Light

Question Paper

Course	CIE IGCSE Physics
Section	3. Waves
Topic	Light
Difficulty	Easy

Time Allowed 50

Score /36

Percentage /100

Question 1a

The spectrum of white light is made up of seven colours.

Fig. 7.1 shows a partially-completed spectrum. Two labels are missing.

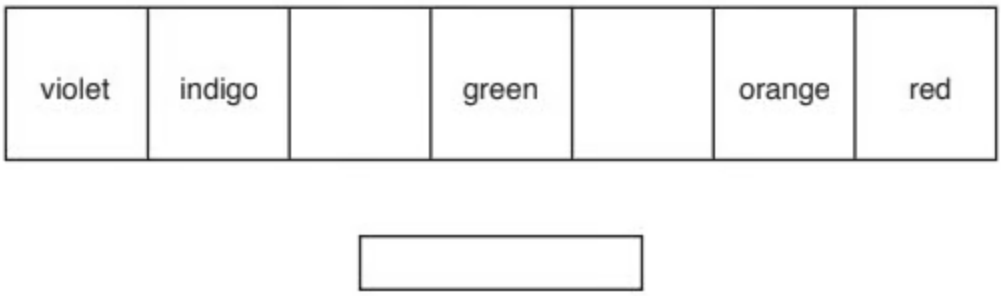

Fig. 7.1

(i) On Fig. 7.1, write the name of the missing colour in each blank space.

[2]

(ii) On Fig. 7.1, indicate the direction of increasing wavelength for the spectrum. Draw an arrow in the box below the spectrum of colours.

[1]

[3 marks]

Question 1b

A ray of red light strikes one face of a triangular glass prism as shown in Fig. 7.2.

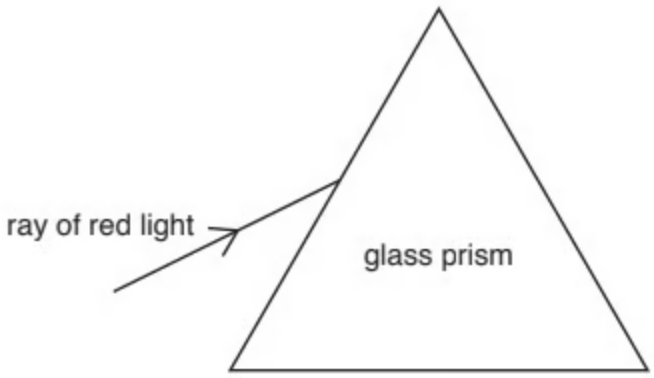

Fig. 7.2

(i) On Fig. 7.2, draw the path of the ray as it travels through the glass prism and enters the air.

[2]

(ii) State the term used to describe what happens to the ray of red light as it enters and leaves the prism.

[1]

[3 marks]

Question 2a

Fig. 5.1 represents an object positioned on the principal axis of a thin lens.

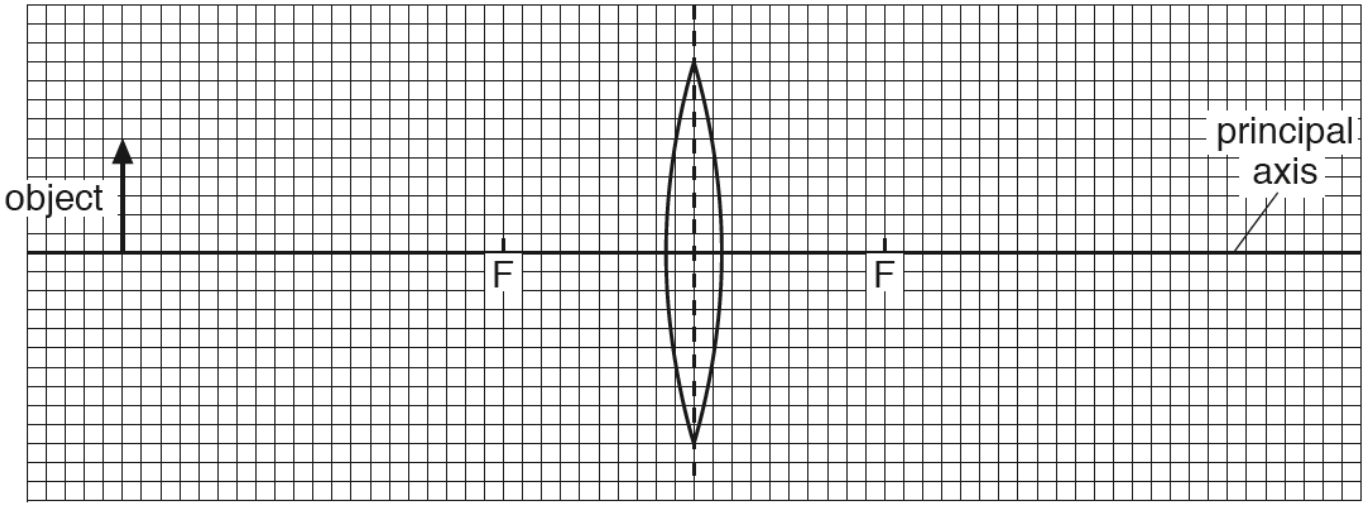

Fig. 5.1

Each small square of the grid represents 0.5 cm. Each principal focus of the lens is labelled F.

