

Waves Refraction and Reflection Past Paper Questions Edexcel Physics
IGCSE Higher

1.

A student is investigating refraction of light.

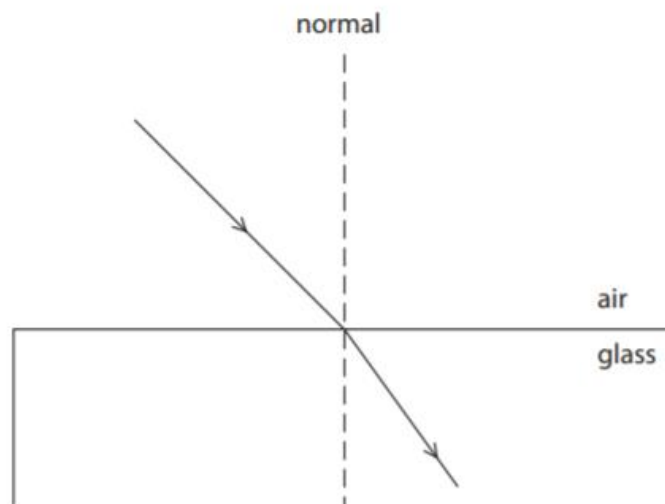
(a) What is **refraction**?

(1)

(b) The diagram shows a ray of light travelling from air to glass.

Add labels to show the angle of incidence, i , and the angle of refraction, r .

(2)

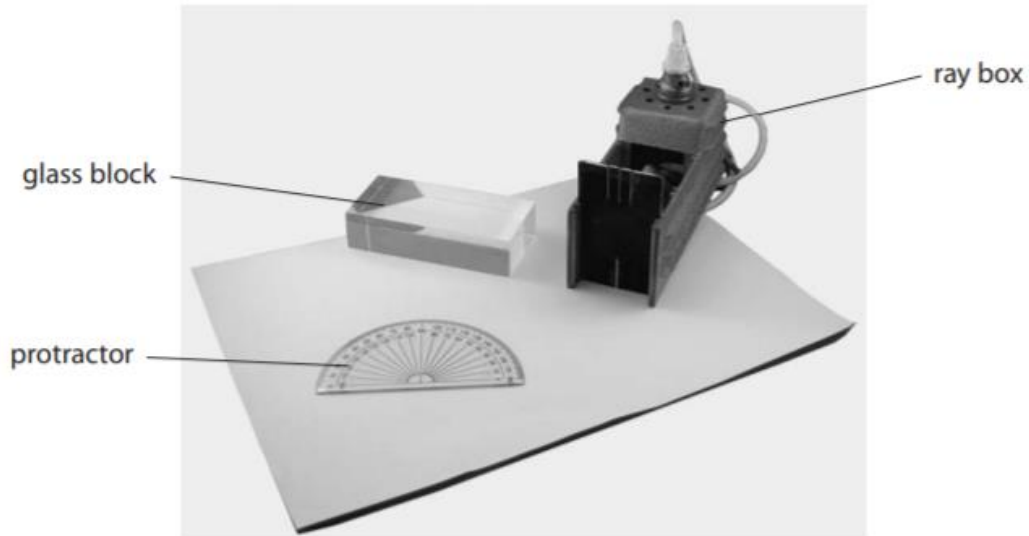


(c) The student wants to find the refractive index of the glass.

(i) State the equation linking refractive index, angle of incidence and angle of refraction.

(1)

(ii) The photograph shows the apparatus the student has available.



Describe how the student should carry out the experiment.

You should include:

- what the student should measure
- how the measurements should be made
- how the student should use a graph to find the refractive index.

(6)

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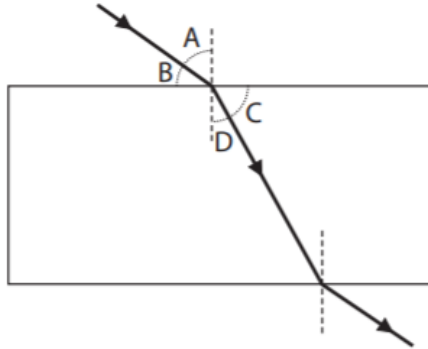
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2.

A student plans to measure the refractive index of glass.

She traces a ray of light through a glass block as shown in the diagram.



(a) Which letter represents the angle of refraction?

(1)

- A
- B
- C
- D

(b) Explain how the student can use the glass block to find an accurate value for the refractive index of glass.

(4)

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3.

This question is about the reflection of light.

(a) Light reflects from a plane mirror.

(i) Use words from the box to complete the sentence below.

(1)

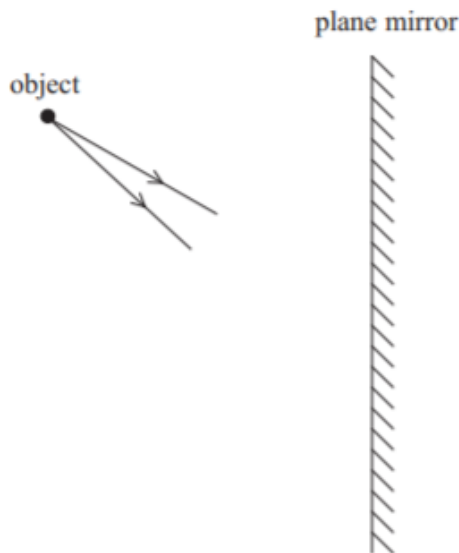
less than equal to greater than

When light reflects from the surface of a plane mirror, the angle of incidence is the angle of reflection.

(ii) The diagram shows two rays of light coming from an object.

