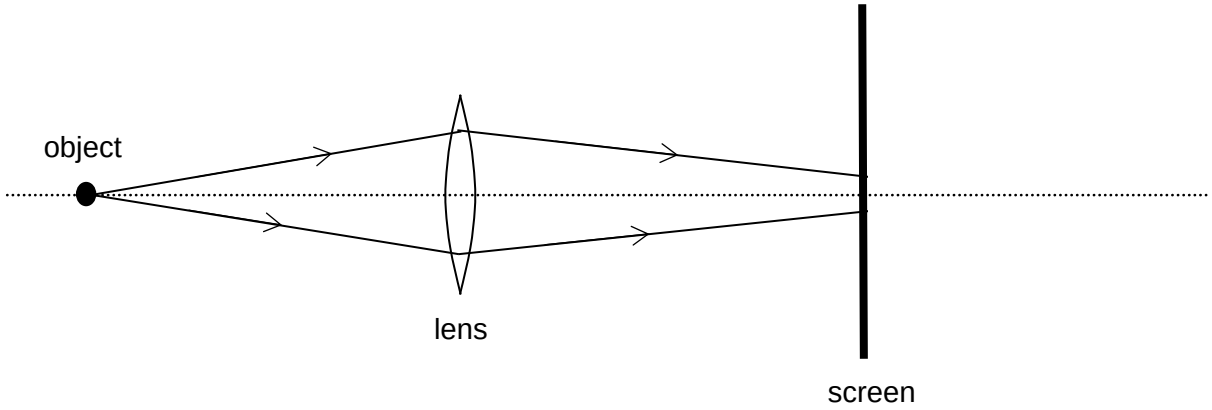
Questions on Lenses

1 The diagram shows a lens forming a blurred image of an object on a screen.

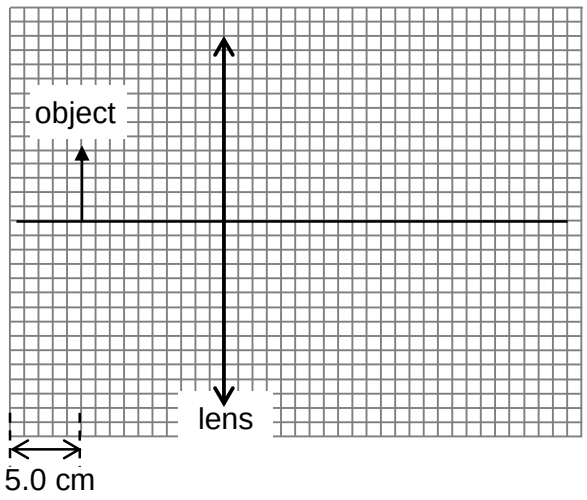


How can a sharp image be obtained on the screen?

A By moving the object towards the lens and screen.
B By moving the screen towards the lens and object.
C By using a lens of shorter focal length.
D By using a lens of longer focal length.

2016S4MYEP1Q6

2 The scaled diagram shows an object and a convex lens used to produce a real image. The magnification of the real image is 1.5.



What is the focal length of the convex lens?

A 4.0 cm
B 6.0 cm
C 8.0 cm
D 10.0 cm

2016S4MYEP1Q7

3 We can see things in the world because there is a converging lens system in our eyes.

Which of the following describe(s) the nature of the image formed on in our eye when we are looking at a distant object?

(1) real
(2) upright
(3) diminished

A (1) only
B (2) only
C (1) and (2) only
D (1) and (3) only

2016S4MYEP1Q8

4 An image is formed of an object placed 24.0 cm from a converging lens of focal length 8.0 cm.

Which statement is true?

A The image is magnified.
B The image is virtual.
C The image is 10.0 cm from the lens.
D The magnification is 0.50.

