

Polarisation

Revised AH Physics 2014

11. A student, wearing polarising sunglasses, is using a tablet computer outdoors. The orientation of the tablet seems to affect the image observed by the student. Two orientations are shown in Figure 11A.

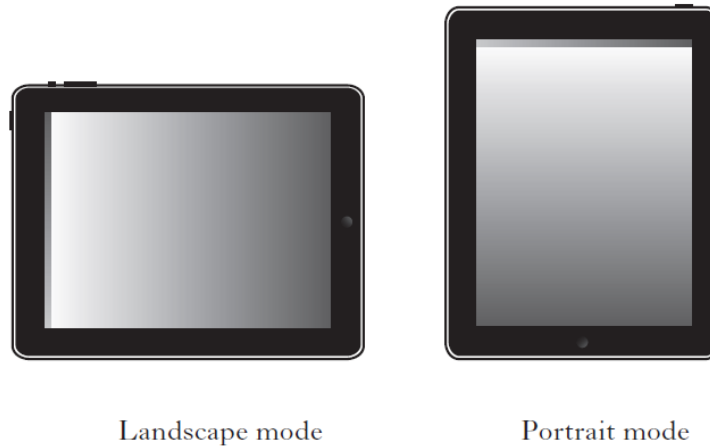


Figure 11A

- (a) In landscape mode the image appears bright and in portrait mode it appears dark.
- (i) What may be concluded about the light emitted from the tablet screen? **1**
- (ii) The student slowly rotates the tablet. Describe the change in brightness observed by the student as it is rotated through 180° . **2**
- (b) Unpolarised sunlight is incident on a water surface as shown in Figure 11B.

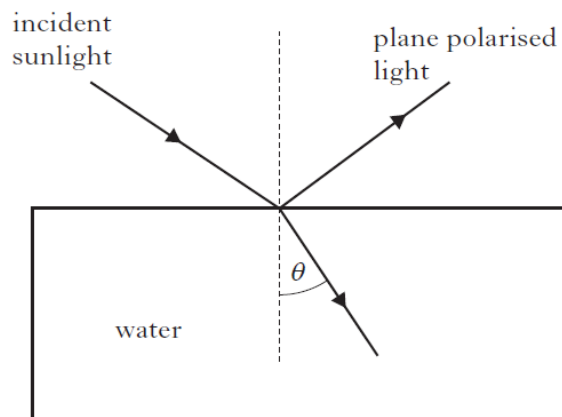


Figure 11B

The light is 100% plane polarised on reflection.
Calculate the angle of refraction θ .

2
(5)

12. Some early 3D video cameras recorded two separate images at the same time to create two almost identical movies.

Cinemas showed 3D films by projecting these two images simultaneously onto the same screen using two projectors. Each projector had a polarising filter through which the light passed as shown in Figure 12.

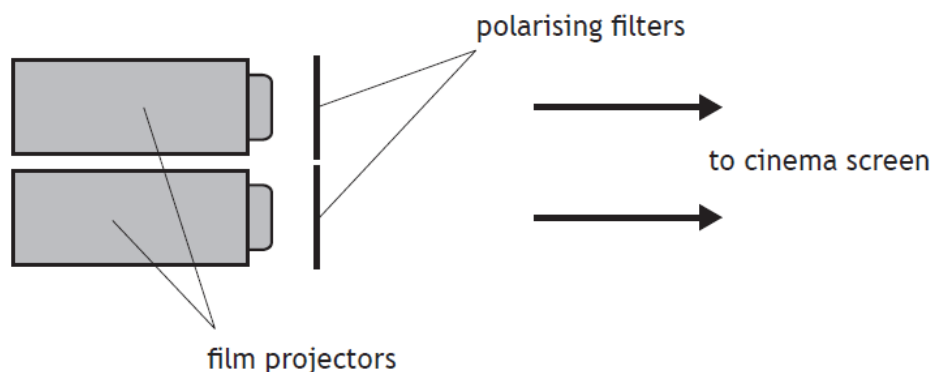


Figure 12

- (a) Describe how the transmission axes of the two polarising filters should be arranged so that the two images on the screen do not interfere with each other. 1

- (b) A student watches a 3D movie using a pair of glasses which contains two polarising filters, one for each eye.

Explain how this arrangement enables a different image to be seen by each eye. 2

12. (continued)

MARKS

- (c) Before the film starts, the student looks at a ceiling lamp through one of the filters in the glasses. While looking at the lamp, the student then rotates the filter through 90° .

State what effect, if any, this rotation will have on the observed brightness of the lamp.

Justify your answer. 2

- (d) During the film, the student looks at the screen through only one of the filters in the glasses. The student then rotates the filter through 90° and does not observe any change in brightness.

Explain this observation. 1