FREE REVISION PACK

Polarisation

AQA A-level Physics · 7407 / 7408 · Specification 3.3.1.2

Easy | Medium | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Telling polarised from unpolarised light	AQA June 2024 · A-level Paper 1 · Q14	1 mark
2	Easy	Unpolarised light through a polariser	AQA June 2017 · AS Paper 2 · Q11	1 mark
3	Medium	Intensity falls to zero after a 90° turn	AQA June 2022 · AS Paper 2 · Q11	1 mark
4	Medium	Aligning a receiving aerial	AQA June 2025 · AS Paper 2 · Q12	1 mark
5	Medium	Angles for maximum intensity through two filters	AQA November 2020 · A-level Paper 1 · Q17	1 mark

Key ideas to have ready

- Only **transverse** waves can be polarised: the oscillations are restricted to one plane. Longitudinal waves (e.g. sound, ultrasound) cannot be polarised.
- A polariser lets through only the component of the oscillation in its transmission plane, so unpolarised light comes out polarised with reduced intensity.
- Rotating a polariser in polarised light makes the intensity vary: maximum when aligned, zero after 90°, maximum again after 180°.
- Radio waves from an aerial are polarised in the plane of the aerial, so the receiving aerial must be aligned the same way.

How to use this pack

1. The questions are grouped into levels (Easy and Medium). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–2

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

AQA June 2024 · A-level Paper 1 · Q14

1 A detector measures the intensity of light from a source S_1.
Polaroid material is placed between source S_1 and the detector. When the material is rotated through a small angle, the detected intensity does not change.
When this procedure is repeated for a source S_2, the detected intensity decreases.

Which is correct?

[1 mark]

	Light waves from S_1	**Light waves from S_2**	
A	unpolarised	polarised	⬭
B	unpolarised	unpolarised	⬭
C	polarised	polarised	⬭
D	polarised	unpolarised	⬭

AQA June 2017 · AS Paper 2 · Q11

2 Which statement is correct about the properties of an unpolarised electromagnetic wave as it passes through a polariser?

[1 mark]

A The wave remains unchanged. ⬭

B The wave does not pass through the polariser. ⬭

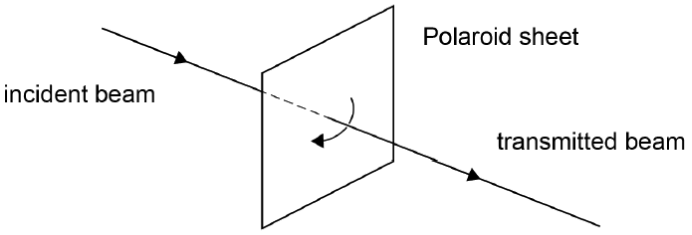
C The wave's electric field oscillates along the direction of travel. ⬭

D The intensity of the wave is reduced. ⬭

Medium Two or three steps. Roughly a third to a half of students get these right. **Questions 3–5**

AQA June 2022 · AS Paper 2 · Q11

3 A narrow beam of light is incident on a sheet of Polaroid material. The intensity of the transmitted beam is a maximum.



The Polaroid sheet is rotated about the beam by $90°$ and the intensity of the transmitted beam decreases to zero.

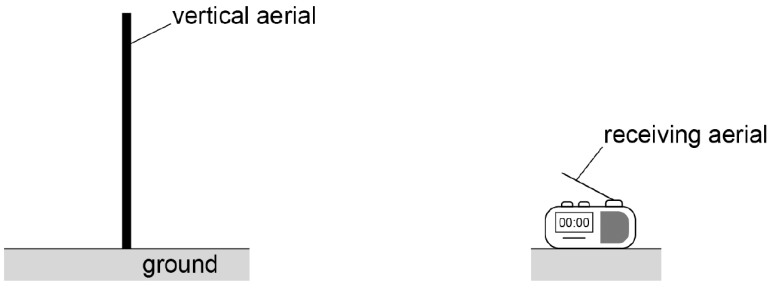
Which row explains this observation?

[1 mark]

	Nature of incident beam	Action of Polaroid material as it is rotated	
A	unpolarised	polarises the incident beam	⬭
B	unpolarised	absorbs the incident beam	⬭
C	polarised	absorbs the incident beam	⬭
D	polarised	changes the plane of polarisation of the incident beam	⬭

AQA June 2025 · AS Paper 2 · Q12

4 Radio waves are transmitted from a vertical aerial and detected by a receiving aerial.
The alignment of the receiving aerial can be varied.



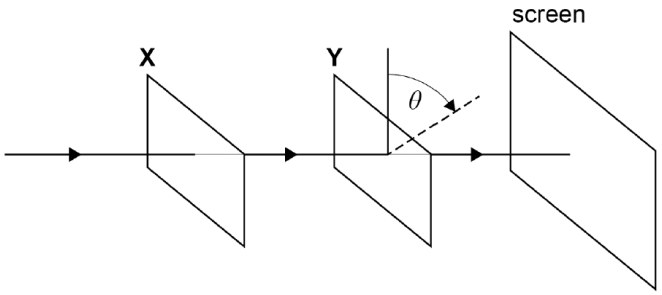
Which row shows the nature of the transmitted radio wave and the alignment of the receiving aerial that is needed in order to detect a maximum signal?

[1 mark]

	Nature of transmitted radio wave	Alignment of receiving aerial	
A	polarised	vertical	⬭
B	polarised	horizontal	⬭
C	unpolarised	vertical	⬭
D	unpolarised	horizontal	⬭

AQA November 2020 · A-level Paper 1 · Q17

5 Unpolarised light travels through two polarising filters **X** and **Y** and is then incident on a screen. When **X** and **Y** are arranged as shown, there is a maximum intensity on the screen.
X is held stationary but **Y** is rotated in a plane at right angles to the beam so that θ increases.



What are the next three values of θ, in rad, for which the beam hits the screen with maximum intensity?

[1 mark]

A $\frac{\pi}{2}, \frac{2\pi}{2}, \frac{3\pi}{2}$ ⬭

B $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}$ ⬭

C $\pi, 2\pi, 3\pi$ ⬭

D $2\pi, 4\pi, 6\pi$ ⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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