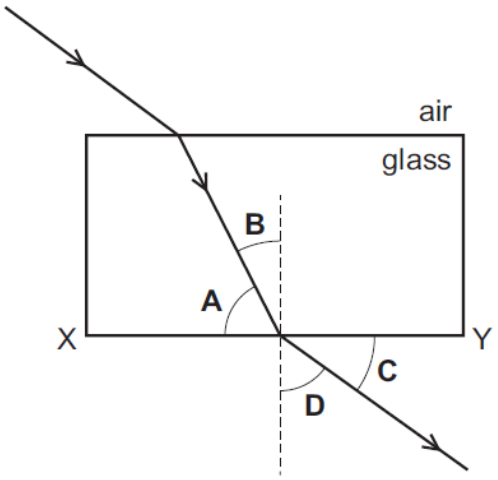
Light – 2021 O Level 5054

1. Nov/2021/Paper_11/No.20

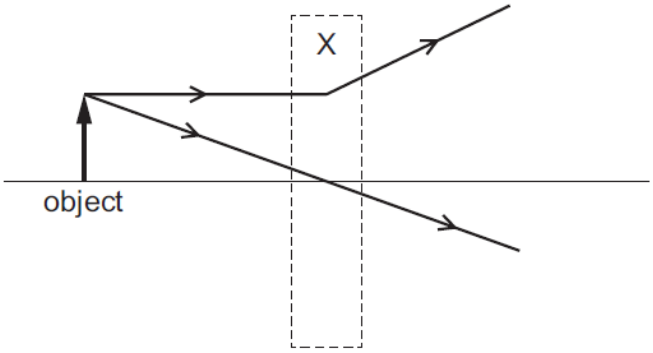
A ray of light passes into a glass block. It travels through the glass block and then emerges into the air.

Which angle is the angle of refraction at the surface XY?



2. Nov/2021/Paper_11/No.21

Two rays of light pass through a lens in region X.



Which type of lens is in region X and which type of image is formed?

	type of lens	type of image
A	converging	real
B	converging	virtual
C	diverging	real
D	diverging	virtual

3. Nov/2021/Paper_11/No.22

A girl is long-sighted.

Which statement is correct?

A She sees close objects less clearly than a person with normal vision.

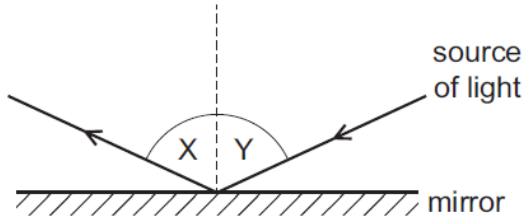
B She sees distant objects more clearly than a person with normal vision.

C The fault is corrected with a diverging lens.

D The image of a close object is formed in front of her retina.

4. Nov/2021/Paper_12/No.23

Light reflects from a plane mirror as shown.

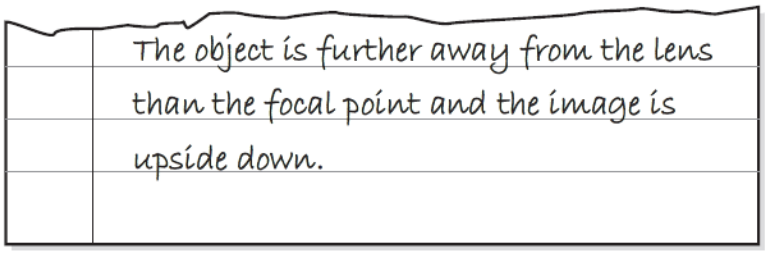


Which row is always correct?

	symbol of angle X	relationship between X and Y
A	*i*	X = Y
B	*i*	X + Y = 90°
C	*r*	X = Y
D	*r*	X + Y = 90°

5. Nov/2021/Paper_12/No.24

A piece of paper torn from an exercise book is shown.



Which process is being described?

A the formation of a virtual image by a diverging lens

B the formation of a virtual image by a converging lens

C the formation of a real image by a diverging lens

D the formation of a real image by a converging lens

6. Nov/2021/Paper_12/No.25

A girl is long-sighted.

Which statement is correct?

A She sees close objects less clearly than a person with normal vision.

B She sees distant objects more clearly than a person with normal vision.

C The fault is corrected with a diverging lens.

D The image of a close object is formed in front of her retina.

7. Nov/2021/Paper_22/No.3

Fig. 3.1 shows light entering a transparent block.

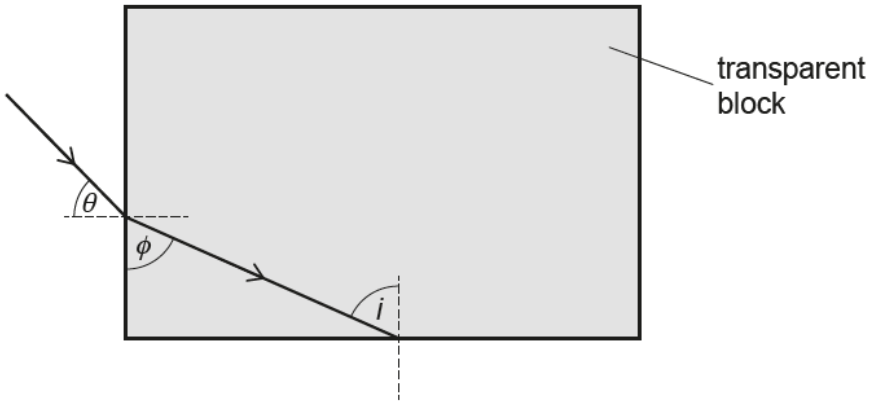


Fig. 3.1 (not to scale)

The light enters the block at an angle θ to the normal and travels through the block until it meets the bottom surface.