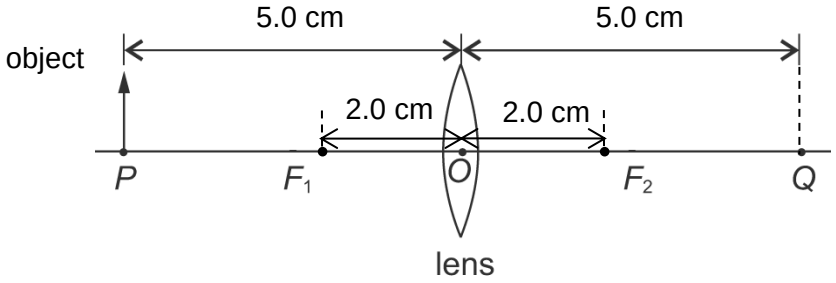
2016S4MYEP1Q9

5 A converging lens is used to produce an image that is 3 times the size of its object. If the distance between the object and the image is 40.0 cm, what is the focal length of the lens?

A 7.5 cm **B** 10 cm **C** 13 cm **D** 15 cm

2017S4EOYP1Q14

6 The diagram shows an object at *P* placed 5.0 cm away from a converging lens which has a focal length of 2.0 cm. The points F_1 and F_2 are the principal foci of the lens.



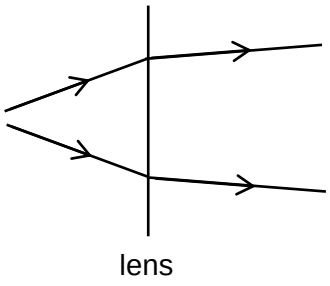
At which point will the image of the object at *P* be formed by the lens?

A at F_2
B between *O* and F_2
C between F_2 and *Q*
D at *Q*

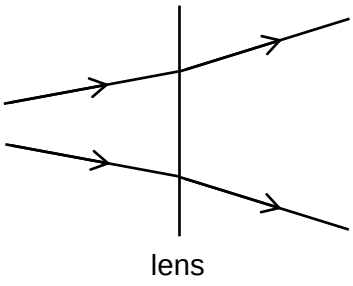
2019S4MYEP1Q8

7 Which diagram shows rays of light passing through a converging lens?

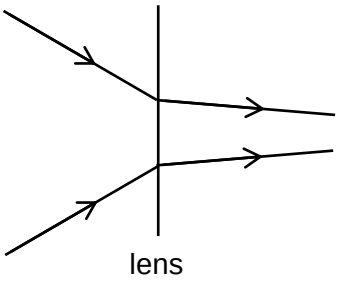
A



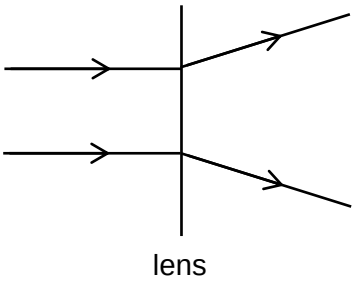
B



C



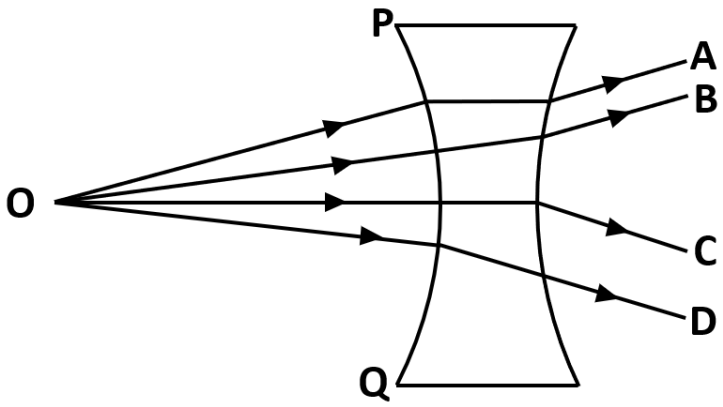
D



2018S4MYEP1Q5

8 The diagram below shows a symmetrical glass block with 4 rays entering surface PQ from point O. Surface PQ is part of a circle with its centre at O.
Point O is on the principal axis.

Which ray follows the correct path?



2020S4WA1Q5

9 A student uses a converging lens to produce an enlarged virtual image. The focal length of the lens is 15 cm.
What is a suitable distance between the object and the lens?

