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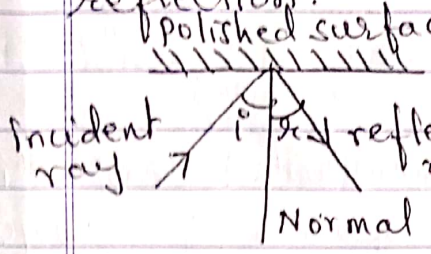
Light 

NOTES.

## Reflection

* Definition. When a ray of light incident on a polished surface comes back into the same medium, it is known as reflection.



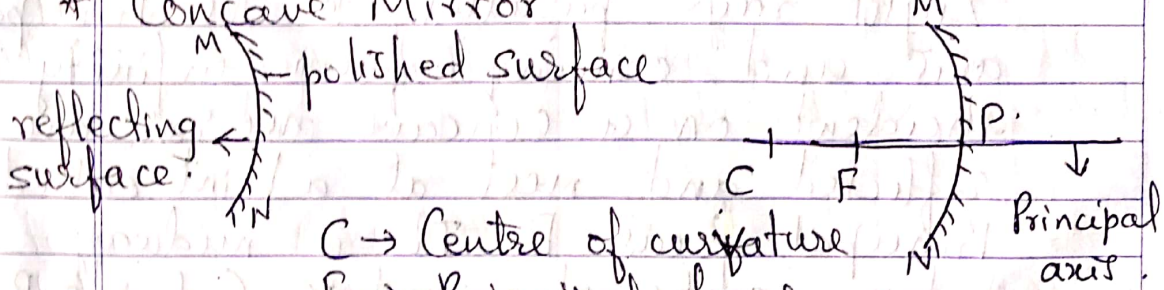

$i \rightarrow \angle^{le}$ of incidence
$r \rightarrow \angle^{le}$ of reflection
($\angle^{le} \rightarrow$ angle)

* Laws of reflection:

1) The incident ray, the reflected ray & the normal to the polished surface at the point of incidence lie in the same plane.
2) The angle of incidence is equal to angle of reflection.

## Spherical Mirrors

* Concave Mirror

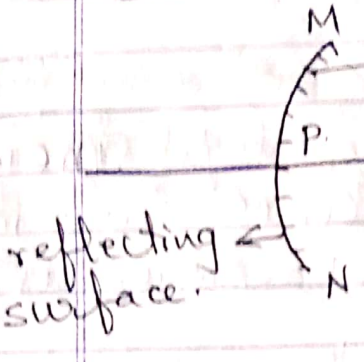



C → Centre of curvature
F → Principal focus.

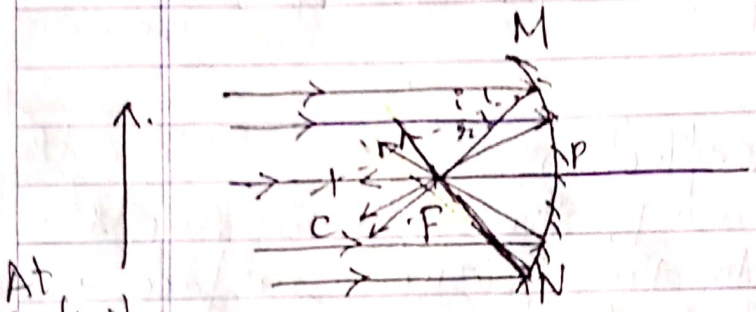
Spherical Mirror is part of a sphere.
C → centre of sphere.
P → Pole.

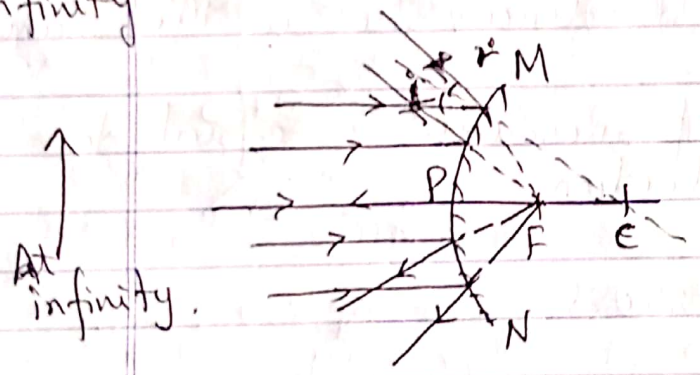
CP → radius of curvature → R
PP → focal length → f.
R = 2f.

