

**1** Which of the following waves **cannot** be polarised?

- A radio
- B ultrasonic
- C microwave
- D ultraviolet

**(Total 1 mark)**

**2** The sound quality of a portable radio is improved by adjusting the orientation of the aerial. Which statement is a correct explanation of this improvement?

- A The radio waves from the transmitter are polarised.
- B The radio waves from the transmitter are unpolarised.
- C The radio waves become polarised as a result of adjusting the aerial.
- D The radio waves become unpolarised as a result of adjusting the aerial.

**(Total 1 mark)**

**3** Which one of the following properties of light waves do polarising sunglasses depend on for their action?

Light waves may

- A interfere constructively.
- B interfere destructively.
- C be polarised when reflected from a surface.
- D be polarised by the lens in the eye.

**(Total 1 mark)**

**4** (a) State the difference between *transverse* and *longitudinal* waves.

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**(2)**

(b) State what is meant by *polarisation*.

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(2)

(c) Explain why polarisation can be used to distinguish between transverse and longitudinal waves.

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(2)

(Total 6 marks)

5

Polarization is a property of one type of wave.

(a) Circle below the type of wave that can be polarized.

transverse

longitudinal

(1)

(b) Give **one** example of the type of wave that can be polarized.

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(1)

(c) Explain why some waves can be polarized but others cannot. Space is provided for sketches should you wish to include them in your answer.

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(3)

(Total 5 marks)

6

(a) State the characteristic features of

(i) longitudinal waves,

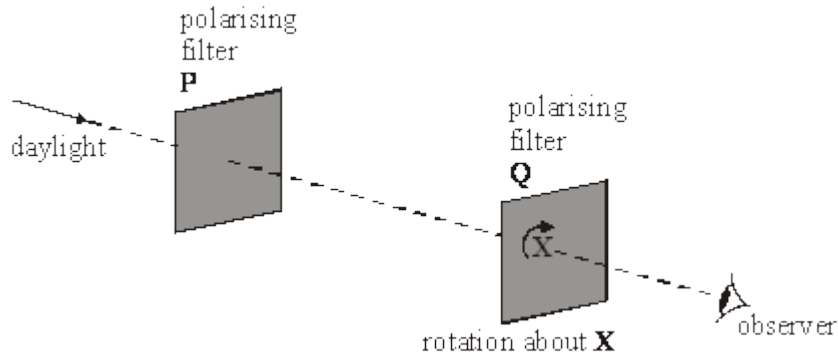
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(ii) transverse waves.

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(3)

(b) Daylight passes horizontally through a fixed polarising filter **P**. An observer views the light emerging through a second polarising filter **Q**, which may be rotated in a vertical plane about point **X** as shown in **Figure 1**.



**Figure 1**

Describe what the observer would see as **Q** is rotated slowly through 360°.

You may be awarded marks for the quality of written communication provided in your answer.

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(2)  
 (Total 5 marks)

7

- (a) Define the amplitude of a wave.

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(1)

- (b) (i) Other than electromagnetic radiation, give **one** example of a wave that is transverse.

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(1)

- (ii) State **one** difference between a transverse wave and a longitudinal wave.

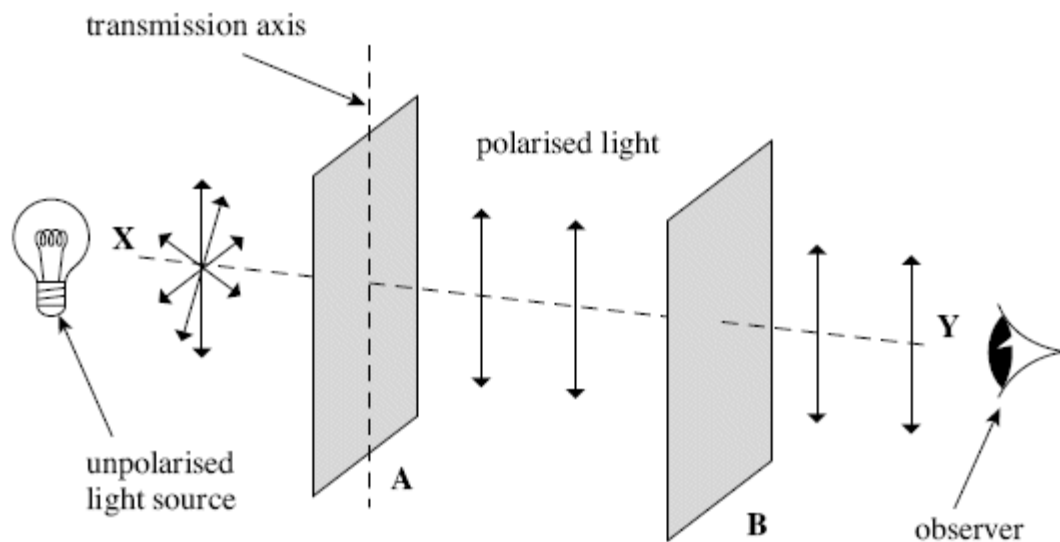
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(1)

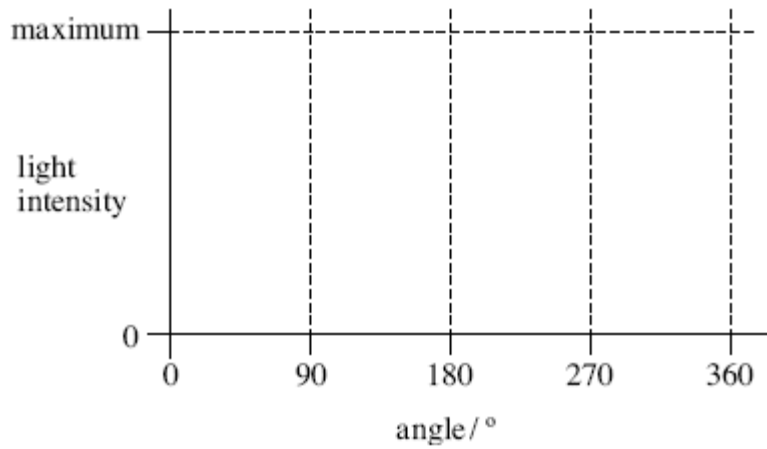
- (c) The figure below shows two identical polarising filters, **A** and **B**, and an unpolarised light source. The arrows indicate the plane in which the electric field of the wave oscillates.

- (i) If polarised light is reaching the observer, draw the direction of the transmission axis on filter **B** in the figure below.



(1)

- (ii) The polarising filter **B** is rotated clockwise through  $360^\circ$  about line **XY** from the position shown in the figure above. On the axes below, sketch how the light intensity reaching the observer varies as this is done.



(2)

- (d) State **one** application, other than in education, of a polarising filter and give a reason for its use.

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(2)

(Total 8 marks)