

frequency = unit

(ii) Suggest how the cleaner removes plaque. (1)

.....
.....

(iii) Suggest why water is sprayed on the tip of the cleaner. (1)

.....
.....

(b) Ultrasound waves are also used to produce images.

This is an ultrasound image of a fetus surrounded by fluid.



(i) The ultrasound image is caused by waves which bounce off the fetus.

This is an example of waves that are

(1)

- A** absorbed
- B** reflected
- C** refracted
- D** repelled

(ii) State the equation linking wave speed, frequency and wavelength.

(1)

(iii) The ultrasound waves have a wavelength of 0.00044 m and travel at a speed of 1540 m/s in the fluid.

Calculate the frequency, in MHz, of the ultrasound waves.

(3)

frequency = MHz

(c) Other waves also have medical uses.

Ultraviolet waves are used by doctors to cure some skin conditions.

Suggest two differences between ultrasound waves and ultraviolet waves.

(2)

1

2

(Total for Question 6 = 11 marks)