LIGHT - REFLECTION AND REFRACTION

IMAGE FORMATION BY CONCAVE LENS

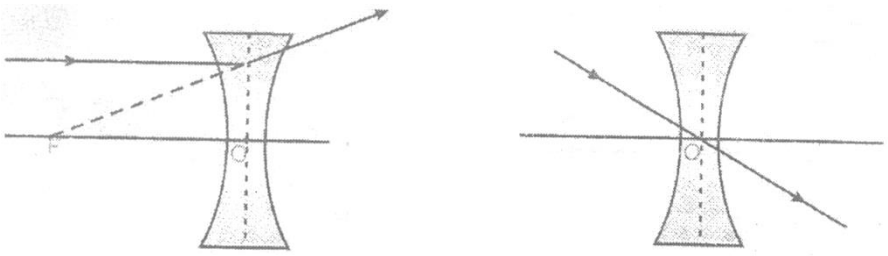
CONCABE LENS

(a) Rules for the formation of images by Concave Lens :

The position of the image formed by a concave lens can be found by considering following two rays coming from a point object (as explained below).

(i) A ray of light coming parallel to the principal axis, after refraction, appears to pass through the principal focus F of the lens, when produced backward as shown in figure (a).

(ii) A ray of light passing through the optical centre O of the lens goes strength without suffering any deviation as shown in figure (b).



(a) (b)

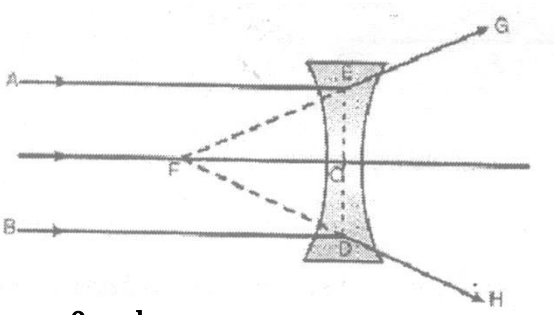
(b) Image formed by Concave Lens :

The image formed by a concave lens in always virtual, erect and diminished and is formed between the optical center O and the principal focus F of the lens. For a thin concave lens of small aperture, the cases of image formation are disused below L

(i) When the object lies at infinity :

When object lies at infinity in front of a concave lens, a virtual, erect, highly diminished image is formed at the principal focus F as explained below.

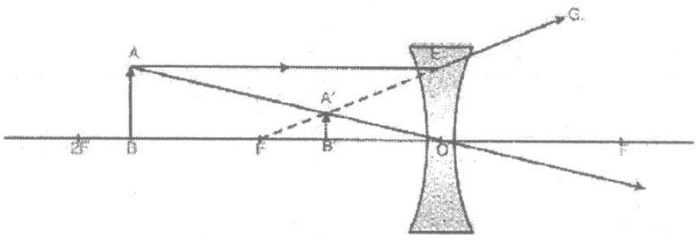
The rays of light AE and BD coming parallel to the principal axis of the concave lens, after refraction, go along EG and DH respectively. When extended in the back direction, these refracted rays appear to pass through the principal focus F. Hence a virtual, erect and highly diminished image is formed at the principal focus F.



(ii) When the object lies between 0 and ∞ :

When an object lies at any position between the optical center O and infinity in front of a concave lens, the image formed is virtual, erect, demised and is formed between the optical centre O and the principal focus F as explained below.

A ray of light AE coming parallel to the principal axis, after refraction, goes along EG and appears to pass through principal focus when produced backward and another ray which is passing through the optical centre O goes straight without any deviation. Both these refracted rays appear to meet at A'. hence, a virtual erect, diminished image is formed between O and F.



The summary of image formation by a concave lens for different positions of the object is given in table.

Position of the object	Position of the image	Size of the image	Nature of the image
At infinity	At F	Highly diminished	Virtual and erect
Between O and ∞	Between O and F	Diminished	Virtual and erect