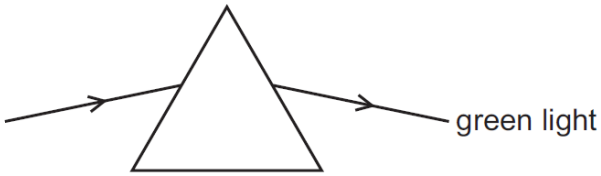
Light – 2021 IGCSE 0625

1. Nov/2021/QPaper_11/No.19

A ray of green light passes through a glass prism as shown.

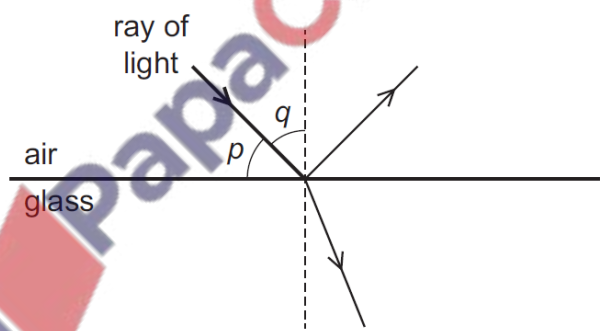


Which colours of light refract as shown in the table?

	refract more than green	refract less than green
A	red	blue
B	red	yellow
C	violet	blue
D	violet	yellow

2. Nov/2021/QPaper_11,12,13,21,22&23/No.20

The diagram shows a ray of light in air incident on a glass block. Some of the light is refracted and some of the light is reflected. Two angles, *p* and *q*, are marked on the diagram.

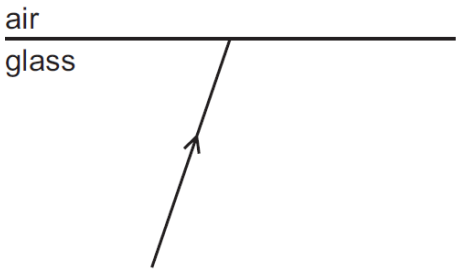


Which row gives the angle of incidence and states whether total internal reflection occurs?

	angle of incidence	total internal reflection
A	*p*	no
B	*p*	yes
C	*q*	no
D	*q*	yes

3. Nov/2021/QPaper_11,21/No.21

The diagram shows a ray of light in glass incident on the surface between the glass and air.



What happens if the angle of incidence is made larger than the critical angle for the glass?

A The angle of refraction becomes equal to 90°.

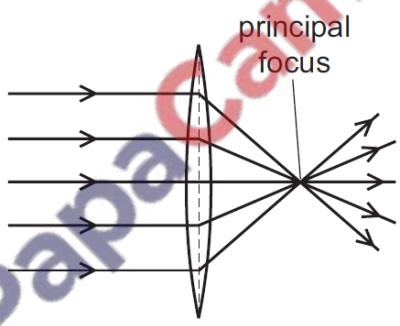
B There is a refracted ray and a ray reflected inside the glass.

C There is a refracted ray only.

D There is only a ray reflected inside the glass.

4. Nov/2021/QPaper_12/No.19

A thin, converging lens causes parallel rays of light to converge to a single point known as the principal focus.



Which statement explains this?

A The light diffracts.

B The light disperses.

C The light reflects.

D The light refracts.

5. Nov/2021/QPaper_12&22/No.21

The letter F is reflected in a mirror.

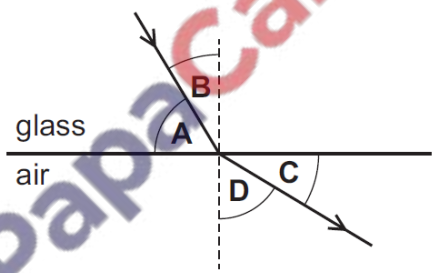
What does the optical image look like?

A B C D

6. Nov/2021/QPaper_13/No.19

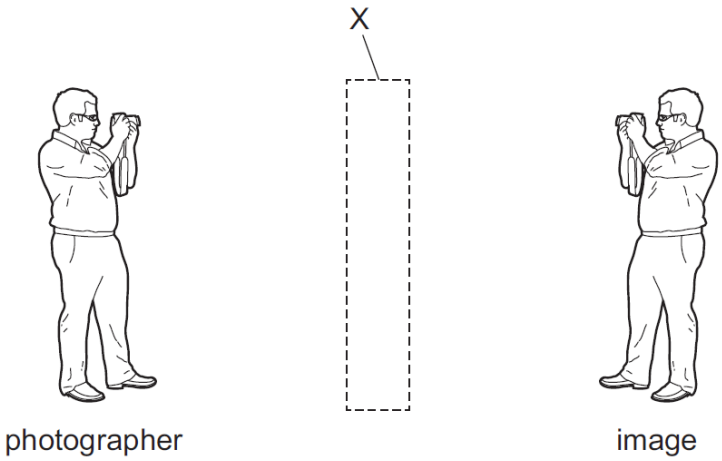
A narrow beam of light travels through glass. It reaches the edge of the glass and refracts into the air.