The angle between the ray in the block and the vertical side of the block is ϕ.

(a) Light travels more slowly in the block than in air.

(i) Explain how Fig. 3.1 shows this.

.....

.....

..... [2]

(ii) State what happens to the wavelength of the light and what happens to the frequency of the light as it enters the block.

wavelength .....

frequency .....

[2]

(b) The refractive index of the transparent material is 1.6. Angle θ is 45°.

(i) Determine angle ϕ.

ϕ = ... [3]

(ii) The angle of incidence i at the bottom surface is equal to ϕ and the critical angle for the material of the block in air is 39°.

Explain what happens to the light after it meets the bottom surface.

.....

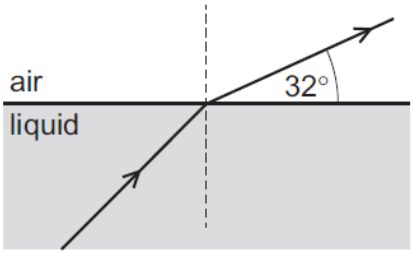
.....

..... [2]

[Total: 9]

8. June/2021/Paper_11/No.21

Light refracts from a liquid into air as shown.



not to scale

The refractive index for light moving from air to the liquid is 1.4.

What is the angle of incidence in the liquid?

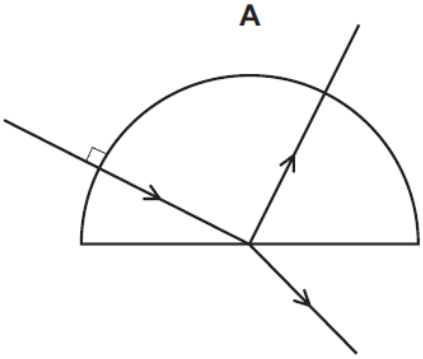
A 22° **B** 37° **C** 41° **D** 45°

9. June/2021/Paper_11/No.22

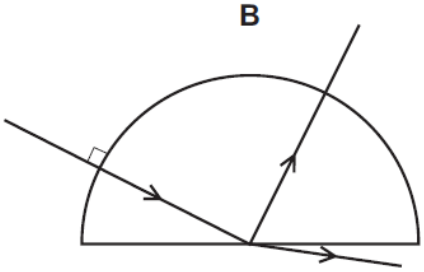
A ray of red light in air enters a semi-circular block.

Which diagram shows the partial reflection and the refraction of the ray?

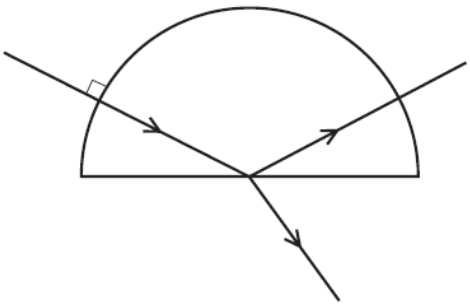
A



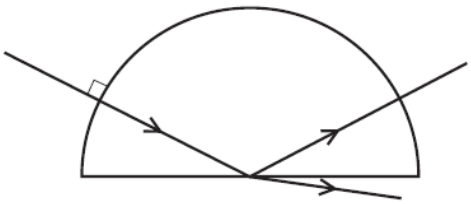
B



C



D



10. June/2021/Paper_11/No.23

Which statement about human vision is correct?

A In a normal eye, the image on the retina is magnified and upright.

B In a long-sighted eye, distant objects form images in front of the retina.

C Short-sighted eyes produce only virtual images.

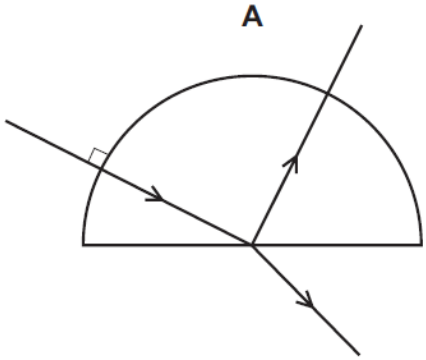
D Short-sight is corrected by the use of a diverging lens.

11. June/2021/Paper_12/No.24

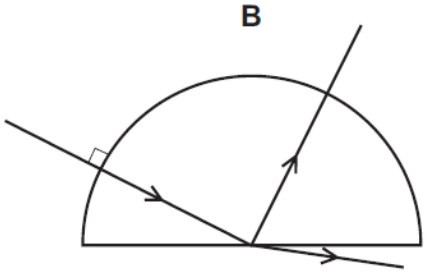
A ray of red light in air enters a semi-circular block.

