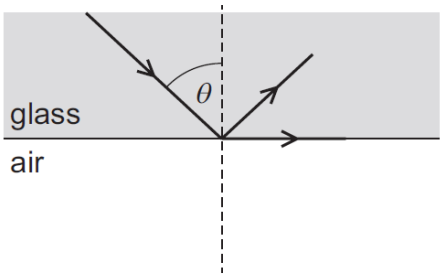
Light – 2021 IGCSE 0625

1. June/2021/Paper_11/No.23

The diagram shows a narrow beam of light incident on a glass-air boundary. Some of the light emerges along the surface of the glass and some is reflected back into the glass.



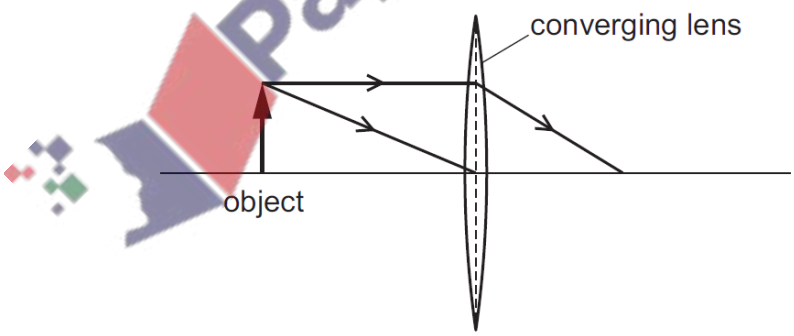
Which row is correct?

	this is an example of total internal reflection	angle θ is the critical angle
A	no	yes
B	no	no
C	yes	no
D	yes	yes

2. June/2021/Paper_11,12,13,21,22&23/No.24

An object is placed in front of a thin converging lens.

The diagram shows the paths of two rays from the top of the object.



An image of the object is formed on a screen to the right of the lens.

How does this image compare with the object?

A It is larger and inverted.

B It is larger and the same way up.

C It is smaller and inverted.

D It is smaller and the same way up.

3. June/2021/Paper_12&22/No.22,23

Which statement about the image of an object formed in a plane mirror is correct?

A It is smaller than the object.

B It is the same size as the object.

C It is larger than the object.

D It is inverted.

4. June/2021/Paper_12/No.24

The table shows information about different colours of light.

colour of light	frequency / Hz
violet	7.2×10^{14}
blue	6.3×10^{14}
yellow	5.2×10^{14}
red	4.5×10^{14}

Using the data, what is the frequency of orange light?

A 4.0×10^{14} Hz

B 5.0×10^{14} Hz

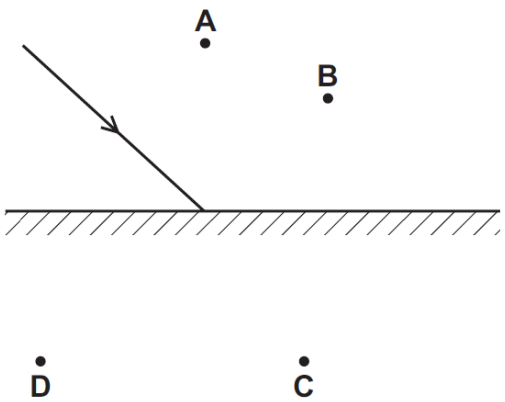
C 6.0×10^{14} Hz

D 7.0×10^{14} Hz

5. June/2021/Paper_13/No.23

The diagram shows a ray of light striking a plane mirror.

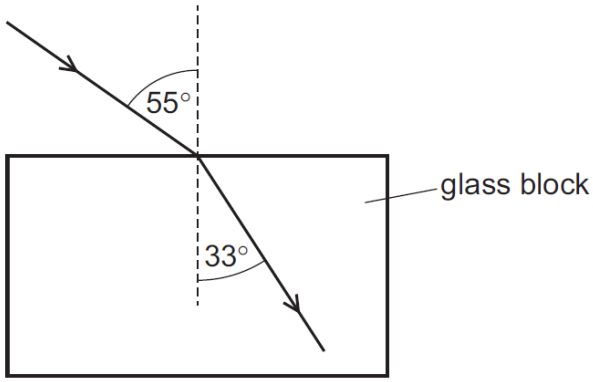
Through which point does the reflected ray pass?



