Convex Mirrors

Objective

A convex mirror is used to expand the field of view and allow observation of the largest possible area of

Tools:

objects in front of it.

- Convex mirror
- Candle or luminous object
- Ruler
- White screen (for trial only)

Theory

A convex mirror is a mirror whose reflecting surface bulges outward. It is widely used in car side mirrors and surveillance mirrors.

Applications:

1. **Car side mirrors**
   Used to see a wider area of the road and reduce blind spots.
2. **Traffic safety**
   Installed at dangerous curves, intersections, and parking garage exits.
3. **Security surveillance**
   Used in shops, warehouses, banks, and schools to monitor wide angles.
4. **Factories and warehouses**
   For monitoring the movement of workers and vehicles in corridors.
5. **Public places**
   Such as hospitals, long hallways, and shopping centers.

Properties of a Convex Mirror

A convex mirror diverges reflected rays and always forms a **virtual, upright, and diminished image** located behind the mirror between the focal point and the pole.

Convex Mirror Formula

{1}\{f} = {1}\{d_o} + {1}\{d_i}

Where:

- (f) = focal length (negative for convex mirrors)
- (d_o) = object distance (positive)
- (d_i) = image distance (negative)

Question:
An object of height 4 cm is placed in front of a convex mirror with a radius of curvature of 20 cm. Find the position of the image.

Solution:

1. Finding the focal length (f):

f = {R}\{2} = {20}\{2} = 10

Since the mirror is convex:
f = -10

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2. Finding the image position ((d_i)) using the mirror equation:

Assume the object is placed at a distance:

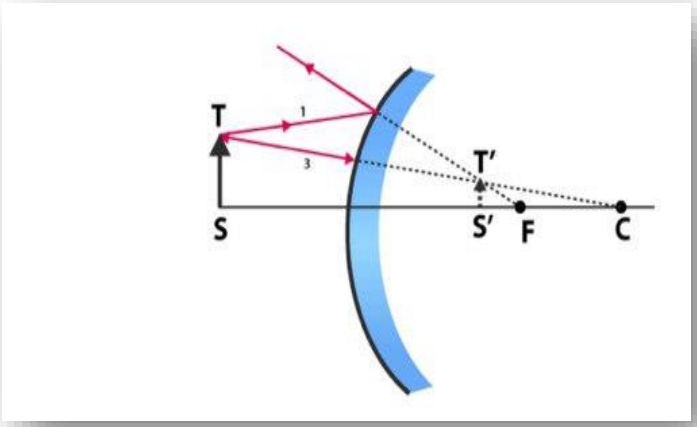
d_o = 30
{1}\{-10} = {1}\{30} + {1}\{d_i}

{1}\{d_i} = {1}\{-10} - {1}\{30}

{1}\{d_i} = - {3}\{30} - {1}\{30} = - {4}\{30}

d_i = -{30}\{4} = -7.5 \

The negative sign confirms that the image is **virtual** and located **behind the mirror**.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