2021 Sec 4 Physics Assignment Answers
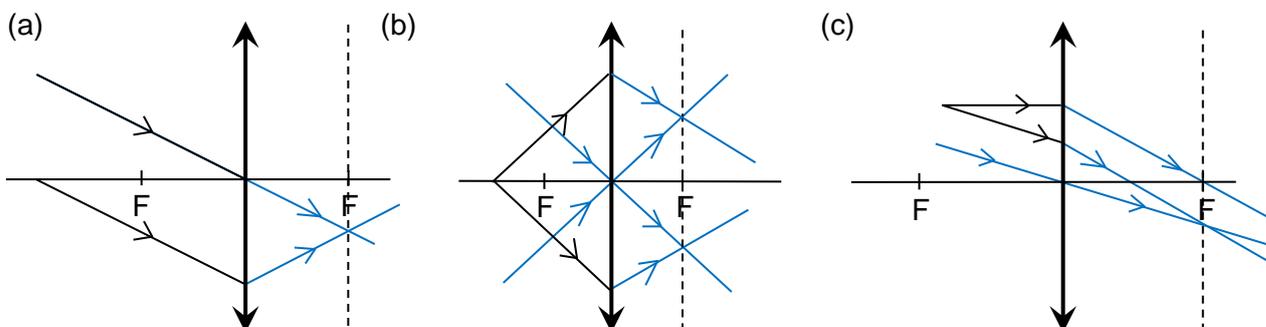**Assignment 9A Lenses**   <u>**Total = 20**</u>

1   Each diagram 1 mark   [3]
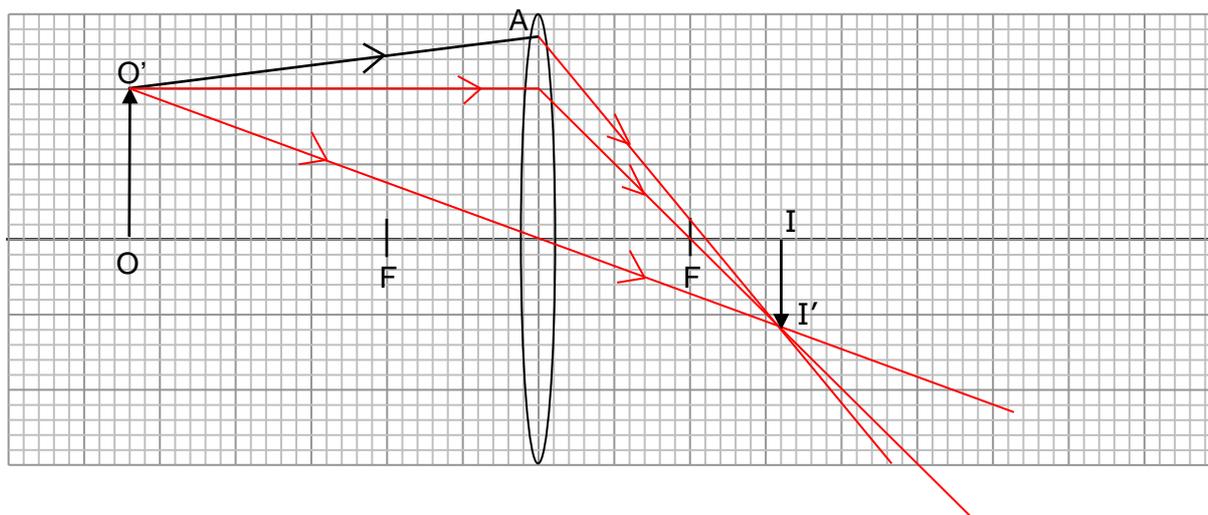
(a)   (b)   (c)

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

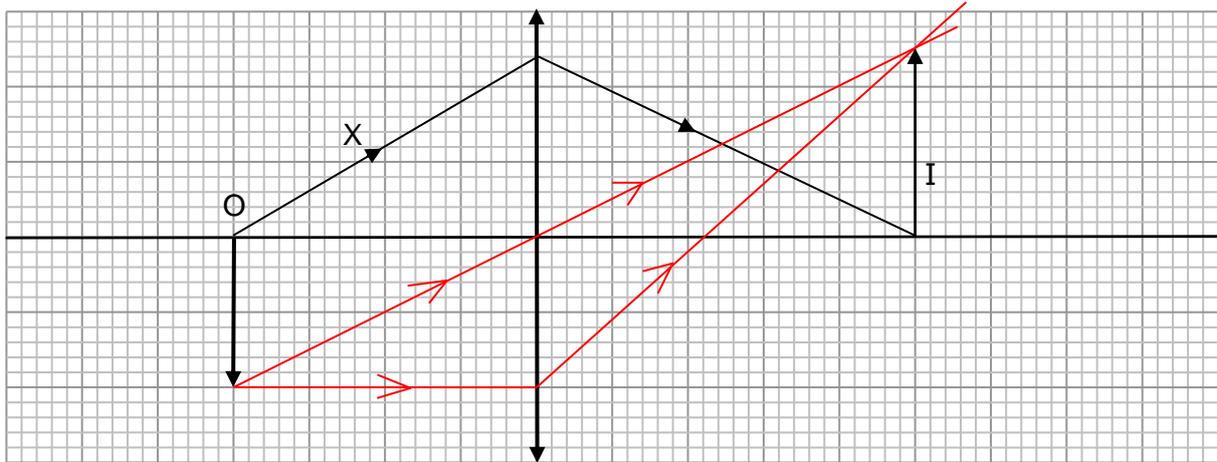Given that 1.0 cm represents 0.5 cm,

(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   = <u>0.6 ± 0.1 cm</u>   [1]

        (ii)   image distance = 3.2 cm x 0.5   = <u>1.6 ± 0.1 cm</u>   [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 cm x 4.0
                              = <u>8.8 cm</u>   [2]

(b) <u>Real, inverted, magnified</u>   [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]
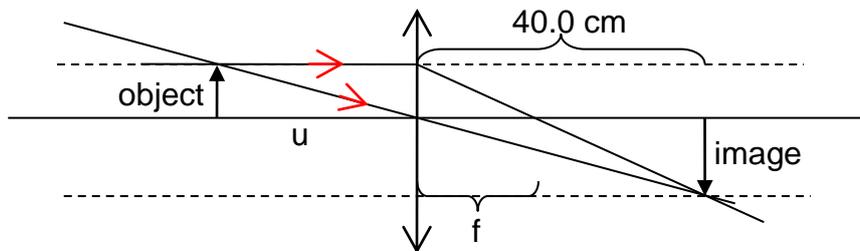
Note: given the lens and image, draw standard rays (in reverse direction) to locate and draw the object.

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

Magnification m = hi / ho = v / u

(i)   1.5 h/h = 40.0/u
        u = <u>26.7 cm</u>   [2]

(ii)   1.5h/h = (40.0-f)/f
        f = <u>16.0 cm</u>   [2]