6. June/2021/Paper_21,22&23/No.22

Light travelling at a speed of 3.0×10^8 m/s strikes the surface of a glass block and undergoes refraction as it enters the block.

The diagram shows a ray of this light before and after it enters the block.



What is the speed of light in the glass?

A 1.8×10^8 m/s

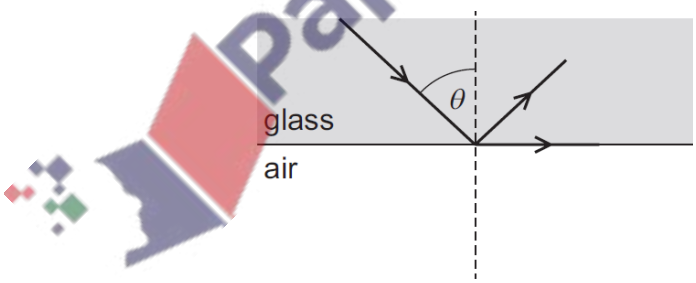
B 2.0×10^8 m/s

C 4.5×10^8 m/s

D 5.0×10^8 m/s

7. June/2021/Paper_21/No.23

The diagram shows a narrow beam of light incident on a glass-air boundary. Some of the light emerges along the surface of the glass and some is reflected back into the glass.



Which row is correct?

	this is an example of total internal reflection	angle θ is the critical angle
A	no	yes
B	no	no
C	yes	no
D	yes	yes

8. June/2021/Paper_23/No.23

A beam of light is monochromatic.

What does monochromatic mean?

A All the waves in the beam must have the same frequency only.

B All the waves in the beam must have the same amplitude only.

C All the waves in the beam must have the same speed only.

D All the waves in the beam must have the same amplitude, frequency and speed.

9. March/2021/Paper_12/No.22

What causes the change in direction when light travels from air into glass?

A The amplitude of the light changes.

B The colour of the light changes.

C The frequency of the light changes.

D The speed of the light changes.

10. March/2021/Paper_12/No.23

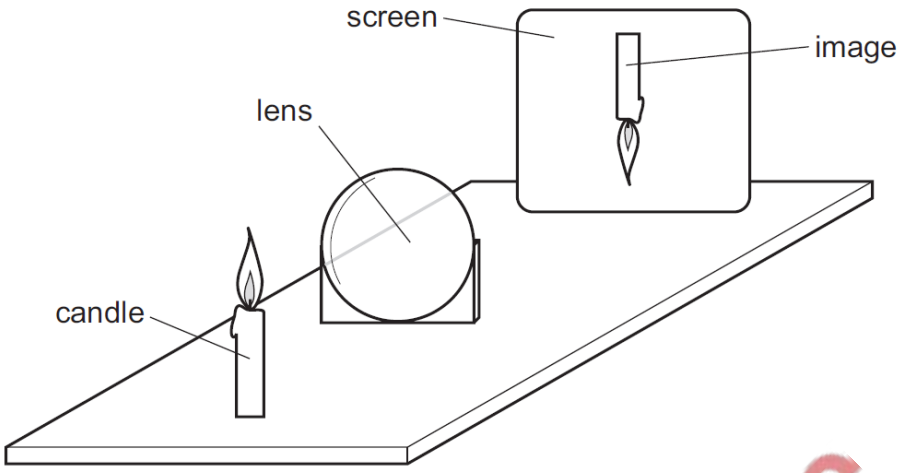
Light from a torch is incident on a plane mirror. The angle of incidence is 38°.

What is the angle of reflection?

A 38° **B** 52° **C** 76° **D** 142°

11. March/2021/Paper_12/No.24

A thin converging lens is used to produce a sharp image of a candle.



Various sharp images are produced on the screen by moving the lens and the screen backwards and forwards.

Which statement is **always** correct?

A The image is at the principal focus (focal point) of the lens.

B The image is bigger than the object.

C The image is closer to the lens than the object.

D The image is inverted.

12. March/2021/Paper_22/No.21

What causes the change in direction when light travels from air into glass?

A The amplitude of the light changes.

B The colour of the light changes.

C The frequency of the light changes.

