

Electromagnetic Spectrum

Question Paper

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

Time Allowed: 64 minutes

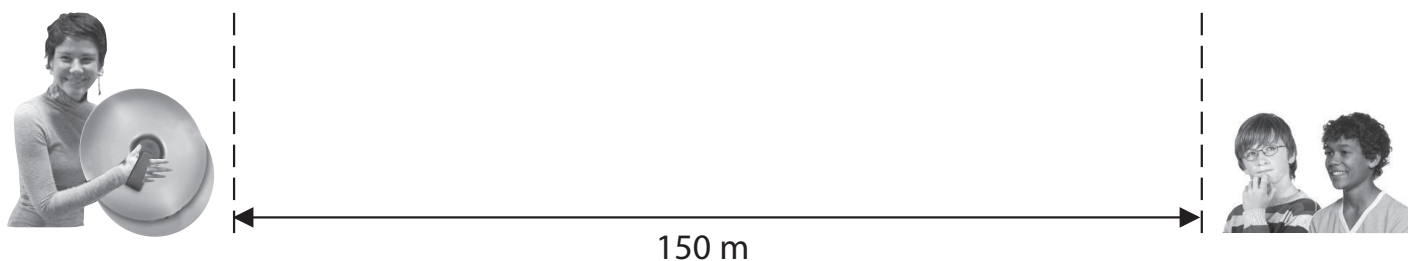
Score: /53

Percentage: /100

Grade Boundaries:

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

1. A teacher and two students are measuring the speed of sound.



The teacher makes a loud sound by hitting two cymbals together.

Each student starts a stopwatch when they see the teacher hit the cymbals. They each stop their stopwatch when they hear the sound.

(a) Describe how a sound wave moves through the air.

(3)

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(b) The students repeat the experiment and record their readings in a table.

Student	Time in s
Andrew	0.44, 0.46, 0.44, 0.48, 0.43
Kefe	0.5, 0.6, 0.4, 0.4, 0.6

(i) State the precision of Andrew's readings.

(1)

(ii) State the equation linking speed, distance travelled and time taken.

(1)

(iii) The teacher was standing 150 m from the students.

Use the experimental data recorded by each student to complete the table below.

Give your answers to an appropriate number of significant figures.

(3)

Student	Mean (average) time in s	Speed of sound in m/s
Andrew		
Kefe		

2. 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 2 = 4 marks)

3. A student is listening to a radio.



(a) The radio is powered by batteries that provide a direct current (d.c.).

What is **direct current**?

(1)

(b) Radio waves are part of the electromagnetic spectrum.

(i) Suggest a property of radio waves that makes them suitable for use in communication.

(1)

(ii) Complete the table to show uses and possible harmful effects of some other parts of the electromagnetic spectrum.

(4)

Part of electromagnetic spectrum	Use	Possible harmful effect on people
microwaves		
ultraviolet		


4. The Earth receives different types of electromagnetic wave from the Sun.

These include

- infrared
- ultraviolet
- visible light

(a) Complete the table by arranging these three types of electromagnetic wave in order of decreasing wavelength.

(1)

longest wavelength  shortest wavelength		

(b) Name two other types of electromagnetic wave.

(2)

1

2

(c) Ultraviolet waves are useful, but they can be dangerous.

(i) State two uses of ultraviolet waves.

(2)

1

.....

2

.....

(ii) State two dangers of ultraviolet waves.

(2)

1

.....

2

.....

(Total for Question 4 = 7 marks)

5. 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)

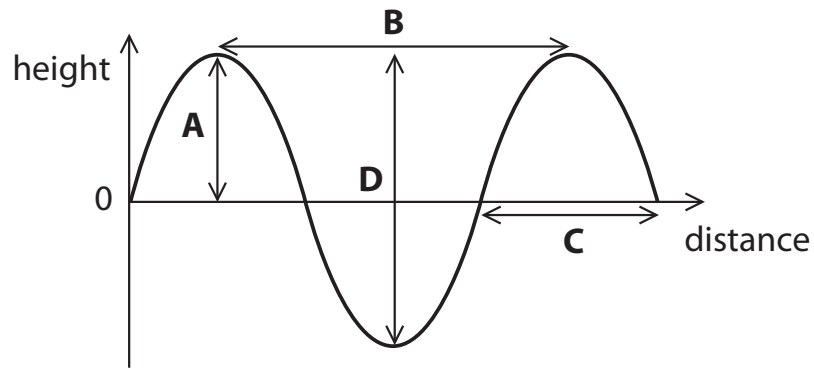
(ii) Calculate the speed of these radio waves and give the unit.

(3)

speed = unit

(Total for Question 5 = 9 marks)

6. 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 6 = 9 marks)