Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/02 Depth in physics (Foundation Tier)

Question Set 12

1 Sarah investigates what happens when light shines on different coloured cards.

(a) She places two coloured square cards next to each other, as shown in **Fig. 1.1**.

Card **R** is red and card **G** is green.

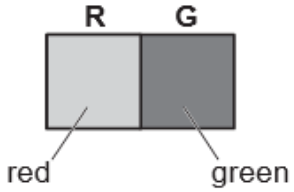


Fig. 1.1

Sarah shines **green** light on both cards.

Fig. 1.2 shows the observed colour of the cards.

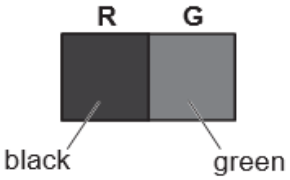


Fig. 1.2

(i) Complete the following sentences about the observation in **Fig. 1.2**.

Use words from the list.

You may use each word once, more than once, or not at all.

absorbs **refracts** **scatters** **transmits**

Card **R** looks black because it ...absorbs..... the green light.

Card **G** looks green because it ...scatters..... the green light. **[2]**

(ii) What colour light can Sarah shine on the red and green cards to make them both appear **black**?

Put a (ring) around the correct colour.

(**blue**) **green** **red** **white** **[1]**

(b) Sarah is now investigating the refraction of light.

A narrow beam of green light is incident on a plastic block.

She measures the angle of incidence, *i*, and the angle of refraction, *r*, as shown in **Fig. 1.3**.

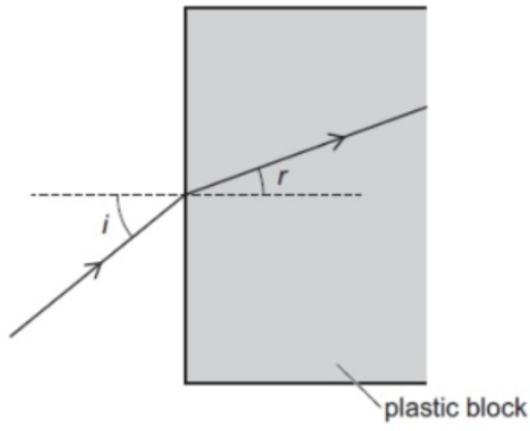


Fig. 1.3

Sarah then draws a graph of angle of refraction, *r*, against angle of incidence, *i*, as shown in **Fig. 1.4**.

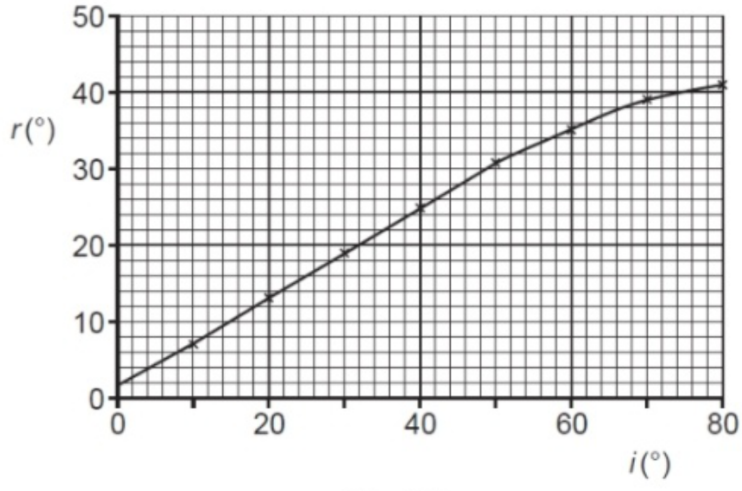
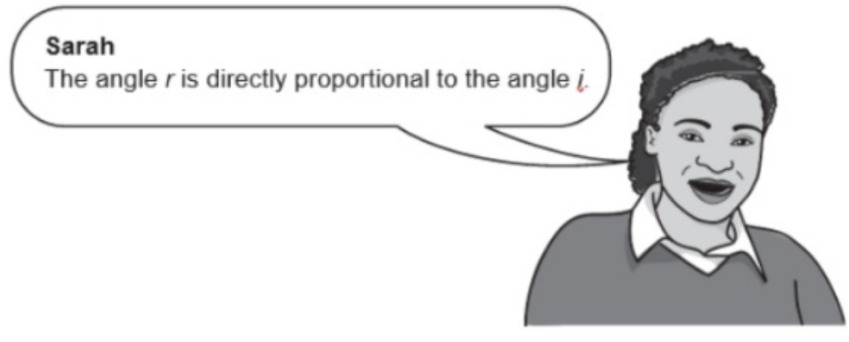


Fig. 1.4

Sarah makes the following hypothesis.



Use **Fig. 1.4** to explain if Sarah is correct. **[2]**

Sarah is not correct as it isn't a straight line, it's a curve and the graph doesn't pass (0,0).

(c) Green light has wavelength 5.6×10^{-7} m and frequency 5.4×10^{14} Hz.

Calculate the **wave speed** of the green light.

Use the equation: wave speed = frequency × wavelength

Give your answer in standard form and to **2** significant figures.

$c = f\lambda = 5.4 \times 10^{14} \times 5.6 \times 10^{-7}$

$= 3.0 \times 10^{8}$ m/s

(2sf)

Wave speed = 3.0×10^{8} m/s **[3]**

Total Marks for Question Set 12: 8

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