

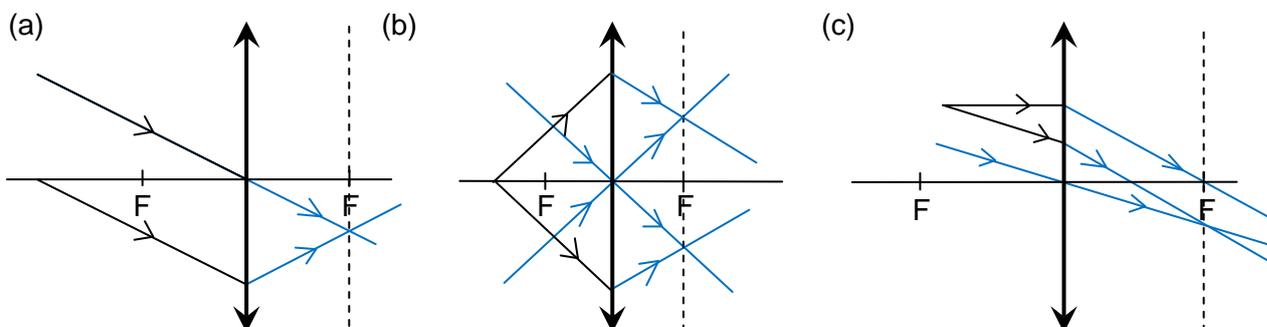


2020 Sec 4 Physics Assignment Answers  
AS9.1 Lenses

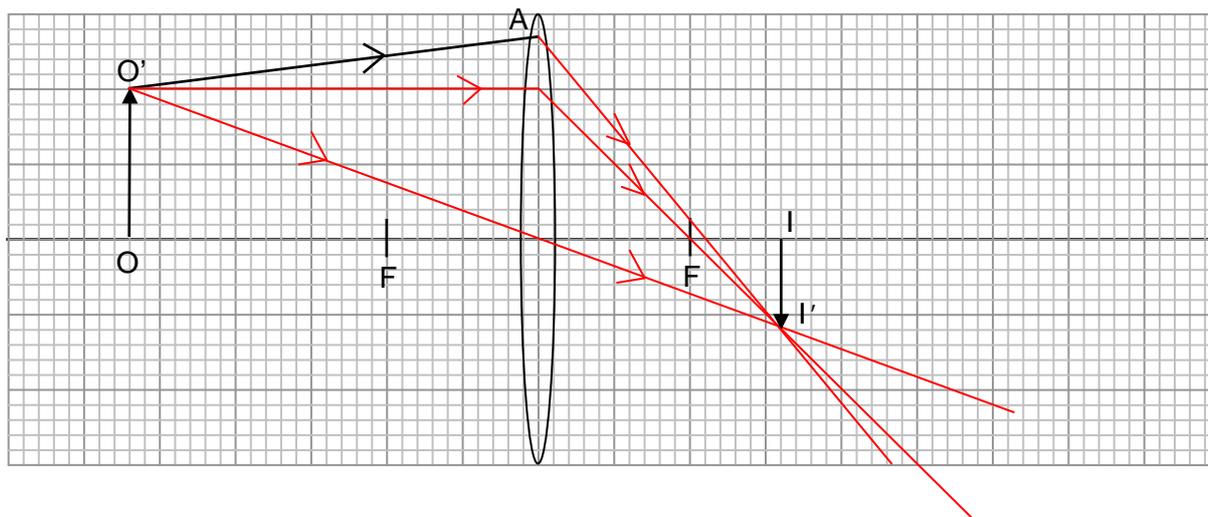
Total = 20

1 Each diagram 1 mark

[3]



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,

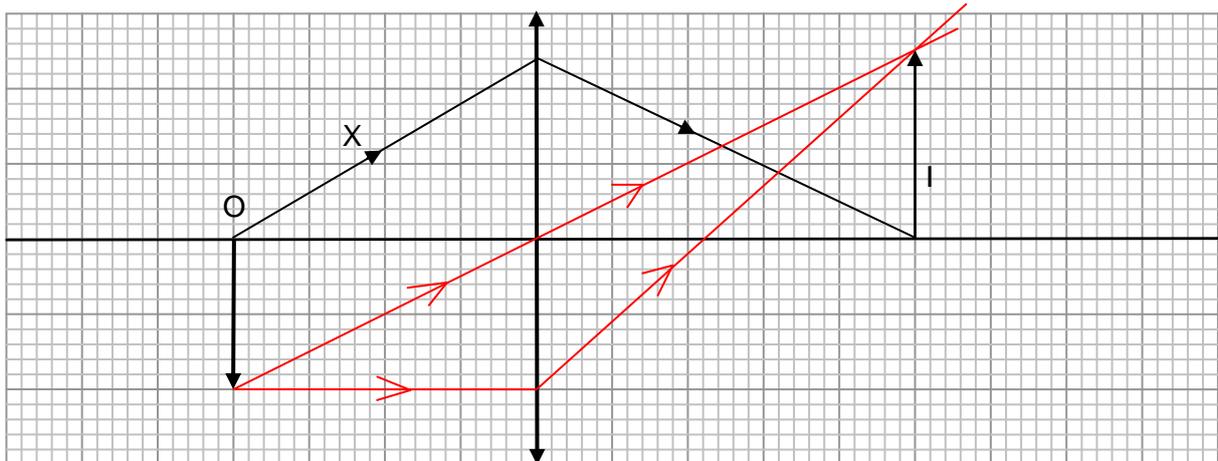
(a) Draw rays from O' to locate its image I'. [2]

(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. [1]

(c) (i) Size of image = 1.2 cm x 0.5 = 0.6 ± 0.1 cm [1]

(ii) image distance = 3.2 cm x 0.5 = 1.6 ± 0.1 cm [1]

- 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:

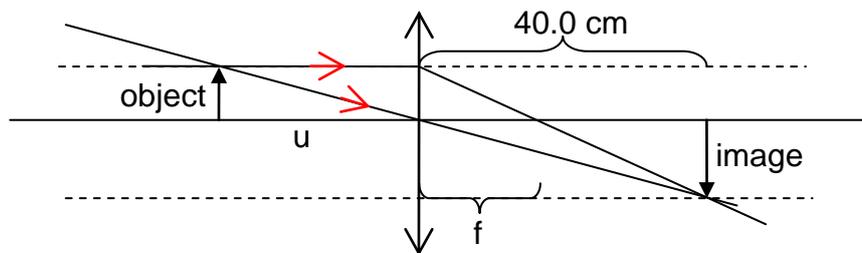
(i) locate and draw the image. Label clearly the image formed, I. [1]

(ii) Focal length =  $2.2 \text{ cm} \times 4.0$   
= 8.8 cm [2]

(b) Real, inverted, magnified [3]

- 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. [2]



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)  $1.5 h/h = 40.0/u$   
 $u = \underline{26.7 \text{ cm}}$  [2]

(ii)  $1.5h/h = (40.0-f)/f$   
 $f = \underline{16.0 \text{ cm}}$  [2]