Convex Mirror




Principal Focus




Light rays parallel to the Principal axis and coming from infinity incident on a concave mirror are reflected and meet at a point called Principal focus F. It is midway between centre of curvature C & pole P. For a convex mirror the rays seem to diverge or come from a point beyond the mirror which is the

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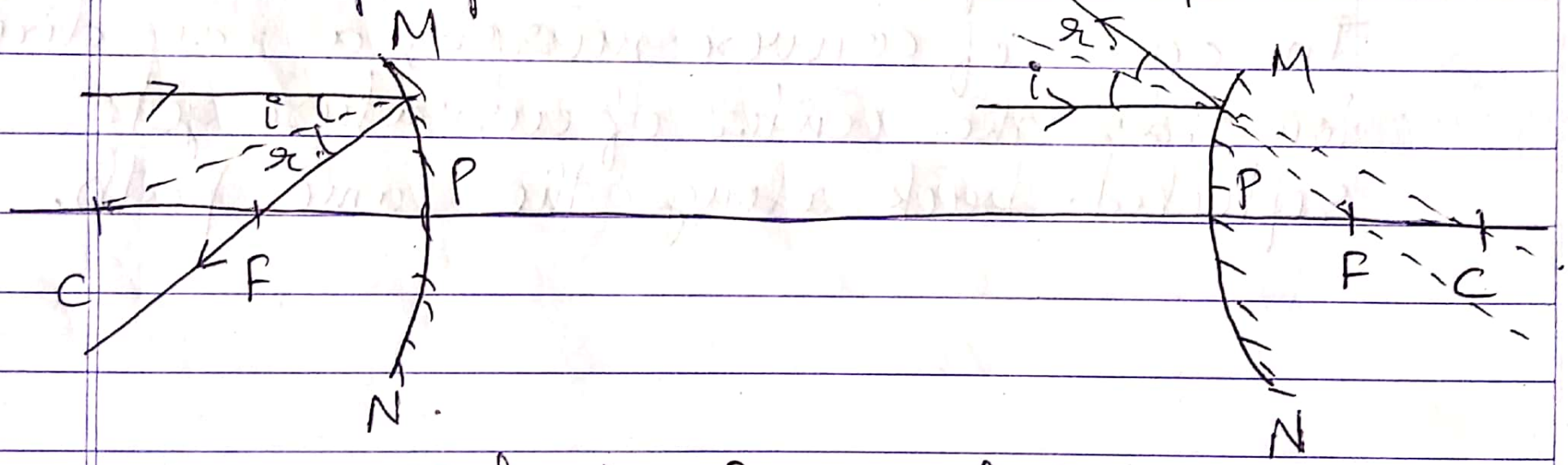
Principal focus F. The length between Pole and Principal focus is known as focal length.

The diameter of the reflecting surface of a spherical mirror is called its aperture or opening. MN represents the aperture.

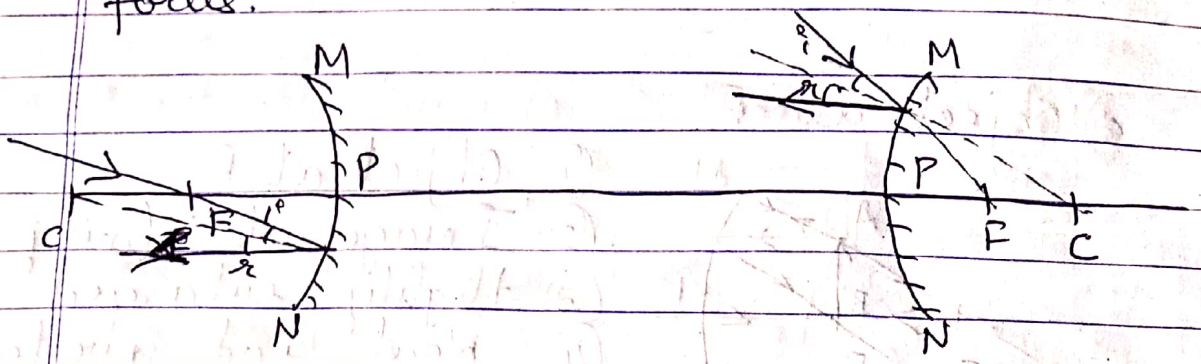
# Representation of Images formed by Spherical mirrors using Ray diagram.