What is the angle of refraction?



7. Nov/2021/QPaper_13&23/No.21

A photographer sees his image as shown.



What could X be?

A

mirror

B

translucent glass block

C

transparent glass prism

D

transparent semicircular glass block

8. Nov/2021/QPaper_21/No.19

Two beams of light are both the same colour of red. One beam is travelling through air. The other beam is travelling through water. Each beam has a different brightness.

Which quantity is the same for both sets of waves?

A amplitude

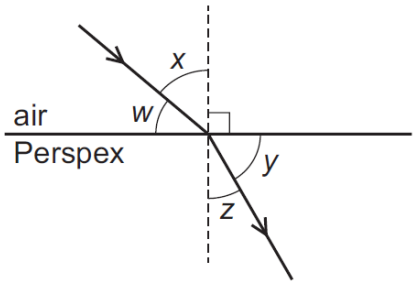
B frequency

C speed

D wavelength

9. Nov/2021/QPaper_22/No.19

The diagram shows how a ray of light refracts when going from air to Perspex.



The critical angle of Perspex is *c*.

Which expression is correct?

A $\frac{\sin x}{\sin z} = \sin c$

B $\frac{\sin z}{\sin x} = \sin c$

C $\frac{\sin w}{\sin y} = \sin c$

D $\frac{\sin y}{\sin w} = \sin c$

10. Nov/2021/QPaper_23/No.19

A ray of light travels from air into a glass block.

	in air	in glass
speed of ray	v_a	v_g
wavelength of ray	λ_a	λ_g
frequency of ray	f_a	f_g

Three suggestions as to how the refractive index of glass n may be calculated are listed.

1 $n = \frac{v_a}{v_g}$

2 $n = \frac{\lambda_a}{\lambda_g}$

3 $n = \frac{f_a}{f_g}$

Which suggestions are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

11. Nov/2021/QPaper_32/No.9

(a) Fig. 9.1 shows a ray of light reflected by a plane mirror.

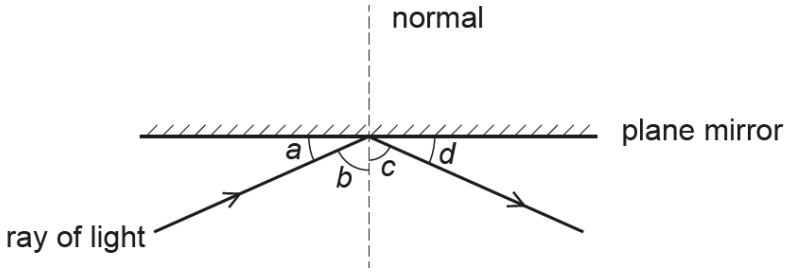


Fig. 9.1

(i) State which angle, *a*, *b*, *c* or *d*, is the angle of incidence. ..... [1]

(ii) State which angle, *a*, *b*, *c* or *d*, is the angle of reflection. ..... [1]

(b) Fig. 9.2 shows a road junction viewed from above. A plane mirror allows the drivers of the two cars A and B to see each other.

