

Ray Diagrams

Aim:- To find the image distance for varying object distances in case of a convex lens and draw corresponding ray diagrams to show the nature of image formed.

Material and Apparatus required:- Convex lens preferably of focal length 15 cm, candle with stand, lens holder, a screen with stand, matchbox, meter scale.

Principle:- The nature and position of the image form by convex lens depends upon the position of the object with respect to convex lens. The image may be real or virtual. To get a real image, the object should be placed beyond the focus.

Procedure:-

1. Obtain an approximate value of the focal length of the convex lens by focusing the image of a distant object.
2. Fix a meter scale on the table with a cello tape.
3. Fix lens in a lens holder and place it in the middle the meter scale, such that its principal axis is parallel to the meter scale.
4. Mount a candle vertically on a candle stand, light it with a matchbox and place it on the left hand side of the lens. Adjust the height of the candle or the lens such that the tip of the lighted candle lies on the principle axis of the lens.
5. Place a vertically mounted card board pasted with graph paper (Screen) on the right side of the lens. Adjust its height such that the entire image can be taken on the screen.
6. Make adjustment to get a sharp image of lighted candle on the screen, by keeping the lighted candle at (1) beyond $2F$ (2) at $2F$ (3) between $2F$ and F .

Result:-

1. As the object moves towards the focus of the lens the size of the image increases
2. When object is brought too close to the lens, the image on the other side is not seen.

Precautions:-

1. Perform the experiment at a shaded place.
2. For obtaining the rough focal length of the lens any distant object can be considered either a tree or sun.

On the left side

Draw ray diagrams for convex lens

1. object between F and $2F$

2. Object at $2F$

3. Object beyond $2F$