



GUIDELINES:

Dear Students,

- There is only **one assignment in this lesson**:
Assignment 5: Based on image formation by convex mirror and uses of convex mirror.
- Complete the Assignment in Physics Notebook.
- **Video links** have been provided for better understanding of the concept through visuals. Watch the videos carefully as these will help you in doing the assignment.
- Read the lesson from **NCERT textbook** also.
- Link for the lesson : <http://ncert.nic.in/textbook/pdf/jesc110.pdf> (page no. 166 to 168)

SUB TOPICS:

1. **Ray diagrams for image formation by Convex Mirror**
2. **Uses of convex mirror**

INTRODUCTION

In the first e-lesson, we learnt about four rules of image formation by convex mirror. Kindly note that “**the intersection of at least two reflected rays, gives the position of image of the point object**”. So you have to use any of the two rules to draw ray diagrams for image formation by convex mirror.

It is important to note that in convex mirror, whatever may be the position of the object in front of convex mirror, the image formed is always virtual, erect and diminished.

Let's begin the journey of learning:

1. RAY DIAGRAMS FOR IMAGE FORMATION BY CONVEX MIRROR

Consider the following cases:

(a) When the object is at infinity:

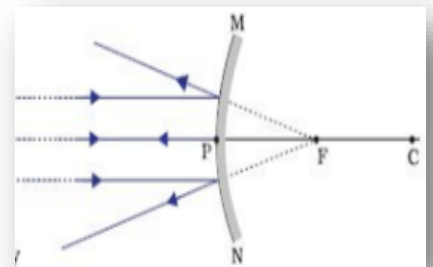
When the object is placed at infinity, the rays coming from it are parallel to Principal axis. These parallel rays after reflection from the mirror appear to come from focus (F).

Position of image : At F (Focus), behind the mirror

Nature of image : Virtual and Erect.

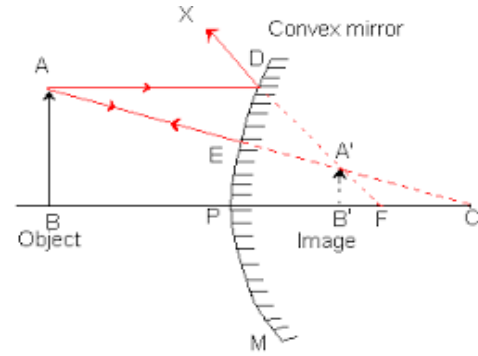
Size of Image : Highly diminished, point sized

Real Life Practical Application : used as reflectors in street lamps



(b) When the object is between Pole and Infinity:

Consider an object AB placed anywhere between pole and infinity. The incident ray AD, parallel to Principal axis after reflection from mirror appears to come from F (Focus). Another ray AE directed towards C (Centre of curvature) gets reflected back along the same path. The two reflected rays DX and EA appear to meet behind the mirror when the reflected rays are extended backward. Now A'B' is the image of the object AB.



Position of image : Between Pole and Focus (behind the mirror)

Nature of image : Virtual and Erect

Size of Image : Diminished

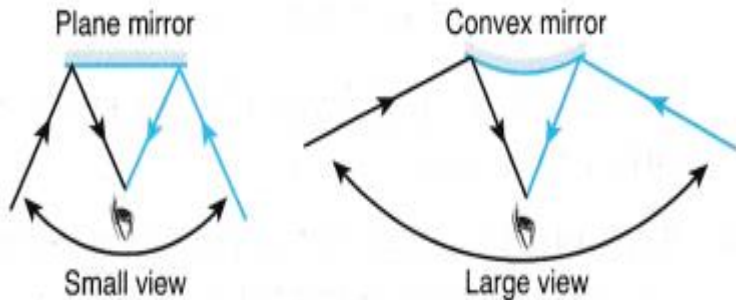
Real Life Practical Application: used as rear view mirrors in vehicles

S. No.	Position of Object	Position of Image	Size of Image	Nature of Image
1.	At infinity	- At focus F (behind the mirror)	- Highly diminished, point sized	- Virtual and erect
2.	Anywhere between infinity and pole of mirror	- Between P and F ; (behind the mirror)	- Diminished	- Virtual and erect

2. USES OF CONVEX MIRROR

1) Convex mirror is used as a **rear view mirror in vehicles**. This is because:

- Irrespective of the position of the object, the image formed by convex mirror is always erect.
- Convex mirror has wider field of view as they are curved outwards.



2) Convex mirror is used as **reflector in street lamps** as it diverges the light rays and hence spreads the light, so that visibility increases.



3) Convex mirror is used as **Vigilance Mirror in big shops and stores**.



(b) A security mirror

For better understanding, kindly go through the video links given below:

- For image formation by Convex Mirror : <https://youtu.be/DtEPYqvGJ1l>
- Uses of convex mirror as rear view mirror : <https://youtu.be/4H6bOMeeFmY>
- Comparative analysis of Plane and Spherical mirrors (**a quick recap**) : <https://youtu.be/oDNqfxRYQY0>

ASSIGNMENT 5

Q.1 Which of the following best describes the image formed by a convex mirror when the object's distance from the mirror is less than the absolute value of the focal length (f)?

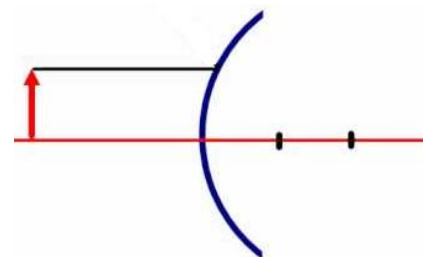
- | | |
|----------------------------------|--------------------------------|
| a. virtual, upright and enlarged | b. real, inverted and reduced |
| c. virtual, upright and reduced | d. real, inverted and enlarged |

Q.2 When the image of an object is seen in a convex mirror, the image _____.

- | | |
|-----------------------------------|------------------------------|
| a. will always be real. | b. will always be virtual. |
| c. may be either real or virtual. | d. will always be magnified. |

Q.3 A ray of light parallel to principal axis is incident on the reflecting surface of convex mirror.

Draw a ray diagram to show image formation in this case. Also state the nature and size of the image.



Q.4 How will you distinguish between plane, concave and convex mirror without touching its surface?

Q.5 A man stands in front of a mirror of special shape. He finds that his image has a normal head size, a fat body and very small legs. What can we say about the shapes of the three parts of the mirror?

Q.6 Give a reason for the following:

- Convex mirror is used as rear view mirror in cars.
- Convex mirror is used as vigilance mirror in shops.

S. NO.	CONTENT	VIDEO LINK
1	For image formation by Convex Mirror	https://youtu.be/DtEPYqvGJ1l
2.	Uses of convex mirror as rear view mirror	https://youtu.be/4H6bOMeeFmY
3.	Comparative Analysis of Plane and Spherical mirror (a quick recap)	https://youtu.be/oDNqfxRYQY0