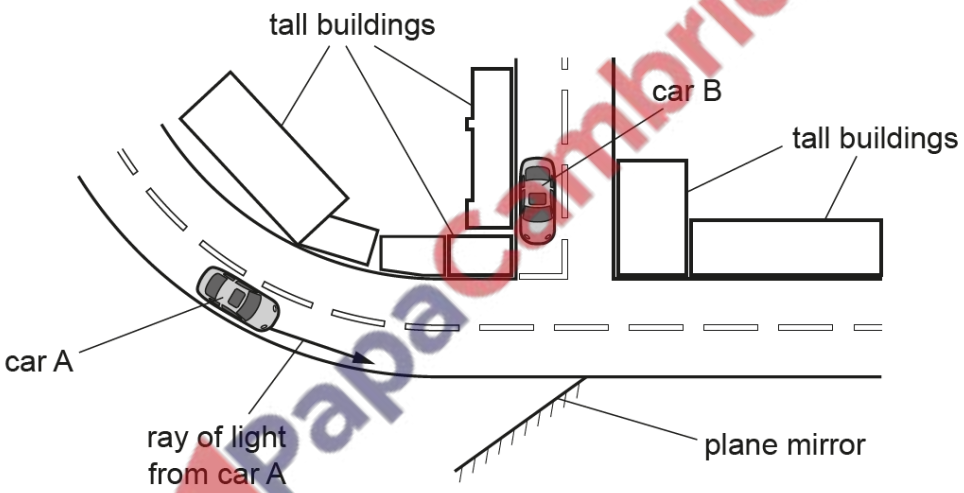


Fig. 9.2

Fig. 9.2 shows a ray of light from car A travelling towards the plane mirror.

On Fig. 9.2, carefully continue this ray to show how the driver of car B can see car A.

[2]

[Total: 4]

12. Nov/2021/QPaper_33/No.8

(a) The diagram in Fig. 8.1 shows a ray of light travelling from a glass block into air.

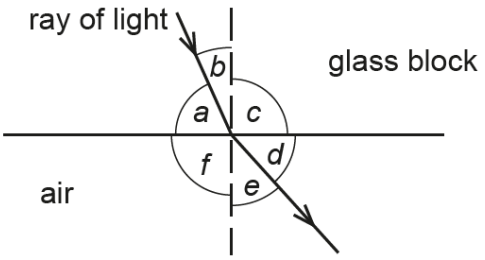


Fig. 8.1

(i) State the name for the dashed line shown in Fig. 8.1.

..... [1]

(ii) State the letter, *a*, *b*, *c*, *d*, *e* or *f*, which indicates the angle of incidence of the ray in Fig. 8.1.

..... [1]

(iii) State the letter, *a*, *b*, *c*, *d*, *e* or *f*, which indicates the angle of refraction of the ray in Fig. 8.1.

..... [1]

(b) The diagram in Fig. 8.2 shows an object and a thin converging lens.

Two rays are drawn from the object to the lens. The points marked F are the principal focuses of the lens.

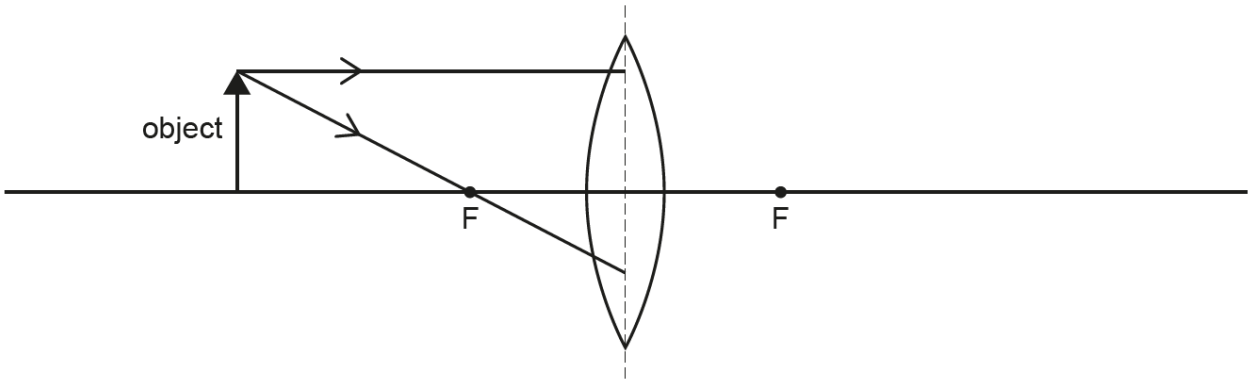


Fig. 8.2

(i) Continue the paths of the **two** rays in Fig. 8.2 to show how the lens forms an image of the object. [2]

(ii) On Fig. 8.2, draw an arrow to represent the image. [1]

(iii) Tick (✓) **two** rows to indicate the nature of the image formed by the lens in Fig. 8.2.

nature of image	tick
enlarged	
the same size	
diminished	
upright	
inverted	

[2]

[Total: 8]

13. Nov/2021/QPaper_41/No.5

(a) Explain, in terms of the behaviour of light rays, what is meant by *principal focus* for a thin converging lens.

.....

.....

..... [2]

(b) State what is meant by *focal length*.

.....

