AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 6.6.2.2

Properties of electromagnetic waves 1

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2019–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

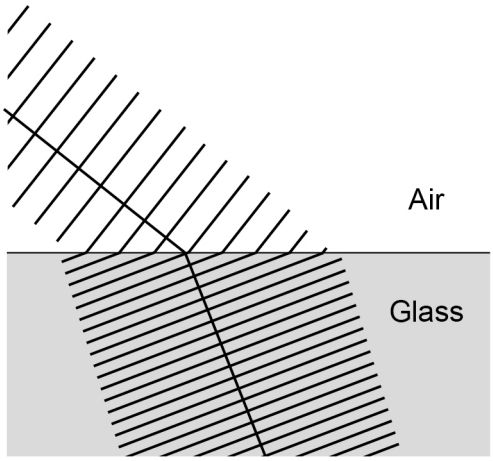
6.6.2.2 Properties of electromagnetic waves 1

Question 01

June 2019 | 8464/P/2H | Original Q7

0 7 Wave front diagrams are used to explain why light refracts when it passes from air into glass.

Figure 10



0 7 . 1 Explain why the light refracts as it passes from air into glass.

[3 marks]

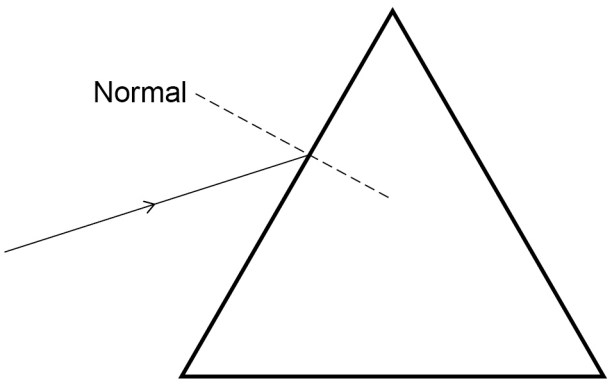
Question 7 continues on the next page

6.6.2.2 Properties of electromagnetic waves 1

Question 01 · continued

0 7 . 2 **Figure 11** shows a ray of red light entering a glass prism.

Figure 11



Complete the ray diagram to show the ray emerging from the glass prism.

[3 marks]

6.6.2.2 Properties of electromagnetic waves 1

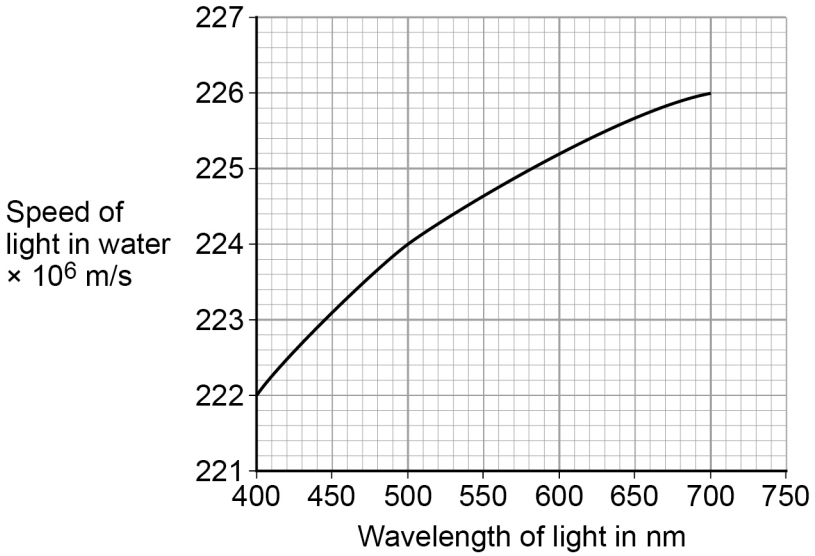
Question 01 · continued

0 7 . 3 White light is made up of a continuous spectrum of different wavelengths that all travel at 3×10^8 m/s in air.

Rainbows are produced because different wavelengths of light travel at different speeds in water.

Figure 12 shows the speed of different wavelengths of light in water.

Figure 12



Explain why violet light is refracted the most as it enters water.

[3 marks]

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6.6.2.2 Properties of electromagnetic waves 1

Question 02

June 2025 | 8464/P/2H | Original Q3

0 3 A pair of sunglasses has lenses that absorb all ultraviolet and some visible light.