D The speed of the light changes.

13. March/2021/Paper_22/No.22

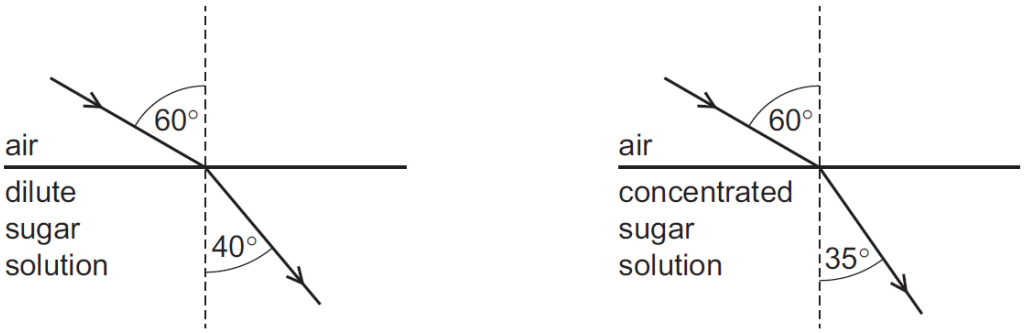
Light from a torch is incident on a plane mirror. The angle of incidence is 38°.

What is the angle of reflection?

A 38° **B** 52° **C** 76° **D** 142°

14. March/2021/Paper_22/No.23

Two rays with an angle of incidence of 60° pass into dilute and concentrated sugar-water solutions. The refractions are shown.

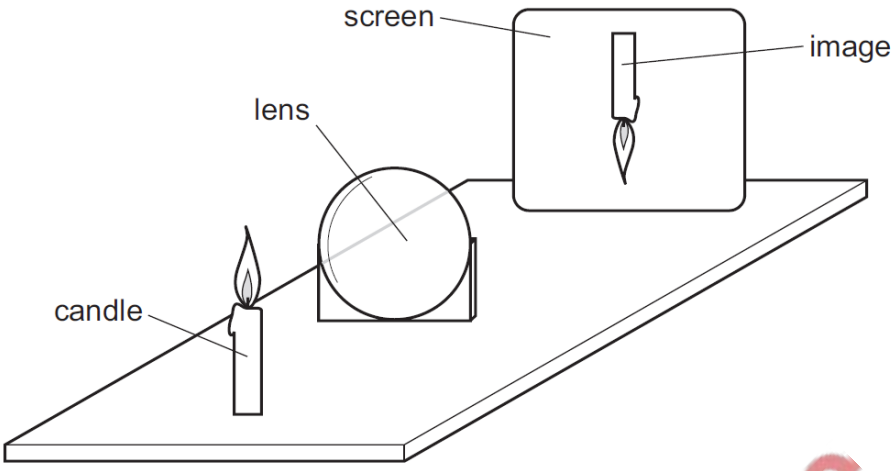


Which row is correct?

	refractive index as concentration increases	speed through solution as concentration increases
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

15. March/2021/Paper_22/No.24

A thin converging lens is used to produce a sharp image of a candle.



Various sharp images are produced on the screen by moving the lens and the screen backwards and forwards.

Which statement is **always** correct?

A The image is at the principal focus (focal point) of the lens.

B The image is bigger than the object.

C The image is closer to the lens than the object.

D The image is inverted.

16. June/2021/Paper_32/No.8

A student uses a semicircular glass block to investigate refraction.

(a) He shines a ray of red light into the block, as shown in Fig. 8.1.
X is the middle of the flat surface.

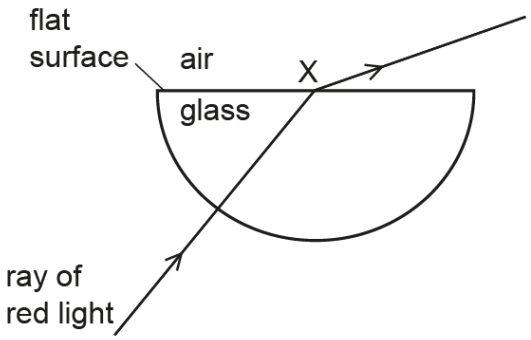


Fig. 8.1

(i) On Fig. 8.1, draw the normal where the ray meets the flat surface at X. [1]

(ii) On Fig. 8.1, label the angle of refraction. Use the letter R for the label. [1]

(iii) The student uses a semicircular glass block. State the name of **one** other piece of equipment that he needs for the investigation.

