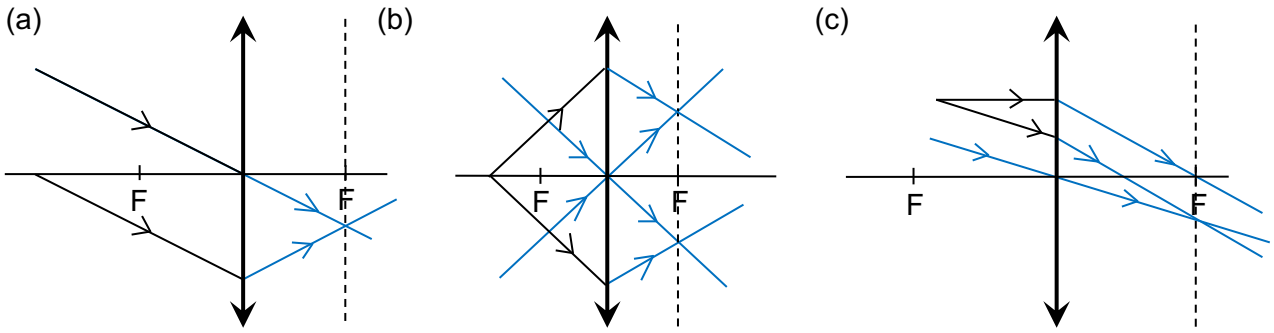
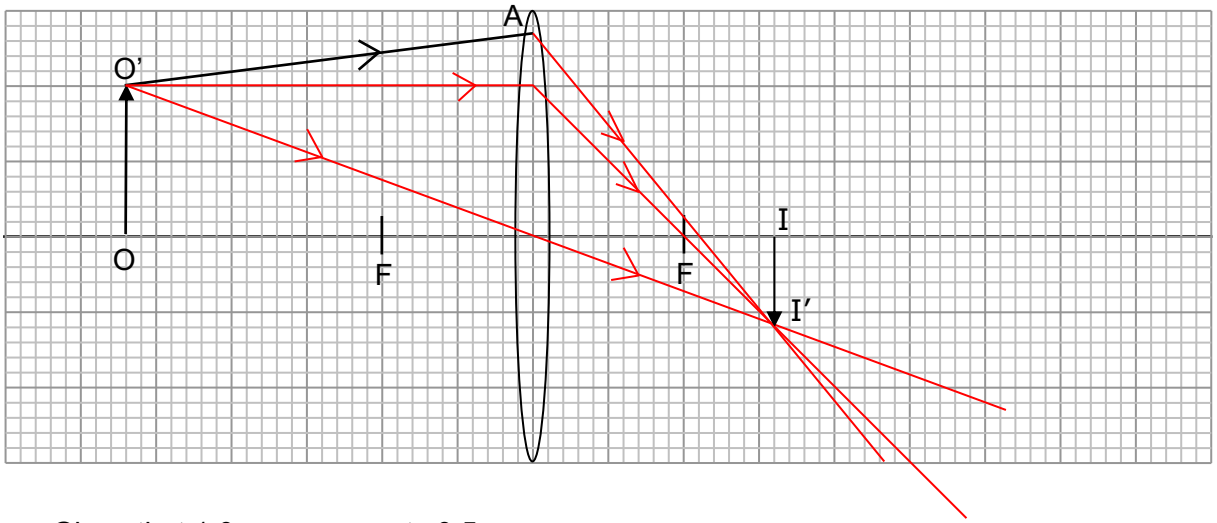
2021 Sec 3 Physics Assignment Answers
Assignment 4.1 Lenses **Total = 20**

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]

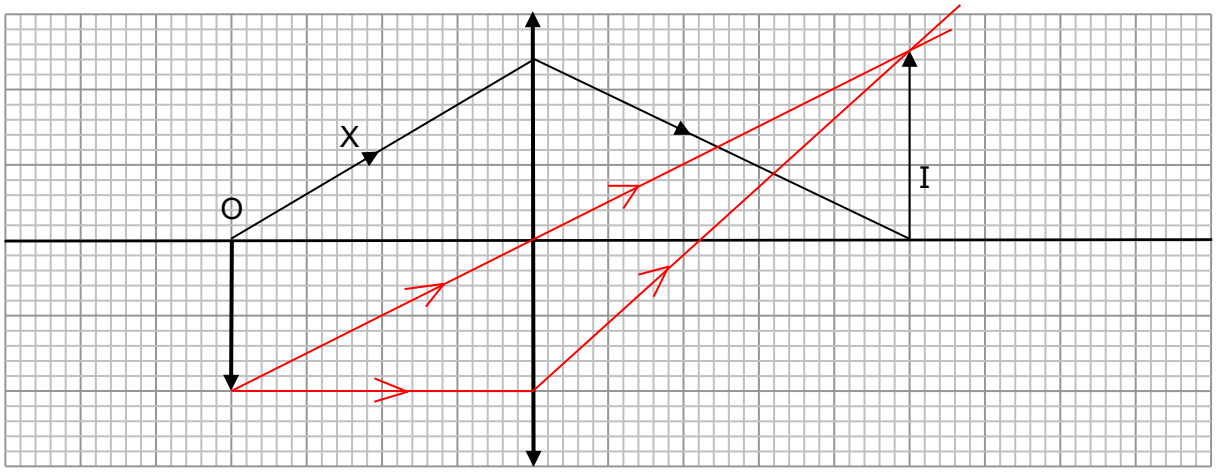
(b) Complete the path of the ray O'A to the image I' and draw and label the image II' of the object OO' on the diagram. [1]

(c)

(i) Size of image = 1.2 cm x 0.5 = $\underline{0.6 \pm 0.1 \text{ cm}}$ [1]

(ii) image distance = 3.2 cm x 0.5 = $\underline{1.6 \pm 0.1 \text{ cm}}$ [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:

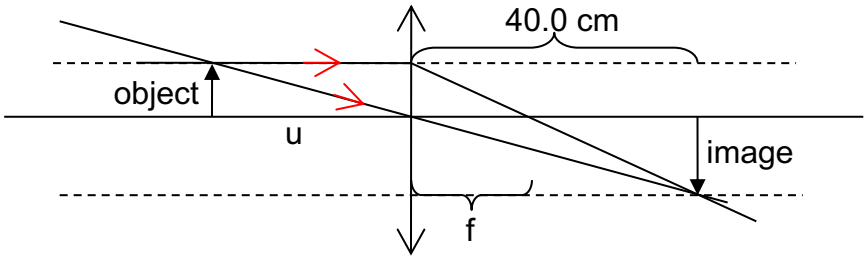
(i) locate and draw the image. Label clearly the image formed, I. [1]

(ii) Focal length = 2.2 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]