Use the grid to determine the focal length of the lens.

focal length = ... cm

[1 mark]

Question 2b

(i) On Fig. 5.1, draw a ray from the top of the object that passes through a principal focus, then through the lens and beyond it.

[1]

(ii) On Fig. 5.1, draw a second ray from the top of the object that passes through the centre of the lens. Continue the path of this ray to the edge of the grid.

[1]

(iii) On Fig. 5.1, draw an arrow to show the position and nature of the image produced by the lens.

[1]

[4 marks]

Question 3a

An object, OX, is placed in front of a converging lens.

Fig. 7.1 shows a ray of light from the object passing through the lens.

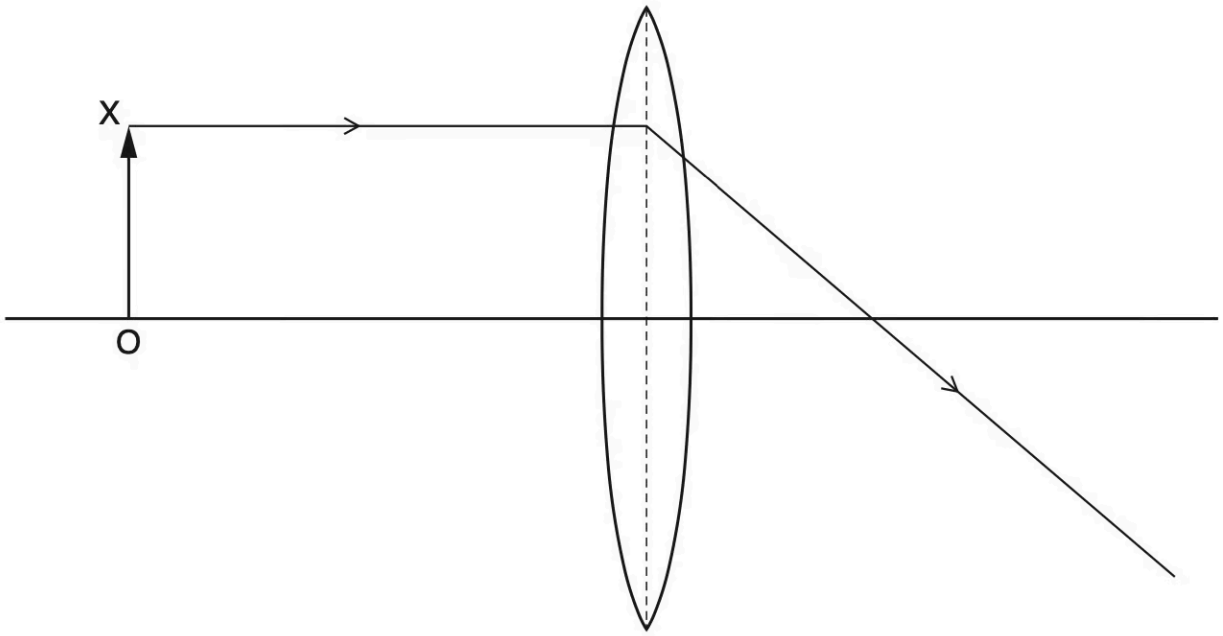

Fig. 7.1

(i) The lens forms an image of object OX.

On Fig. 7.1, draw another ray from X to locate the position of the image.

[1]

(ii) On Fig. 7.1, draw an arrow to represent the image of OX and label it I.

[1]

(iii) On Fig. 7.1, mark a principal focus for the lens and label it F.

[1]

(iv) On Fig. 7.1, measure and record the focal length of the lens.

focal length = ... cm [1]

[4 marks]

Question 3b

Describe the image I.

Choose words from the list. Tick (✓) **two** boxes.

☐ enlarged

☐ diminished

☐ same size

☐ inverted

☐ upright

[2 marks]

Question 4a

Extended tier only

An endoscope is a piece of medical equipment used to see inside a person's body. Endoscopes use optical fibres within a long tube which reflects light from inside the patient to an eye piece lens or camera.