..... [1]

(b) Fig. 8.2 shows a ray of red light incident on the flat surface of the semicircular glass block.
The angle of incidence is greater than the critical angle for glass.

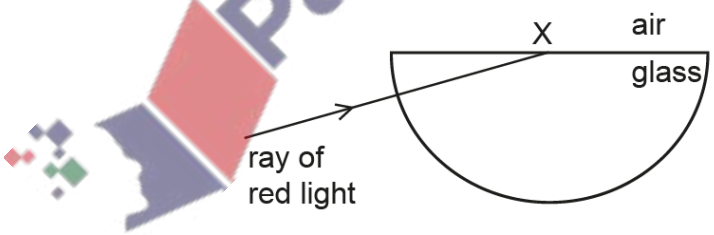


Fig. 8.2

On Fig. 8.2, draw the path of the ray after it strikes the flat surface. [2]

[Total: 5]

17. June/2021/Paper_33/No.8

(a) Fig. 8.1 shows a ray of light incident on a plane mirror.

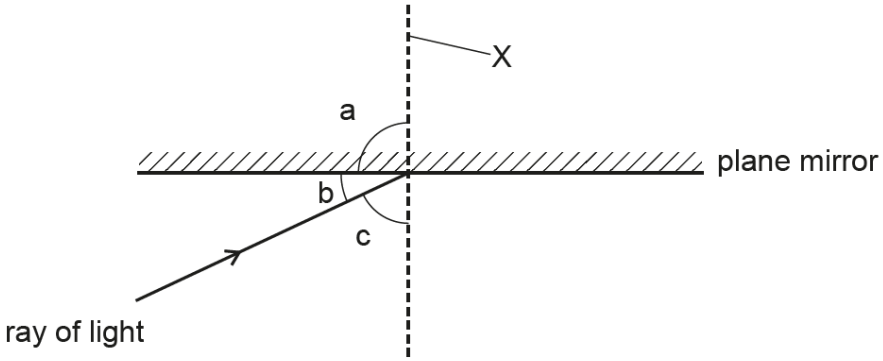


Fig. 8.1

(i) State which angle, a, b or c, is the angle of incidence.

angle of incidence = ... [1]

(ii) State the name of the line labelled X.

..... [1]

(iii) The mirror reflects the ray of light.

On Fig. 8.1, draw the reflected ray. [2]

(b) Fig. 8.2 shows a ray of red light travelling through a semicircular glass block.

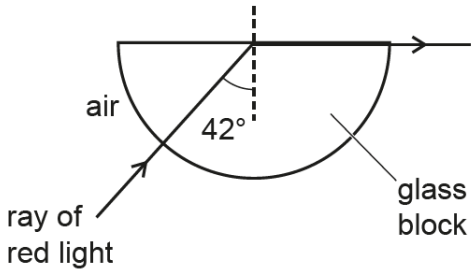


Fig. 8.2

(i) Fig. 8.3 shows another ray of red light entering the semicircular glass block at 60°.

Continue the path of this ray through the glass block and into the air.

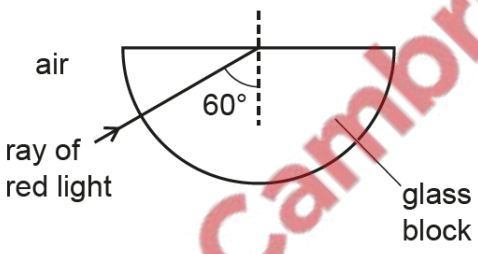


Fig. 8.3

[2]

(ii) Fig. 8.4 shows another ray of red light entering the semicircular glass block at 20°.

Continue the path of this ray through the glass block and into the air.

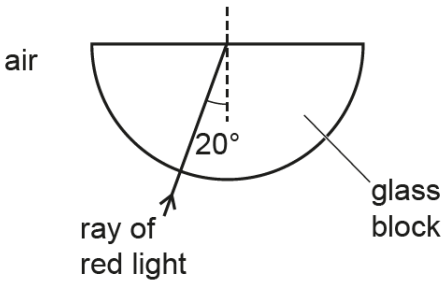


Fig. 8.4

[2]

[Total: 8]

18. June/2021/Paper_42/No.6

(a) Fig. 6.1 shows a ray of green light passing through a prism.