..... [1]

(c) A lens is used to produce a focused image of an object on a translucent screen. Fig. 5.1 shows the object O and its image I.

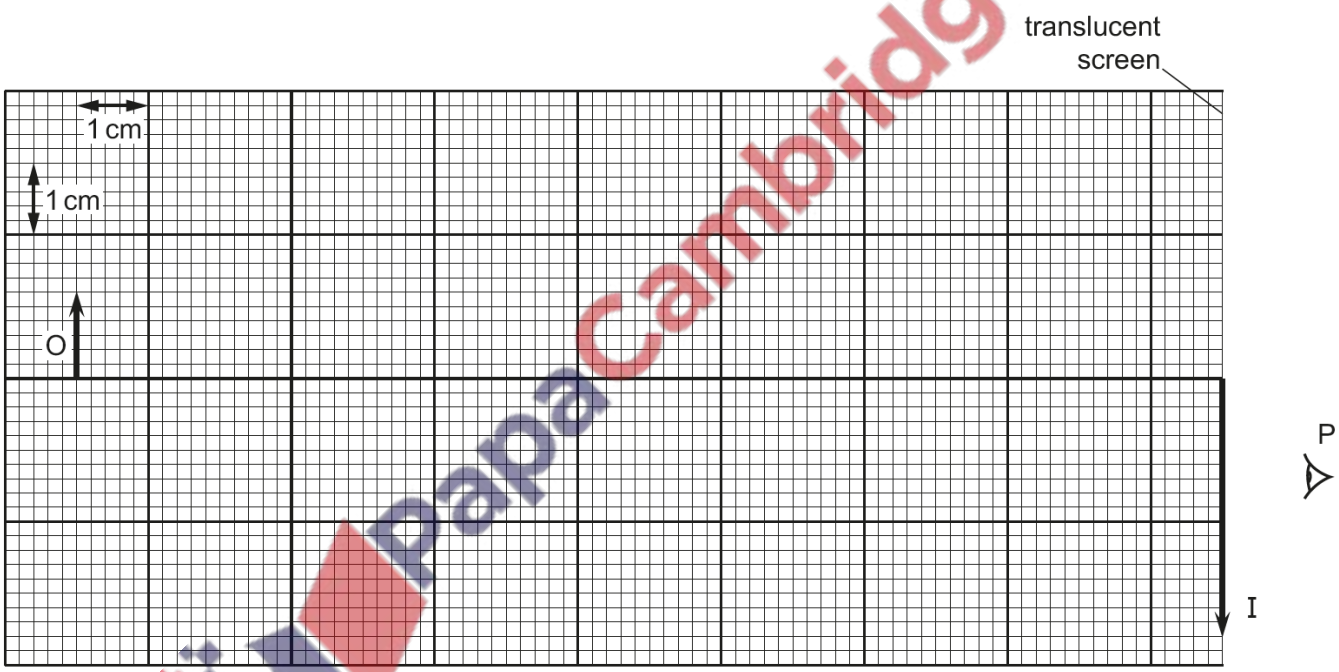


Fig. 5.1

(i) Consider the straight ray that passes from the tip of O to the tip of I and find the position of the lens. Mark the position of the lens by drawing a vertical line labelled L from the top of the grid to the bottom. [1]

(ii) On Fig. 5.1, draw a ray that passes through one of the principal focuses and determine the focal length of the lens.

focal length = ... [2]

(iii) Object O is a printed document that includes a large letter R on the side facing the lens. The top edge of the document corresponds to the tip of O. Fig. 5.2 shows the printed document.

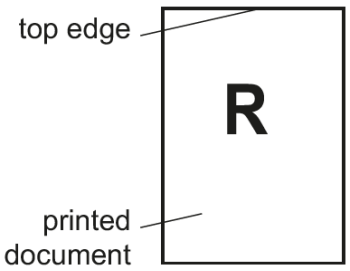


Fig. 5.2

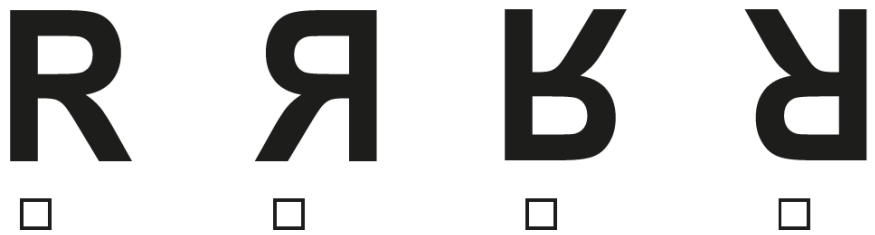


Fig. 5.3

On Fig. 5.3, mark a tick in **one** of the boxes (☑) to indicate how the image on the translucent screen appears to someone who is looking at the screen from point P. Explain why the image has this appearance.