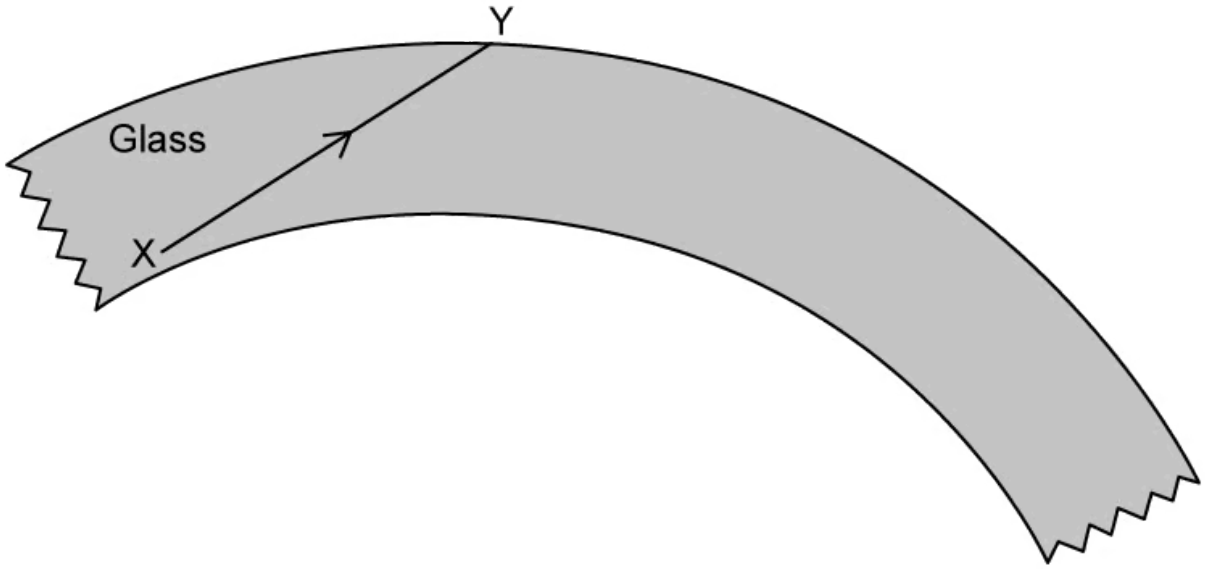

Fig. 1.1

Fig. 1.1 shows a section of optical fibre. Light travels from X to Y.

On Fig. 1.1, complete the path of the light ray until it leaves the section of optical fibre.

[2 marks]

Question 4b

State the type of reflection that occurs within an optical fibre.

[1 mark]

Question 4c

Extended tier only

Calculate the critical angle.

Glass has a refractive index of 1.52.

critical angle = ...

[3 marks]

Question 4d

Extended tier only

When the light ray exits the optical fibre it passes into air.

Calculate the speed of light in glass.

speed of light in glass = ...

[3 marks]

Question 5a

Extended

Fig. 1.1 shows a light ray passing though a block of ice.

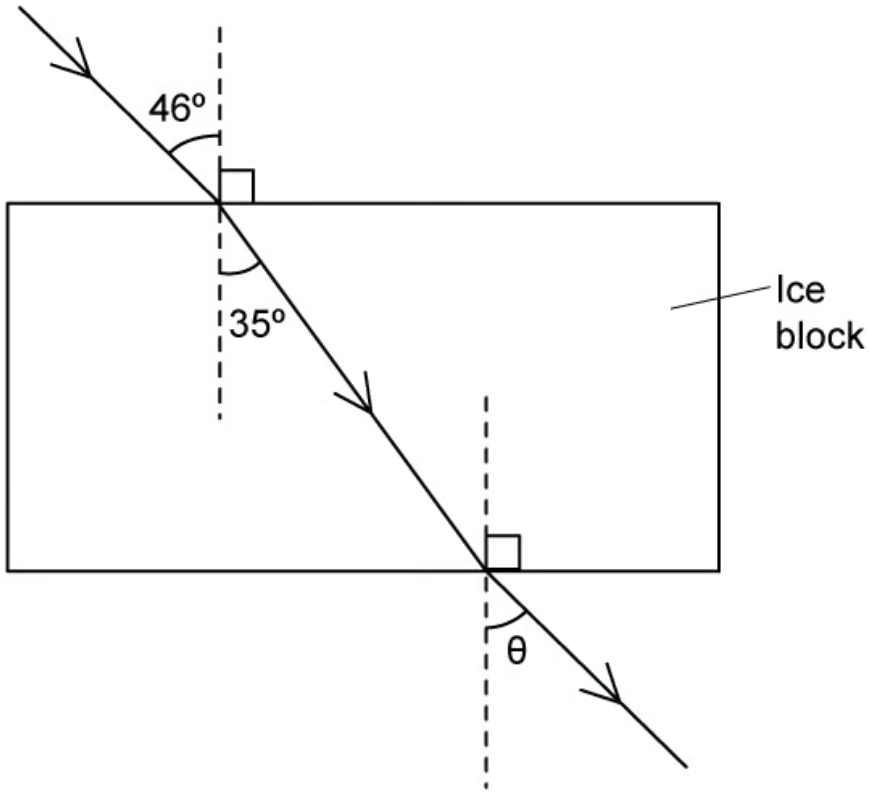

Fig. 1.1

(not to scale)

Determine the refractive index of ice.

refractive index = ...

[3 marks]

Question 5b

Explain why the angle of refraction is smaller than the incident angle for the boundary from air to ice.

[3 marks]

Question 5c

State the correct value of angle θ on Fig. 1.1.

angle θ = ...

[1 mark]

Question 5d

Complete Table 1.2 by drawing a tick to show which properties of light change during refraction.

Property	Does change	Does not change
speed		
wavelength		
frequency		

Table 1.2

[3 marks]