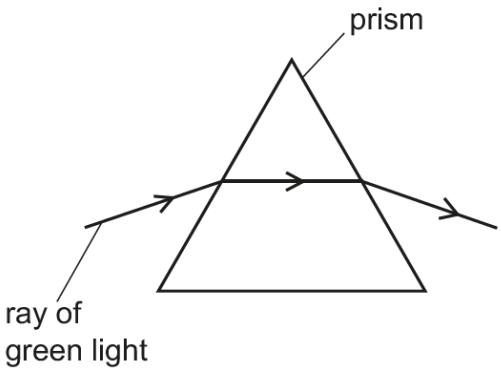


Fig. 6.1

A ray of blue light is directed towards the prism on the same path as the ray of green light.

On Fig. 6.1, draw the path of the blue light through and out of the prism. [3]

(b) The wavelength of the blue light in air is 4.8×10^{-7} m.

Calculate the frequency of the blue light.

frequency = ... [3]

[Total: 6]

19. June/2021/Paper_43/No.6

Fig. 6.1 is a full-scale diagram of a lens and an object O.

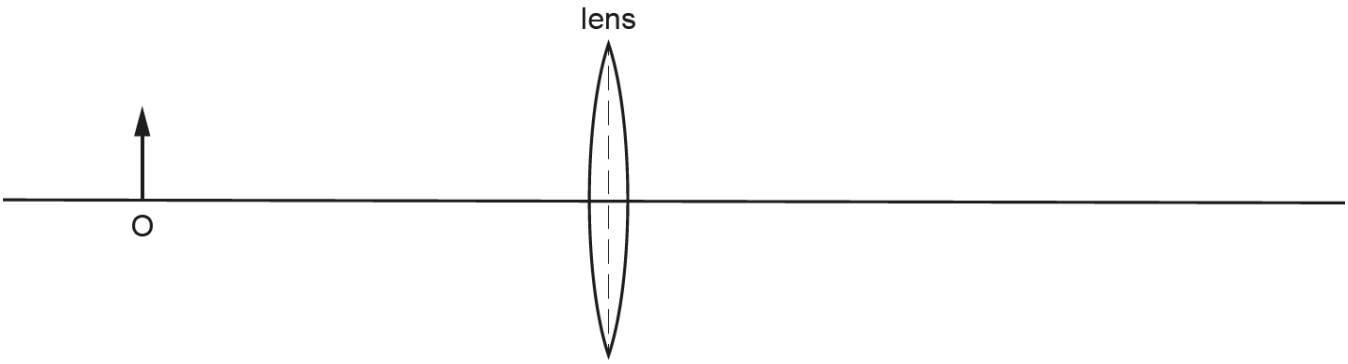


Fig. 6.1

(a) The focal length of the lens is 3.5 cm.

On Fig. 6.1, mark and label with the letter F the positions of the **two** principal focuses. [1]

(b) On Fig. 6.1, draw **three** rays to locate the image. Draw an arrow to represent the image and label the image I. [3]

(c) State **three** properties of the image I.

..... [2]

(d) A student incorrectly states that this lens is being used as a magnifying glass.

(i) State how the image produced by a magnifying glass is different from the image I.

..... [1]

(ii) The student moves the object O to a position P so that the lens shown in Fig. 6.1 acts as a magnifying glass.

On Fig. 6.1, mark a possible position for P. [1]

[Total: 8]

20. March/2021/Paper_32/No.6

Fig. 6.1 shows the path of a ray of red light through a glass block in air.

The critical angle for the red light as it travels from glass into air is 43°.