0 3 . 1 Ultraviolet and visible light are both transverse waves.

What is meant by 'transverse waves'?

[2 marks]

0 3 . 2 Ultraviolet can cause sunburn and eye damage.

Give **one** other risk to health from exposure to ultraviolet.

[1 mark]

0 3 . 3 Complete the sentence.

[1 mark]

Compared with the wavelength of visible light, the wavelength of ultraviolet is _____.

Question 3 continues on the next page

6.6.2.2 Properties of electromagnetic waves 1

Question 02 · continued

0 3 . 4 A wave of visible light has a frequency of 6.25×10^{14} Hz.

speed of light = 3.00×10^{8} m/s

Calculate the wavelength of this light.

Use the Physics Equations Sheet.

Give your answer in nanometres (nm).

[4 marks]

Wavelength = _____ nm

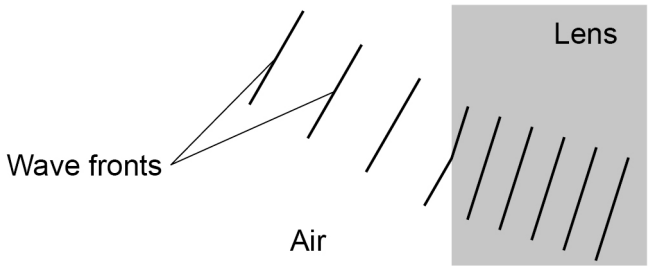
6.6.2.2 Properties of electromagnetic waves 1

Question 02 · continued

0 3 . 5 A ray of visible light incident on the lens in a pair of sunglasses is refracted.

Figure 3 shows a wave front diagram for visible light incident on the lens.

Figure 3



For each wave front, one end of the wave front enters the lens before the other end.

Explain why the light refracts as it enters the lens.

[2 marks]

Question 3 continues on the next page

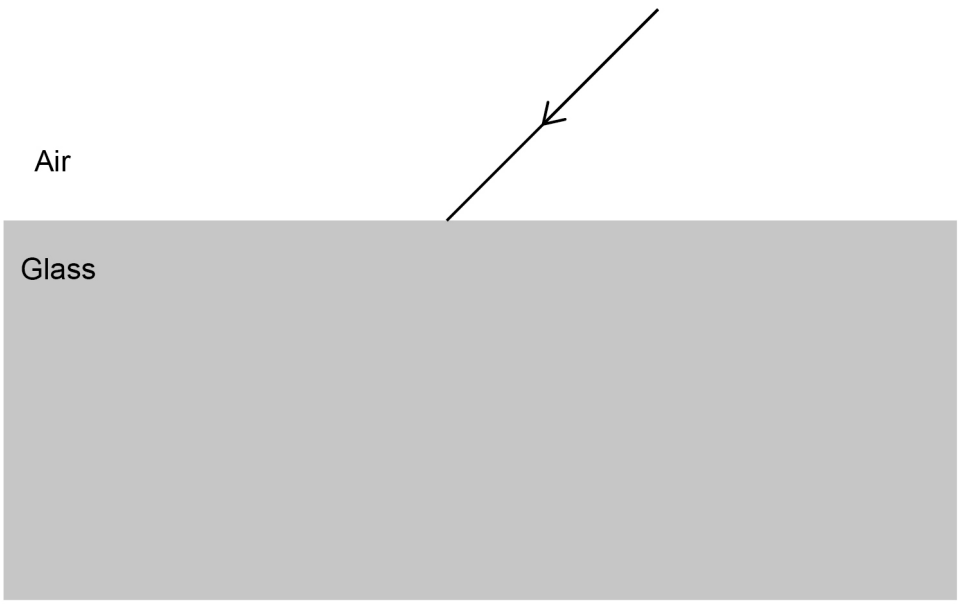
6.6.2.2 Properties of electromagnetic waves 1

Question 02 · continued

0 3 . 6 **Figure 4** shows a ray of visible light incident on glass.

The angle of incidence is 45°.

Figure 4



The angle of refraction of the ray in the glass is 28°.

Complete the ray diagram in **Figure 4** to show the path of the ray in the glass.

You should:

- draw the normal line
- draw the refracted ray in the glass.

You do **not** need to draw the ray leaving the glass.

[2 marks]

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