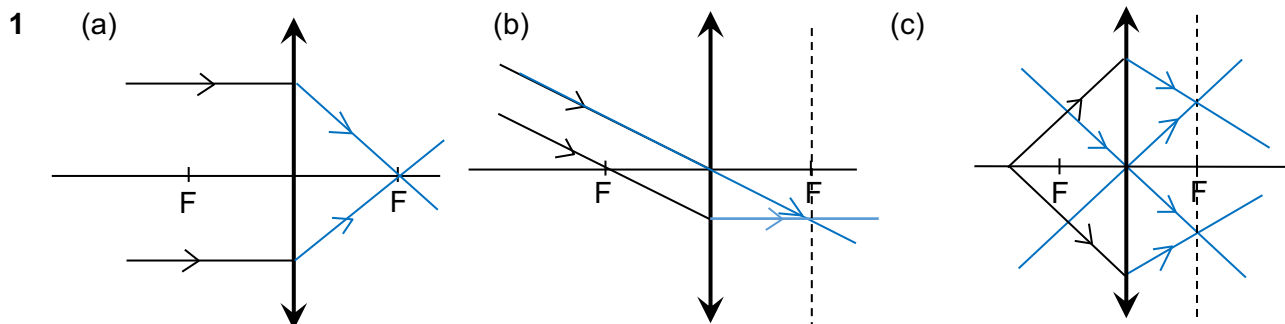
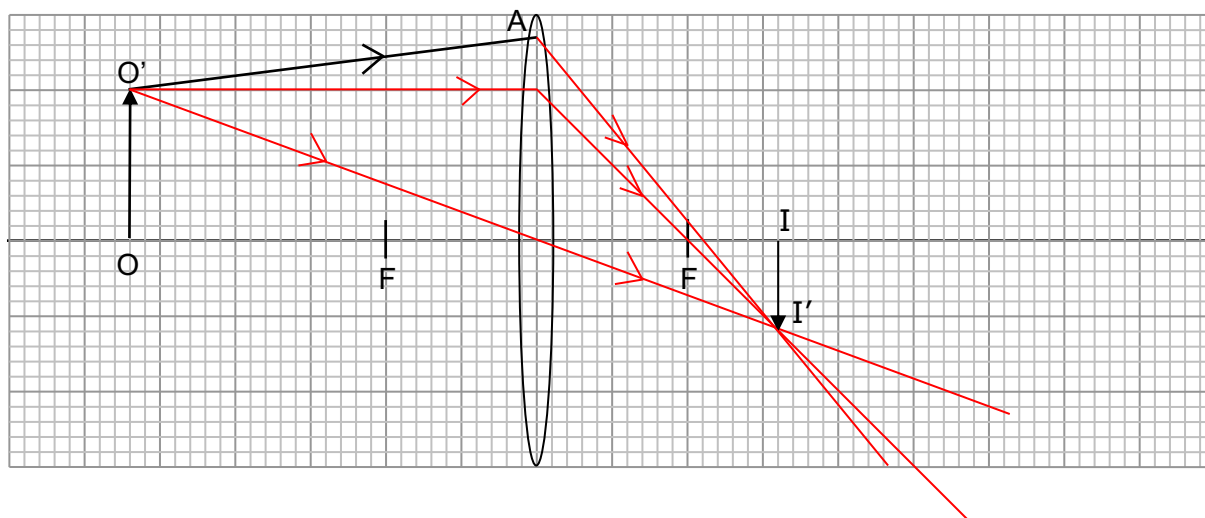