A 12 cm
B 15 cm
C 22 cm
D 30 cm

2020S4WA1Q6

10 A slide 5.0 cm by 3.0 cm is placed 10.0 cm from a convex lens. A clear image is formed on a screen 1.0 m away from the slide. What is the size of the image on the screen?

A 4.5 cm by 2.7 cm
B 5.6 cm by 3.3 cm
C 45 cm by 27 cm
D 50 cm by 30 cm

2020S4WA1Q8

11 An object O is placed in front of a thin converging lens of focal point F and a ray X is reflected off the object as shown in Fig 3.1.

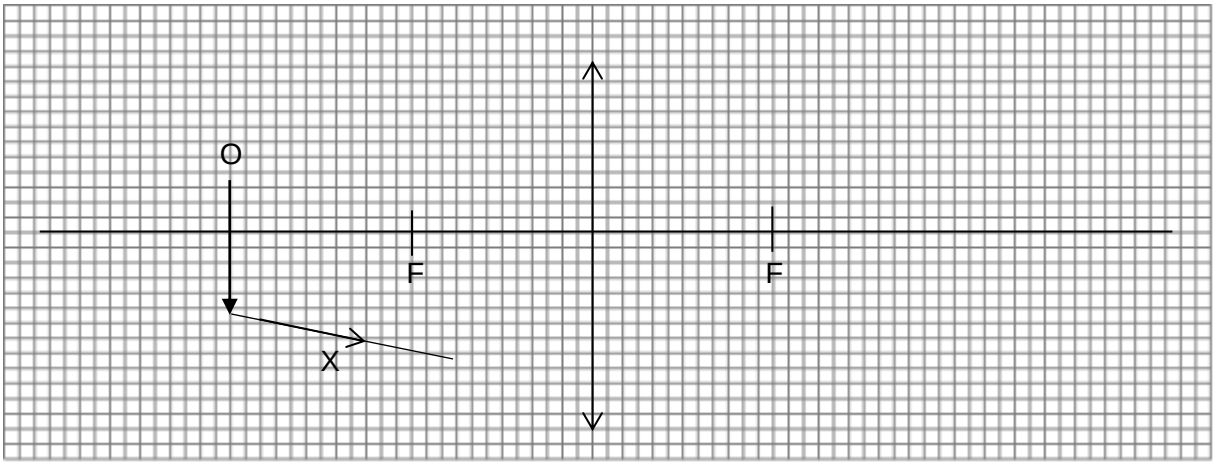


Fig. 3.1

(a) Draw rays to locate the complete image of O formed by the converging lens. Label the image as I. [3]

(b) Complete the path of the ray X. [1]

(c) Describe the characteristics of the image formed.

……[1]

(d) Name an application for such an arrangement.

……..... [1]

(e) The object is moved slightly nearer to the lens, state what will happen to the size of the image.

…….. [1]