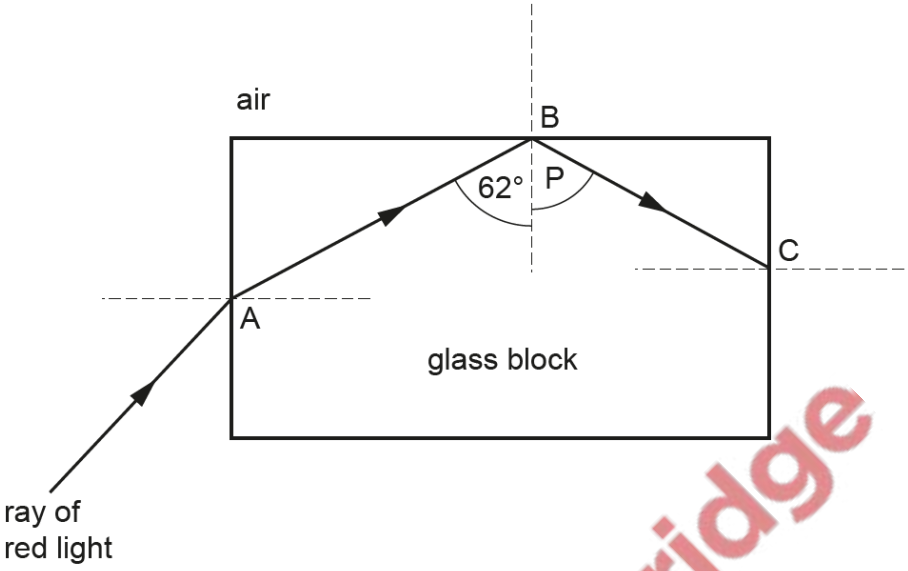


Fig. 6.1

(a) (i) On Fig. 6.1, label the angle of incidence at A. Use the letter X to label the angle. [1]

(ii) State the name of the process which occurs at A.

..... [1]

(iii) State the name given to the dashed line at A.

..... [1]

(b) (i) On Fig. 6.1, one of the angles at B is 62°. State the value of the angle labelled P.

..... [1]

(ii) State the name of the process which occurs at B.

..... [2]

(c) On Fig. 6.1, draw the path of the ray of red light as it travels from C into the air. [1]

[Total: 7]

21. March/2021/Paper_42/No.6

(a) Fig. 6.1 is a full scale diagram showing a converging lens, the two principal focuses F_1 and F_2 and an object PO.

