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PHYSICS

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CLASS 11&12th

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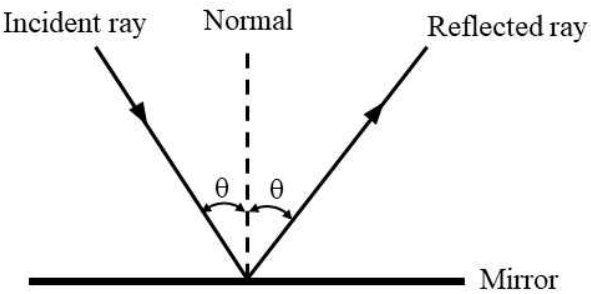
CLASS 12th

Ray Optics And Optical Instruments

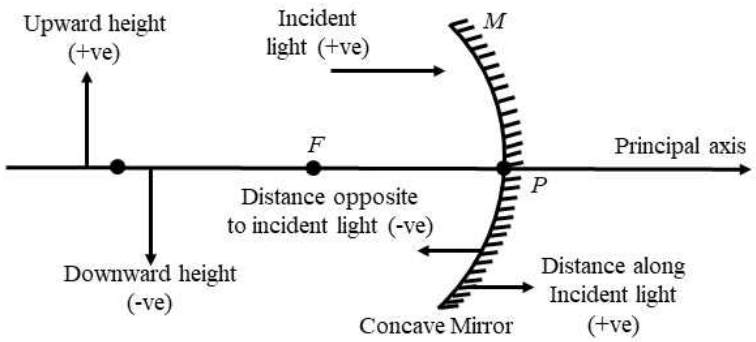
01. Reflection of Light by Spherical Mirrors

The angle of reflection (angle between reflected ray and the normal to the reflecting surface) equals the angle of incidence (Angle between incident ray and the normal). Also that the incident ray. reflected ray lie in the same plane with normal to the reflecting surface.



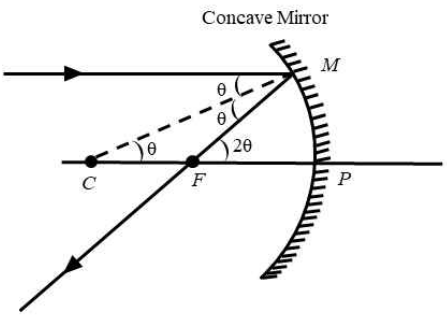
Geometric centre of a spherical mirror is called its pole while that of a spherical lens is called its optical centre.

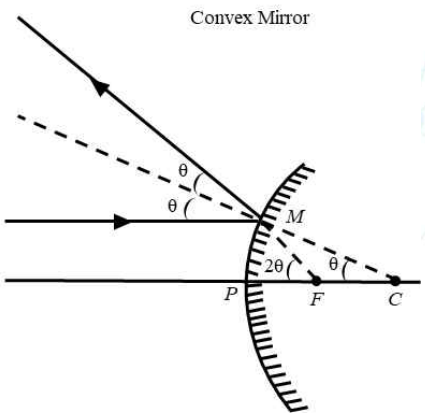
Sign Convention



P − Pole ; F − Focus ; C − Centre of Curvature
$PF = f$ = Focal length of mirror.
$CP = R$ = Radius of curvature of mirror.

02. Focal Length of Spherical Mirrors





To show $f = \frac{R}{2}$

Where, $f =$ Focal length

$=$ Distance between pole and principal focus

$R =$ Radius of curvature of mirror.

Form figure $\angle MCP = \theta$

$\angle MFP = 2\theta$

$$\tan\theta = \frac{MP}{CP};$$

$$\tan 2\theta = \frac{MP}{FP}$$

Considering when θ is small $\tan\theta \approx \theta$; $\tan 2\theta \approx 2\theta$

$$\therefore \quad \frac{MP}{FP} \approx \frac{2MP}{CP}$$

$$FP = \frac{CP}{2}$$

$$F = \frac{R}{2}$$