.....

.....

..... [2]

[Total: 8]

14. Nov/2021/QPaper_42/No.7

Fig. 7.1 shows a ray of light approaching face AB of a glass prism of refractive index 1.5.

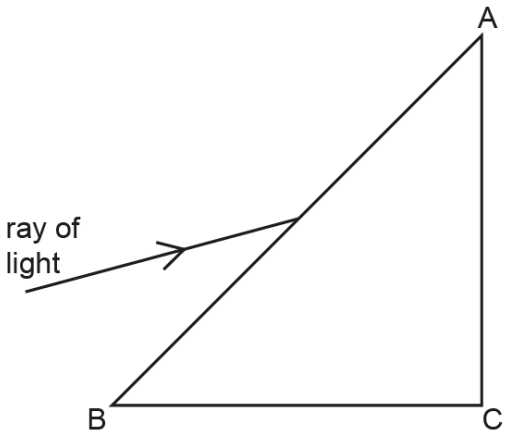


Fig. 7.1

(a) **(i)** On Fig. 7.1, accurately draw the path of the ray within the prism from face AB to face AC.
You will need to make a measurement from Fig. 7.1 and carry out a calculation.

[4]

(ii) Determine the angle of incidence of this ray when it strikes face AC.

angle = ... [1]

(b) Without further measurement or calculation, sketch on Fig. 7.1 the approximate path of the ray after passing through the face AC. [1]

(c) Fig. 7.2 shows a ray of light travelling within an optical fibre.

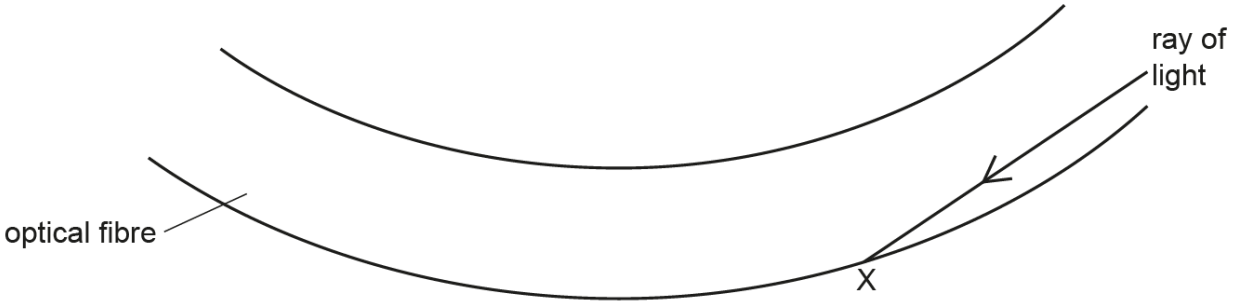


Fig. 7.2

(i) Complete the path of the ray of light to the left-hand end of the fibre. [2]

(ii) Name the process taking place at X. ..... [1]

[Total: 9]

15. Nov/2021/QPaper_43/No.7

(a) Fig. 7.1 shows a ray of green light emerging from one face of a glass prism.

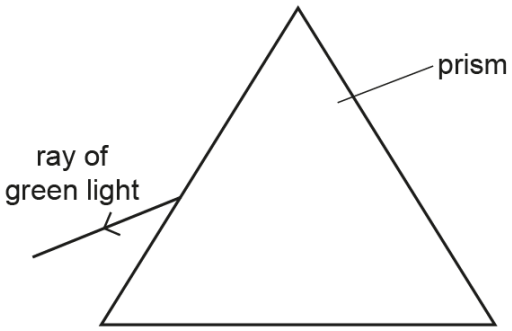


Fig. 7.1

(i) On Fig. 7.1, draw the path of the green light entering and passing through the prism. [2]

(ii) The green light is monochromatic. State, in terms of a **wave property**, what is meant by monochromatic light.

..... [1]

(b) **(i)** State the speed of light in air.

..... [1]

(ii) The wavelength of green light in air is 5.2×10^{-7} m.

Calculate the frequency of green light.

frequency = ... [2]

(iii) The refractive index of glass for green light is 1.52.

Calculate the speed of green light in glass.

speed = ... [2]

[Total: 8]