① A ray parallel to Principal axis.



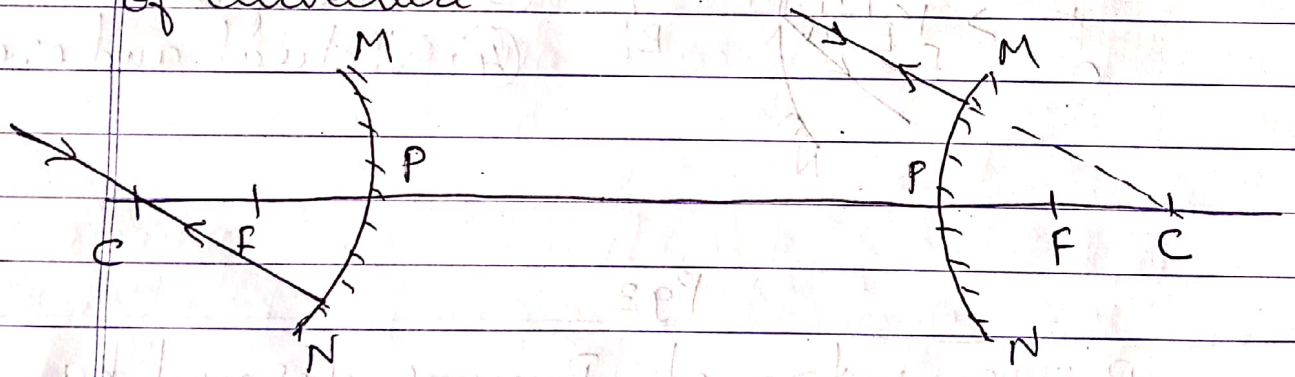

A ray parallel to Principal Axis after reflection in concave mirror passes through Principal focus in convex mirror appears to diverge from Principal focus

2) A ray passing through the Principal focus.




In case of concave mirror a ray passing through principal focus is reflected back parallel to the principal axis.
In case of convex mirror, a ray directed towards the principal focus is reflected along the principal focus.

3) A ray passing through the centre of curvature.




In case of concave mirror, a ray passing through center of curvature reflects back along the same path.
In case of convex mirror, a ray directed towards the center of curvature gets reflected back along the same path.

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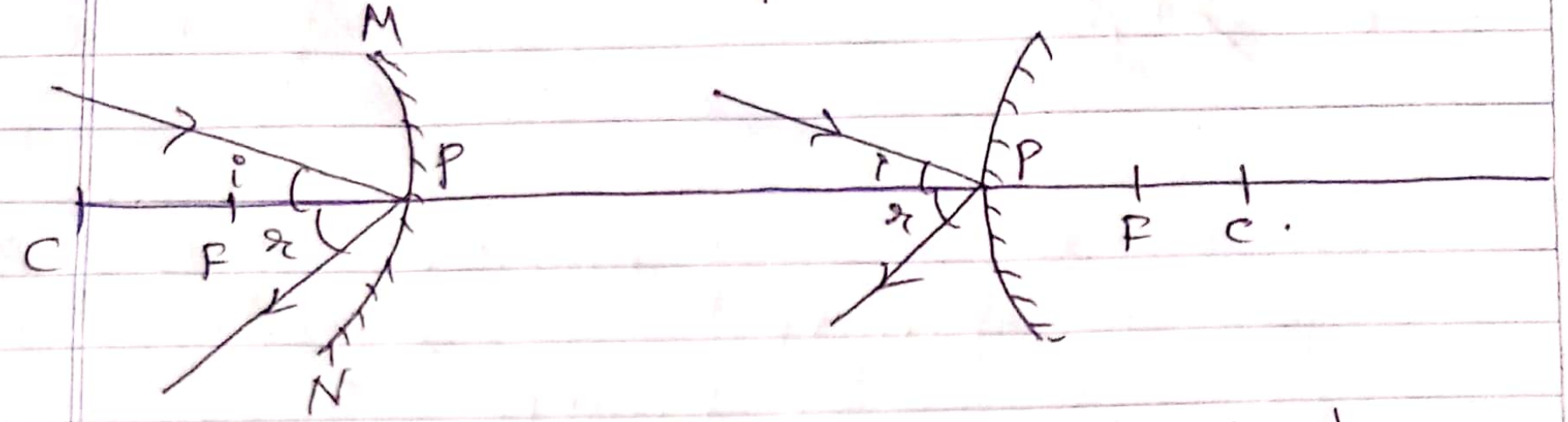
4) A ray incident obliquely to the Principal axes, towards a point P.