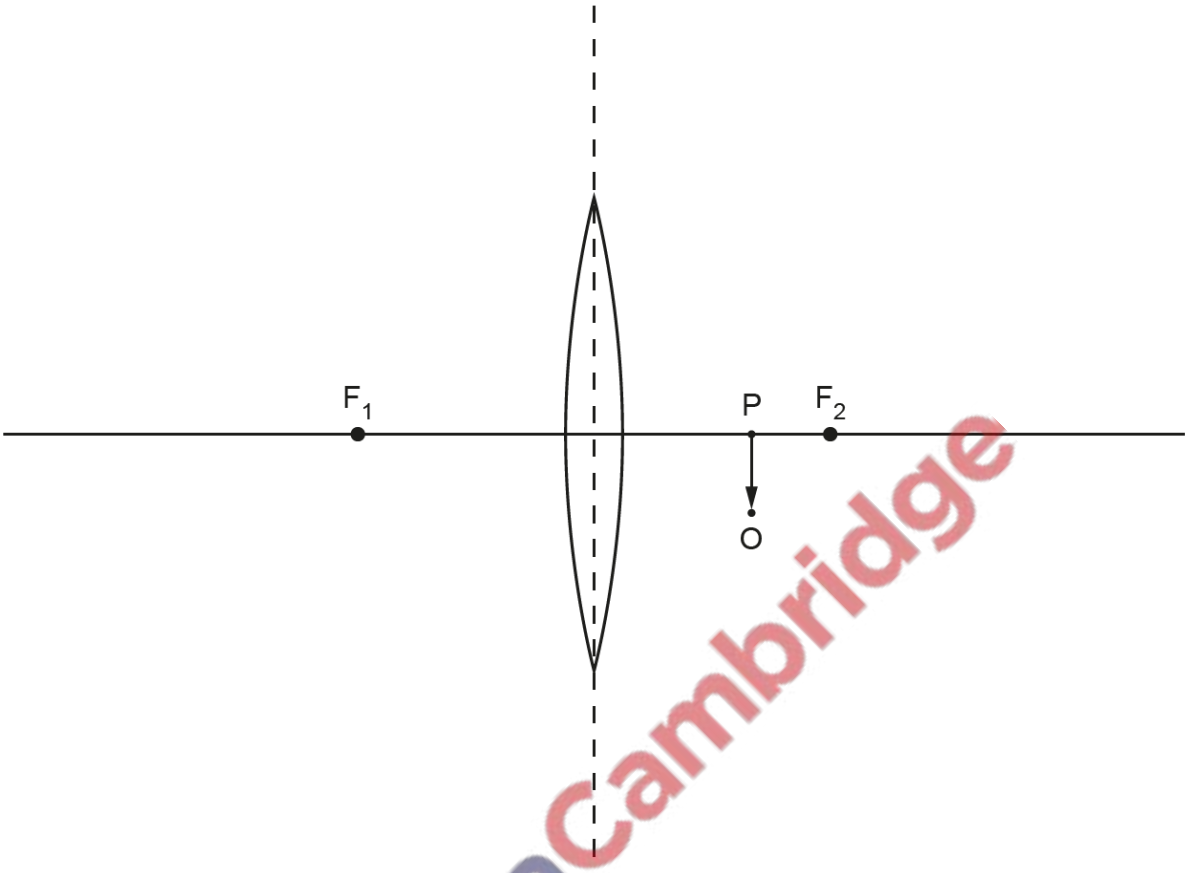


Fig. 6.1

On Fig. 6.1, draw two rays from point O of the object to determine the position of the image. Label the image IJ. Measure the length of the image.

image length = ... [3]

(b) Ring **three** descriptions of the image.

diminished **magnified** **real** **same size**

same way up as object **upside down compared to object** **virtual** [3]

(c) Fig. 6.2 shows three rays of green light passing through glass blocks.

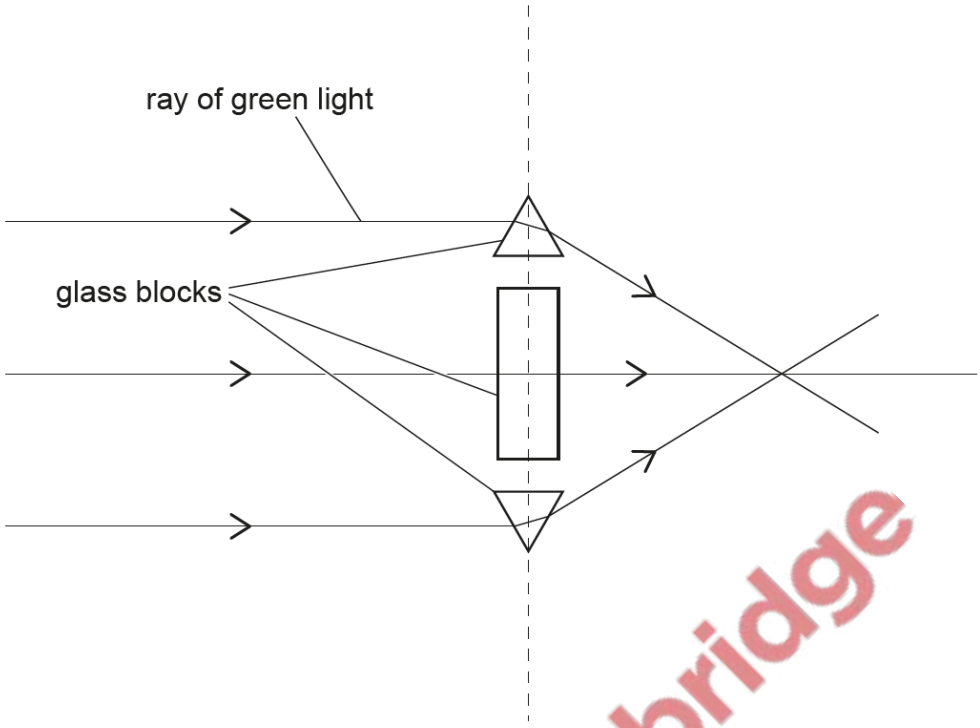


Fig. 6.2

Three rays of red light approach the glass blocks on the same paths as the rays of green light.

On Fig. 6.2, draw the paths of these rays of red light to the right of the glass blocks. [2]

[Total: 8]