RADLEY

Polarization

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Polaroid investigations

Today we shall

1. fully understand polarization of trasverse waves.
2. know some applications of polarization.
3. practise using the concepts on questions.
4. (possibly) discover a hidden gift...

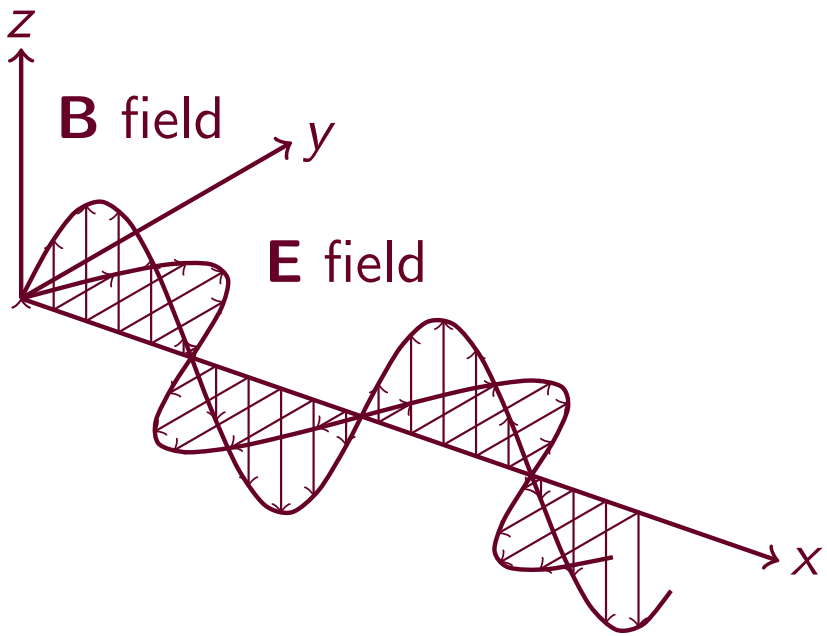
Textbook p. 119 [APFY]

Specification Requirement

Learners should be able to demonstrate and apply their knowledge and understanding of:
the term polarisation

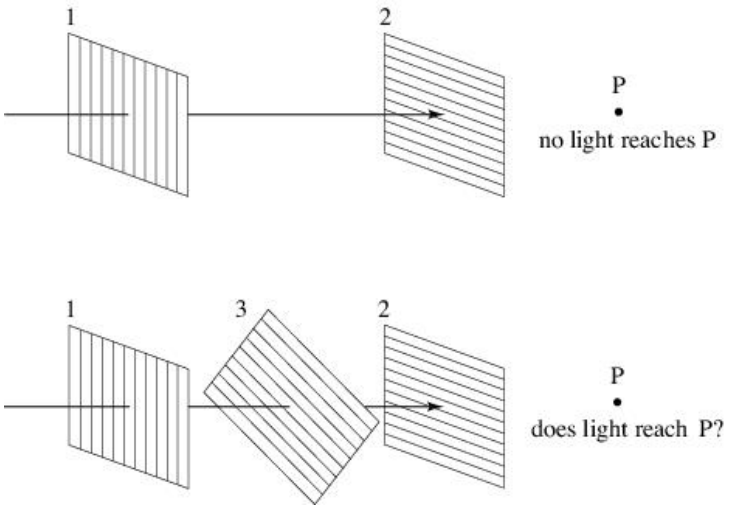
[Eduqas A Level Physics Specification, 2009/10 onwards]

Electomagnetic wave



ConcepTest

When a ray of light is incident on two polarizers with their polarization axes perpendicular, no light is transmitted. If a third polarizer is inserted between these two with its polarization axis at 45° to that of the other two, does any light get through to point P?



(a) yes
(b) no

When a third polarizer is inserted at 45° between two orthogonal polarizers, some light is transmitted. If, instead of a single polarizer at 45°, we insert a large number N of polarizers, each time rotating the axis of polarization over an angle $90°/N$,