2023 Sec 3 Physics Assignment Answers Assignment 4 Lenses



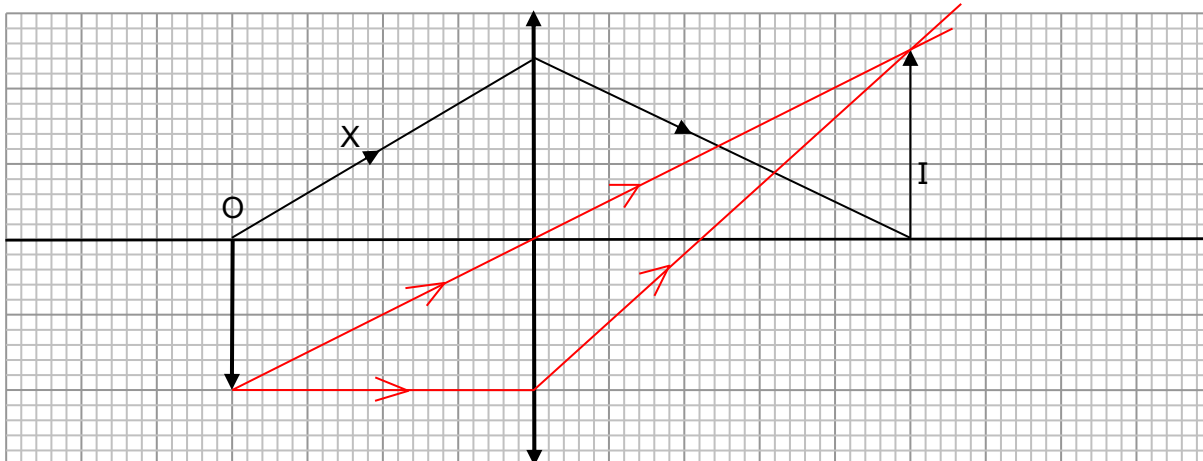
- 2 The scaled diagram below shows a converging lens used in a camera to form an image of the object OO' .



Given that 1.0 cm represents 0.5 cm,

- (a) Draw rays from O' to locate its image I' .
- (b) Complete the path of the ray $O'A$ to the image I' and draw and label the image II' of the object OO' on the diagram.
- (c)
- (i) Size of image = $1.2 \text{ cm} \times 0.5 = \underline{0.6 \pm 0.1 \text{ cm}}$
- (ii) image distance = $3.2 \text{ cm} \times 0.5 = \underline{1.6 \pm 0.1 \text{ cm}}$

- 3 The diagram shows the path of a ray X from an object O as it passes through convex lens.



(a) Given that 1.0 cm represents 4.0 cm, draw necessary ray(s) on the diagram to:

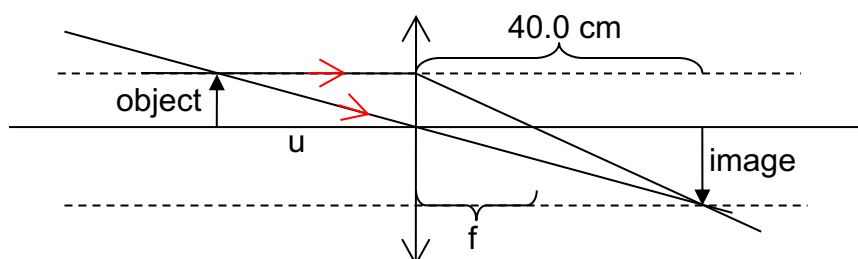
(i) locate and draw the image. Label clearly the image formed, I.

(ii) Focal length = $2.2 \text{ cm} \times 4.0$
= 8.8 cm

(b) Real, inverted, magnified

- 4 A real image of linear magnification of 1.5 is formed 40.0 cm from the centre a thin converging lens when an object is placed in front of the lens.

(a) Sketch and label a ray diagram to show clearly the above arrangement.



Note: given the lens and image, draw standard rays (in reverse direction) to locate and draw the object.

(b) Based on the ray diagram in (a), calculate

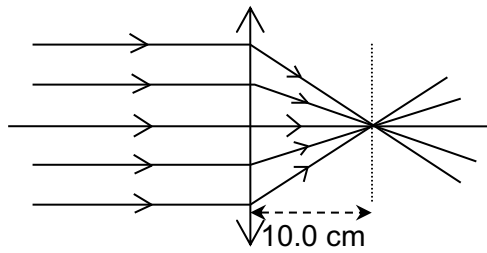
Magnification $m = h_i / h_o = v / u$

(i) $1.5 h/h = 40.0/u$
 $u = \underline{26.7 \text{ cm}}$

(ii) $1.5h/h = (40.0-f)/f$
 $f = \underline{16.0 \text{ cm}}$

- 5 (a) It means that rays parallel to the principal axis will meet 10.0 cm away from the centre of the lens measured along the principal axis.

diagram



(i) $\frac{1}{10.0} = \frac{1}{12.5} + \frac{1}{v}$
 $v = 50.0 \text{ cm}$

(ii) Magnification = $h_i / h_o = v / u$

$$H = 25 \times (50.0/12.5)$$
$$= 100 \text{ mm}$$