Continue the two rays and add further lines to the diagram to show how an image is formed by a plane mirror.

(2)



(iii) The image in a plane mirror is a **virtual image**.

How can you tell this from your diagram?

(1)

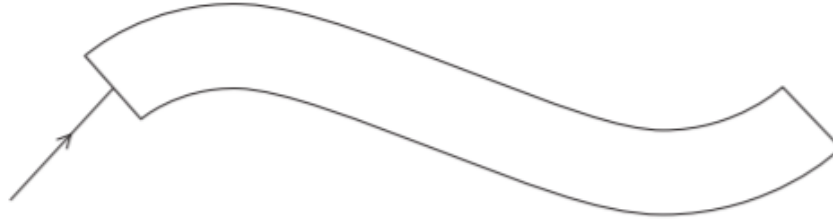
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(b) Light can also reflect along optical fibres by total internal reflection.

(i) Complete the diagram to show the path of the ray of light as it enters and passes through the optical fibre.

(2)



(ii) State **two** conditions required for total internal reflection to happen.

(2)

1

2

(iii) Telephone signals can be sent along optical fibres using light. In earlier systems the signals were sent using electric currents in copper wires.

Suggest **one** advantage of sending signals using optical fibres.

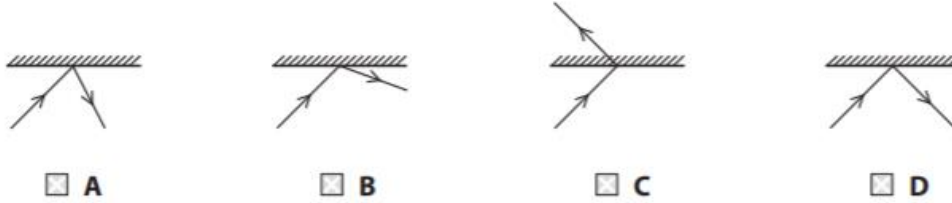
(1)

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4.

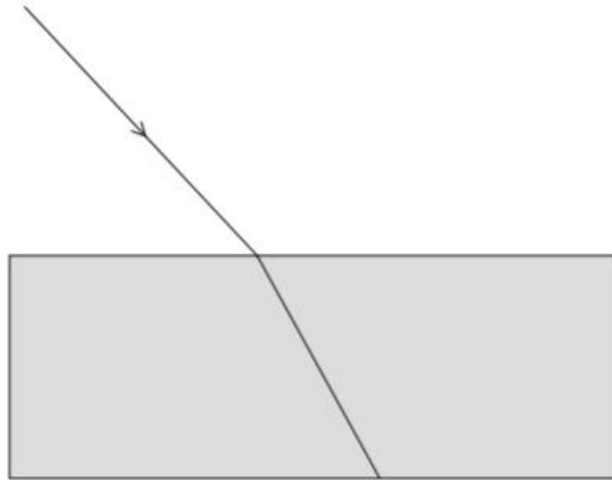
(a) Which diagram shows the reflection of a ray of light at a plane mirror?

(1)



(b) The diagram below shows a ray of light as it passes from air into a glass block.

The angle of incidence is 43° and the light is refracted as shown.



(i) On the diagram, draw the normal for this refraction.

(1)

(ii) On the diagram, mark the angle of refraction.

(1)

(iii) Measure the angle of refraction.

(1)

angle of refraction =^o

(iv) State the relationship between refractive index, angle of incidence and angle of refraction.

(1)

(v) Calculate the refractive index of the glass.

(2)

refractive index =

(c) The diagram shows how light can travel in a glass fibre.



(i) What is the name given to the effect shown?

(1)

(ii) Explain what is happening to the light in the glass fibre.

(3)

5.

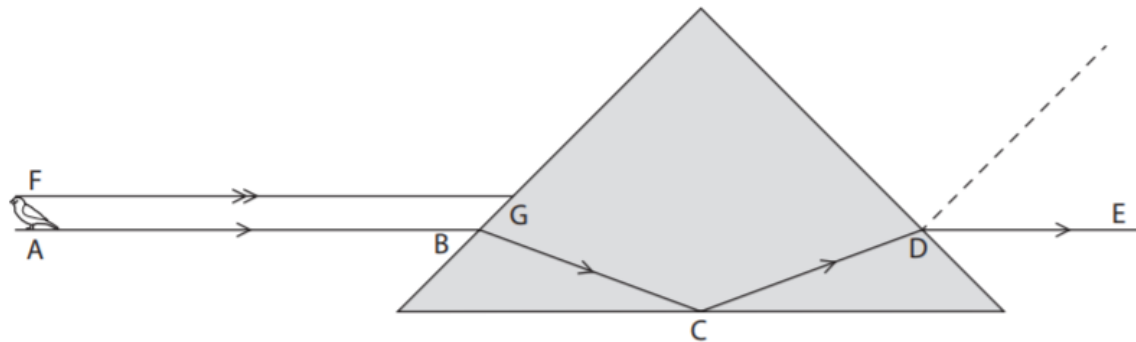
Binoculars are used to look at distant objects.



binoculars

Many binoculars use right-angled prisms.

The diagram shows two parallel rays of light, AB and FG, from a distant bird, incident on a right-angled prism.



(a) (i) On the diagram, draw the normal at G.

(1)

(ii) Measure the angle of incidence at G and the angle of refraction at D.

(2)

angle of incidence at G =

angle of refraction at D =

(b) Explain what happens to the light ray at C.

(3)

(c) Complete the diagram by drawing the path that light ray FG takes through the prism.

(3)