Which diagram shows the partial reflection and the refraction of the ray?

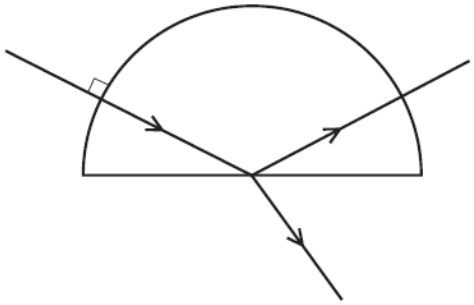
A



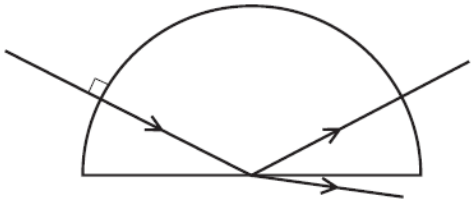
B



C



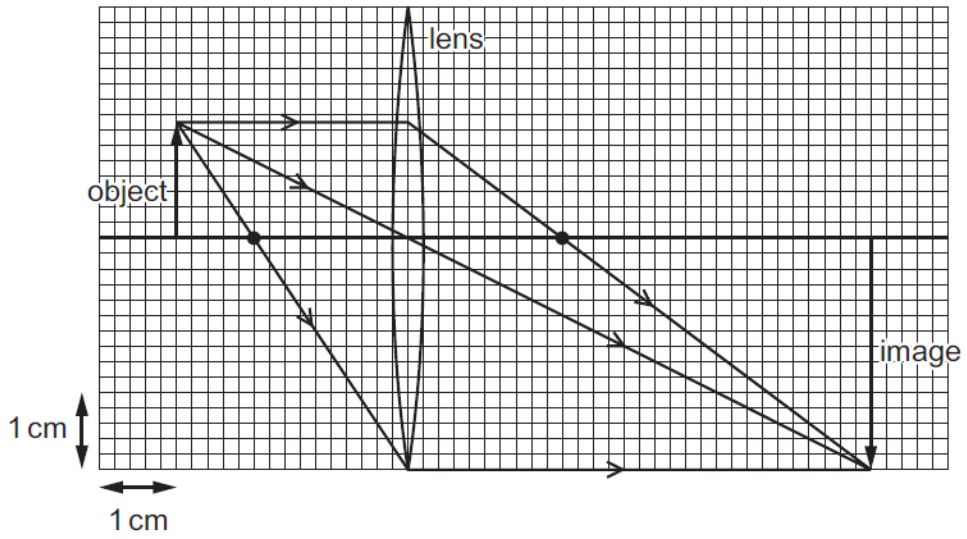
D



12. June/2021/Paper_12/No.25

An object of height 1.5 cm is placed in front of a converging lens of focal length 2.0 cm.

The arrangement is shown on the full-scale ray diagram.



What is the linear magnification produced by the lens?

A 2.0 **B** 3.0 **C** 4.0 **D** 6.0

13. June/2021/Paper_12/No.26

In which optical instrument is the distance between the object and the lens less than the focal length of the lens?

A camera

B magnifying glass

C photographic enlarger

D projector

14. June/2021/Paper_21/No.5

Fig. 5.1 shows part of the ray diagram of a lens being used as a magnifying glass.

Three rays are shown coming from the top of an object O.

The points labelled F are one focal length from the lens.

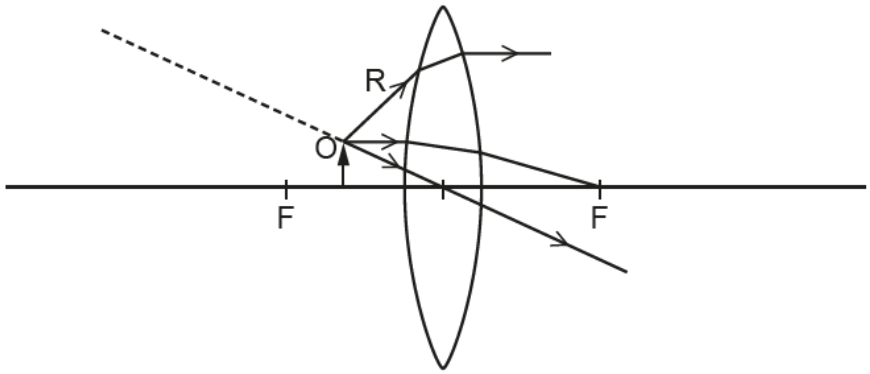


Fig. 5.1

(a) State the name of the type of lens shown in Fig. 5.1.

..... [1]

(b) Describe what happens to the ray of light R:

• as it enters the lens .....

.....

• as it leaves the lens. .....

.....

[2]

(c) Using all three rays from O, complete Fig. 5.1 to show the image formed. [2]

(d) Underline **all** of the words in the list that describe the image formed in **(c)**.

inverted upright real virtual

[1]

[Total: 6]