Lenses
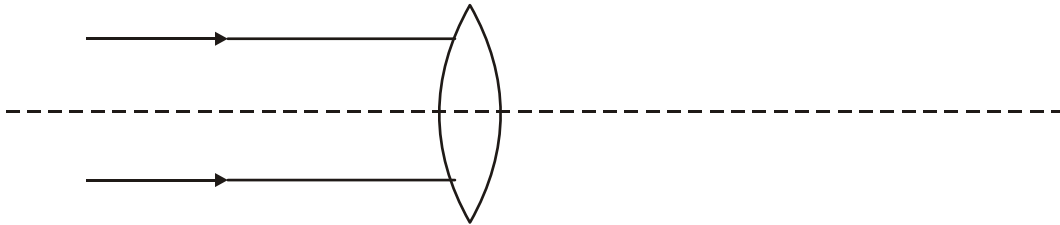
1. (a) The diagram shows two parallel rays of light, a lens and its axis.

(i) Complete the diagram to show what happens to the rays.

(2)

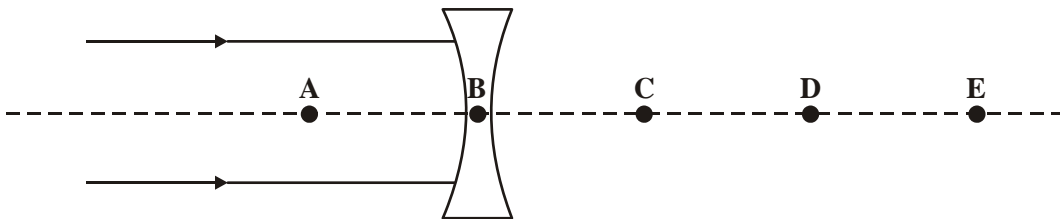(ii) Name the point where the rays come together.

....

(1)

(iii) What word can be used to describe this type of lens?

....

(1)

(b) The diagram shows two parallel rays of light, a lens and its axis.

(i) Which point **A**, **B**, **C**, **D** or **E** shows the focal point for this diagram?

Point ....

(1)

(ii) Explain your answer to part (b)(i).

....

....

(1)

(iii) What word can be used to describe this type of lens?

....

(1)

(c) Complete the following **three** sentences by crossing out the **two** lines in each box which are wrong

In a camera a converging lens is used to produce an image on a

film
lens
screen

.

The image is

larger than
smaller than
the same size as

the object.

Compared to the distance of the image from the lens, the object is

further away from
nearer to
the same distance from

the lens.

(3)

(d)   Explain the difference between a *real* image and a *virtual* image.

....

....

....

....

....

....

(3)
(Total 13 marks)

2.   (a)   A student investigated the refraction of light as it passes out of a transparent plastic block.

She aimed a ray of light at point **X**. She marked the position of the ray as it passed through the transparent plastic block and into the air.

The angle *i* is the angle of incidence.

Ray of light

i   **X**

r

Plastic   Air
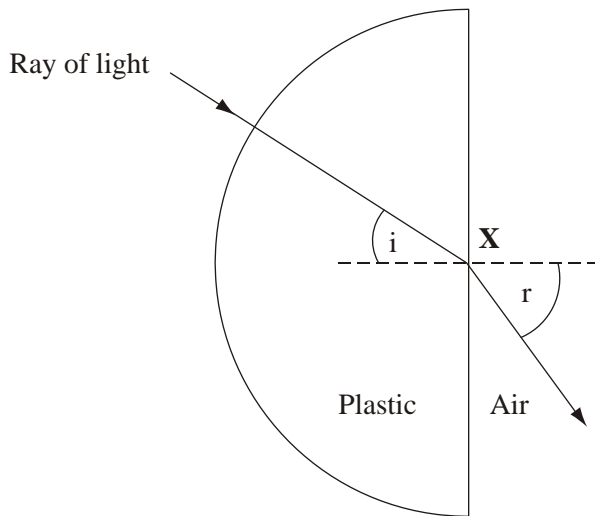
(i)   What is the name of angle **r**?

....

(1)

(ii)   What is the name of the dashed line?

....

(1)

(b)   A camera uses a lens to produce an image which falls on a light detector.

Name a light detecting device which may be used in a camera.

....

(1)

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(c)   The diagram shows the position of an image formed in a camera.

Object

Lens   Image

1.4 cm
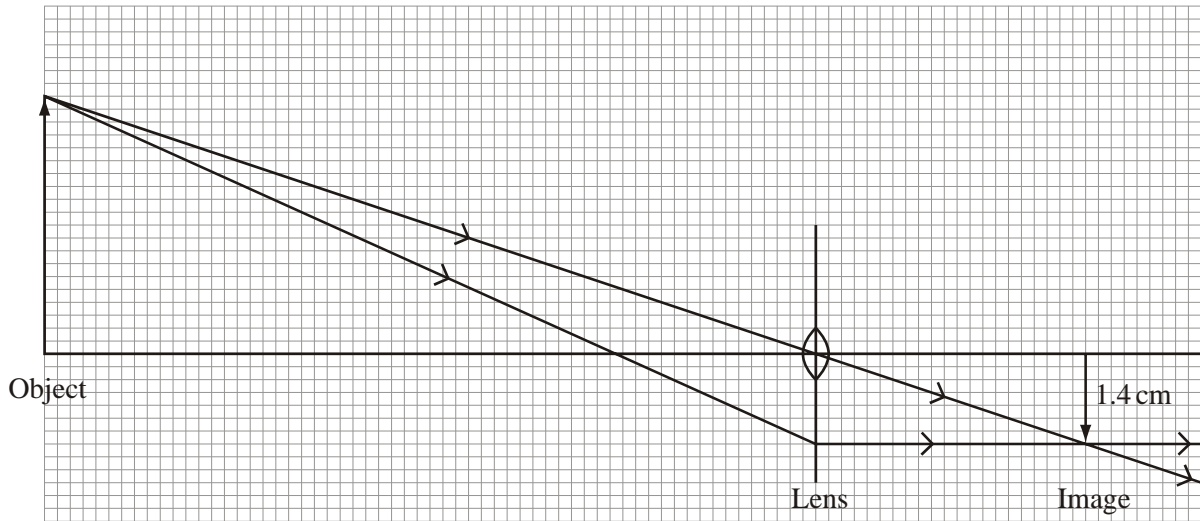
(i)   What type of lens is shown in the diagram?

....

(1)

(ii)   Use the equation in the box to calculate the magnification.

$$\text{magnification} = \frac{\text{image height}}{\text{object height}}$$

Show clearly how you work out your answer.

....

....

Magnification = ...

(2)

(d)   Why does the image formed in a camera have to be a real image?

....

....

(1)
(Total 7 marks)

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