2017S4MYEP2Q3

12 Fig. 3.1 shows the path of a ray as it leaves object O and passes through a convex lens L.

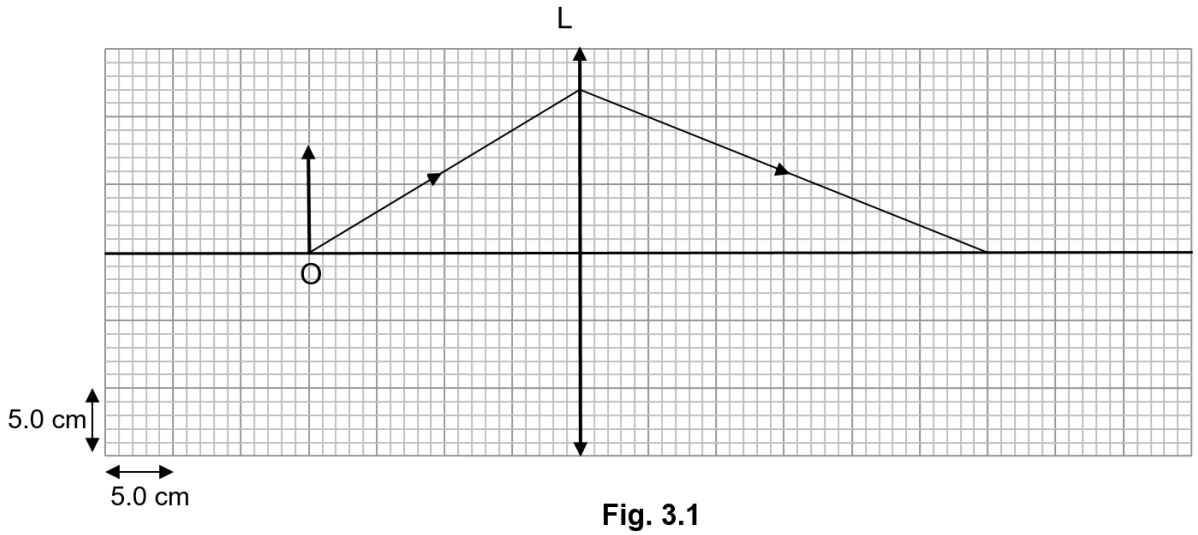


Fig. 3.1

1.0 cm on the grid represents 5.0 cm.

(a) Draw necessary ray(s) on the diagram to locate the image. Label clearly the image formed, **I**. [1]

(b) Determine the focal length of the lens.

focal length = …….. [2]

(c) Describe three characteristics of image **I**.

……..…… [1]

2019S4MYEP2Q3

Answers

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
C	B	D	D	A	C	A	B	A	C

Q11a)

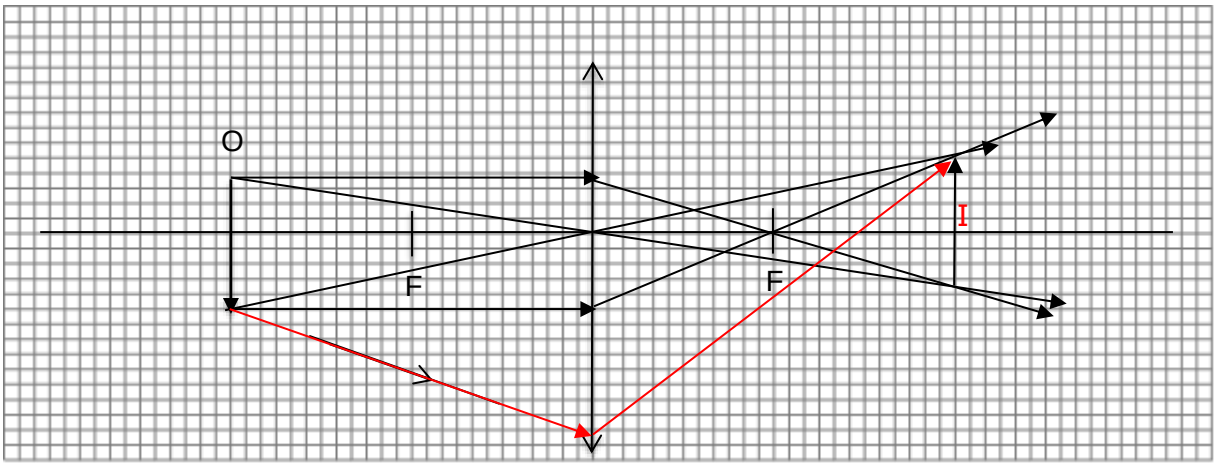


Fig. 3.1

Image located with 4 rays (2 solid rays with arrows from each end of the object)

Image is labelled as I (correct orientation), located at 2F and has same size as object.

Q11b) Completion of the given ray X. (ray must reach tip of image arrow)

Q11c) Image formed is inverted, real and of the same size as object. (all three must be correct to earn the mark)

Q11d) Photocopier

Q11e) Image will be enlarged

Q12(a) Correct position and orientation of image shown on diagram with <u>light ray clearly indicated</u>.

Q12(b) Appropriate construction lines shown on the diagram.
Focal length = 2.4 cm x 5.0 cm per cm = 12.0 cm
(f or F must be indicated in the diagram)

OR correct use of lens formula
1/f = 1/20.0 cm + 1/30.0 cm f = 60.0 cm / 5 = 12.0 cm

Q12(c) Inverted, enlarged and real