

Convex Lens Focal Length Experiment

Aim

To determine the focal length (f) of a convex lens using image formation principles.

Theory

The experiment is based on the thin lens equation:

$$1/f = 1/u + 1/v$$

Where:

f: focal length of the lens

u: object distance from the lens

v: image distance from the lens

Apparatus

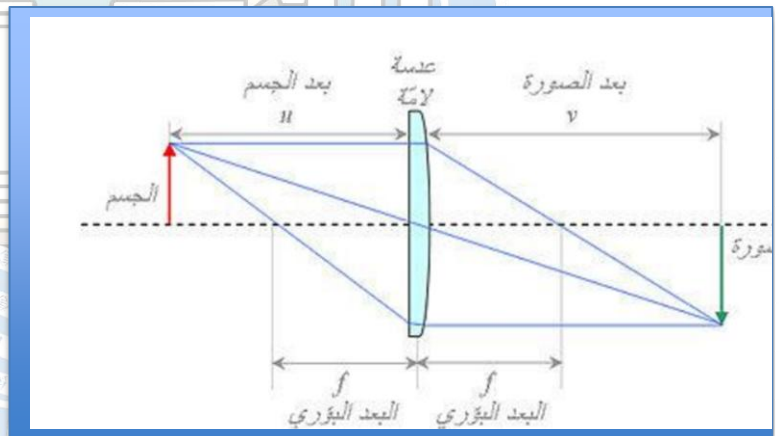
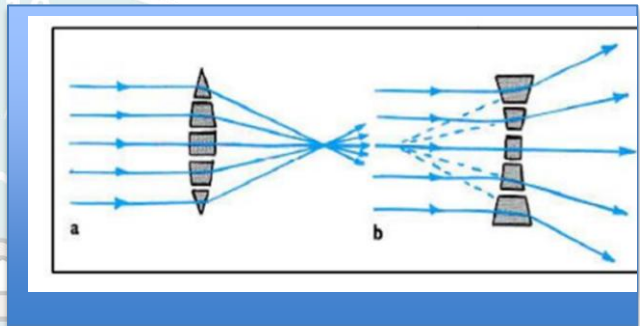
Convex lens

Light source (candle or lamp)

Screen (white paper)

Meter scale (ruler)

Lens holder

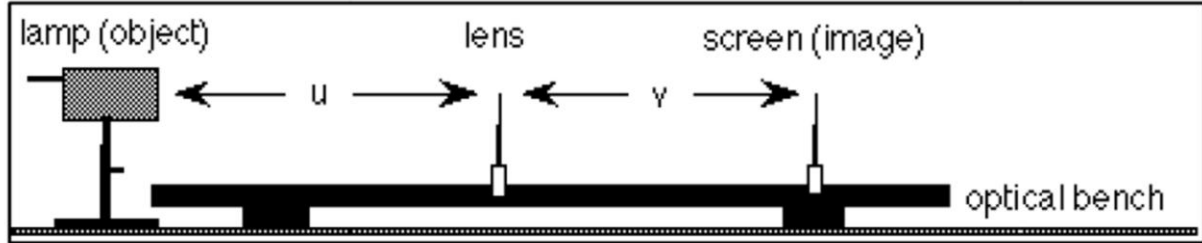


Procedure

1. Place the convex lens on a holder at the center of the meter scale.
2. Position the illuminated object (candle) on one side of the lens.
3. Place the screen on the opposite side.
4. Move the screen until a sharp, inverted image is formed.
5. Measure object distance (u) and image distance (v).
6. Repeat for different positions to improve accuracy.

Calculations

For each reading, substitute values into the lens equation and calculate f .
Take the average of all values for better accuracy.



Example Calculation

Given:

$$u = 20 \text{ cm}$$

$$v = 30 \text{ cm}$$

$$\frac{1}{f} = \frac{1}{20} + \frac{1}{30} = \frac{5}{60}$$

$$f = 12 \text{ cm}$$

Notes

The image is real and inverted when the object is outside the focal point.
Ensure proper alignment.
Repeat measurements to reduce error.

Conclusion

This experiment verifies the lens formula and determines the focal length accurately.