(a) no light,

(b) less light,

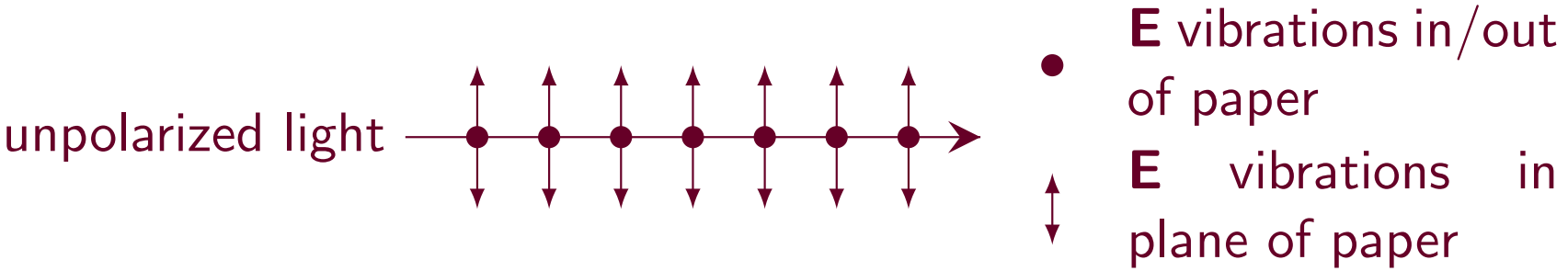
(c) the same amount of light,

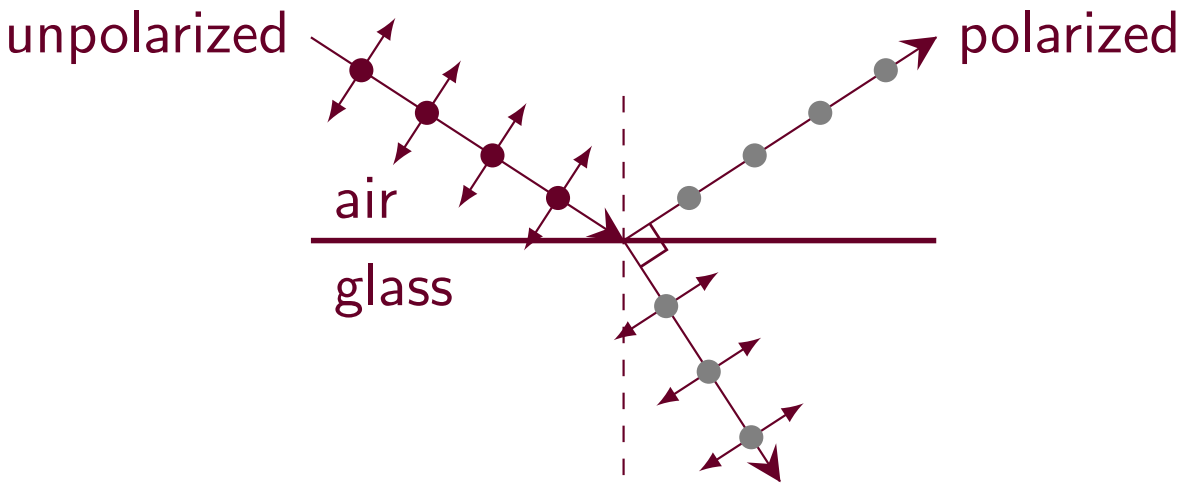
(d) more light

gets through.

LCDs

Brewster Reflexion





Quick questions

1. Light which is vibrating in a single plane is referred to as . . . light.
   electromagnetic transverse unpolarized polarized
2. Light which is vibrating in a variety of planes is referred to as . . . light.
   electromagnetic transverse unpolarized polarized
3. Light usually vibrates in multiple vibrational planes. It can be transformed into light vibrating in a single plane of vibration. The process of doing this is known as . . . .
   translation interference polarization refraction

More Questions

4 Light is passed through a Polaroid filter whose transmission axis is aligned horizontally. This will have the effect of . . . .

(a) making the light one-half as intense and aligning the vibrations into a single plane.

(b) aligning the vibrations into a single plane without any effect on its intensity.

(c) merely making the light one-half as intense; the vibrations would be in every direction.

(d) . . . nonsense! This will have no effect on the light itself; only the filter would be affected.

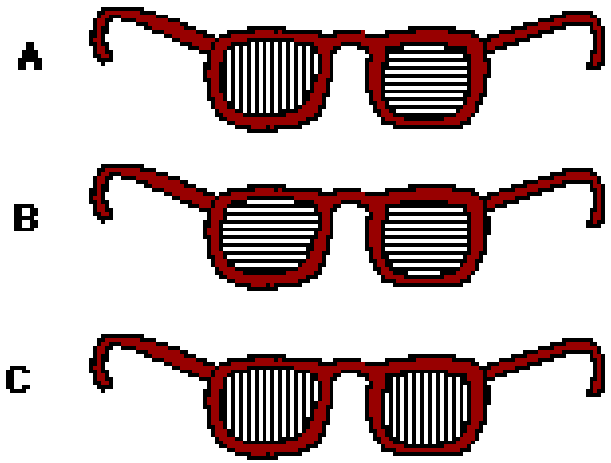
More questions

5 Light is passed through a Polaroid filter whose transmission axis is aligned horizontally. It then passes through a second filter whose transmission axis is aligned vertically. After passing through both filters, the light will be . . . .

(a) polarized
(b) unpolarized
(c) entirely blocked
(d) returned to its original state

Sunglasses

8 Consider the three pairs of sunglasses shown below. Which pair of glasses is capable of eliminating the glare from a road surface? (The transmission axes are shown by the straight lines.)



ConcepTest

In between two crossed polarizers, which are oriented 90° from each other, you place a third polarizer. The one in the middle is oriented at a 45° angle with respect to the other two. From an unpolarized light source of intensity I_0, what intensity of light makes it through the 3 polarizers?

(a) I_0

(b) $\frac{I_0}{2}$.

(c) $\frac{I_0}{4}$.

(d) $\frac{I_0}{8}$.

(e) 0.