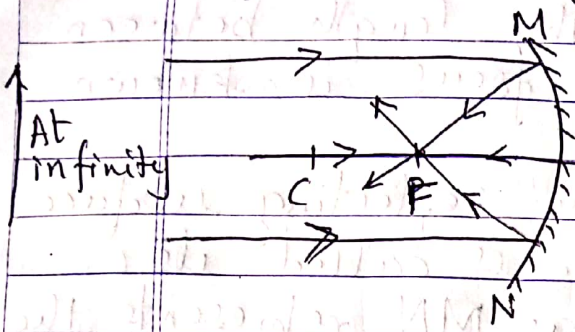

In both the cases a ray incident obliquely at P gets reflected back. following laws of reflection such that angle of incidence = angle of reflection.

# Image formation by Spherical mirrors. (concave)

| Position of object | Position of Image | Size of image | Nature of image. |
|---|---|---|---|
| At infinity | At the focus F | Highly diminished, point sized. | Real and inverted. |
| Beyond 'C' | Between F & C | Diminished | Real & Inverted. |
| At C | At C | Same size as object. | Real & inverted. |
| Between C & F | Beyond C | Enlarged | Real & inverted. |
| At F | At infinity | Highly Enlarged | Real & Inverted. |
| Between P & F | Behind the mirror | Enlarged | Virtual & Erect. |

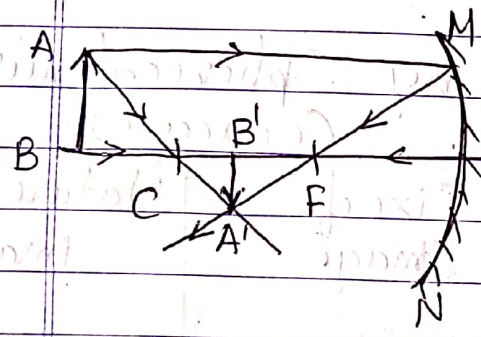
# Image formation by concave mirror.

## 1) Object at Infinity



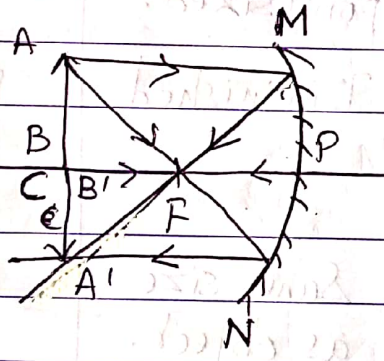

① Object at infinity
② Image at focus.
③ Highly diminished point sized
④ Real & inverted.

## 2) Object beyond C



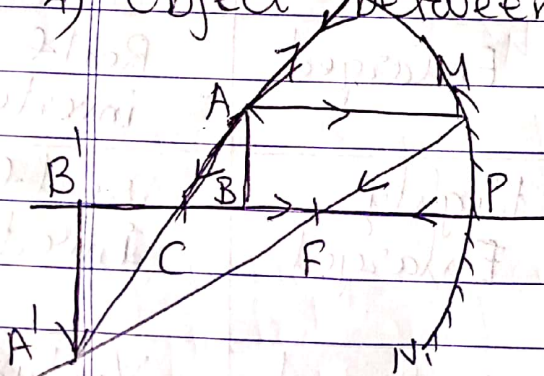

① Object beyond C
② Image between C & F
③ Diminished
④ Real and Inverted

## 3) Object at Center of Curvature




① Object at Center of Curvature
② Image at C
③ Same size as object
④ Real and Inverted.

## 4) Object between C & F




① Object between C & F
② Image beyond C
③ Enlarged.
④ Real and inverted.

## Uses of concave mirrors

A) Used in -

1) Torches, search light and vehicle headlights to get powerful parallel beams of light.
2) Shaving mirrors to see larger image of face
3) By dentists to see large image of patients' teeth.
4) Used to concentrate sunlight to produce heat in solar furnaces.