

PHYS 1200 Physics of Everyday Experience

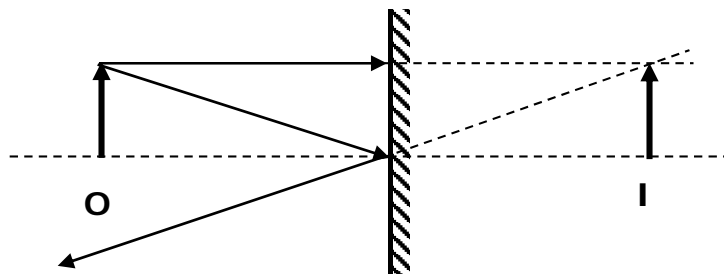
Review questions and exercises for Lecture 31 (L&O-3)

1. What principle of optics explains how lenses work?
2. What is the effect of a converging lens on parallel light rays?
3. What is the effect of a diverging lens on parallel light rays?
4. What type of image is formed of an object located far from a converging lens?
5. How can a converging lens be used as a magnifying lens?
6. How is the human eye capable of focusing on both near and far objects?
7. What type of corrective lens is used for nearsightedness?
8. What type of corrective lens is used for farsightedness?
9. What is the cause of astigmatism?

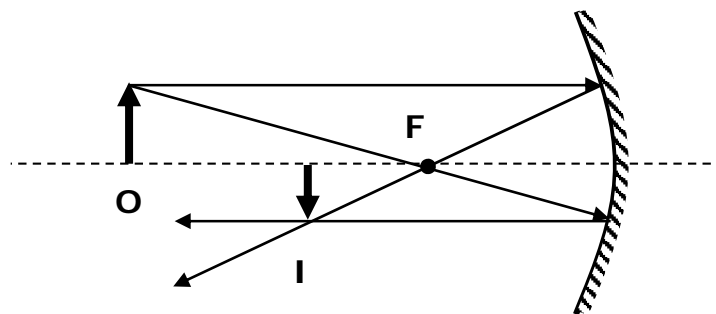
For the remaining questions determine the nature of the images formed by the mirrors and lenses shown below. Is the image: real or virtual, upright or inverted, enlarged or diminished?

O is the object, **I** is the image, and **F** is the focal point.

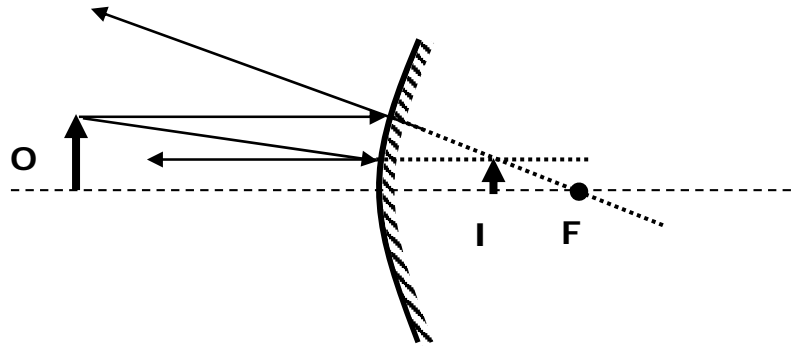
10. Plane mirror



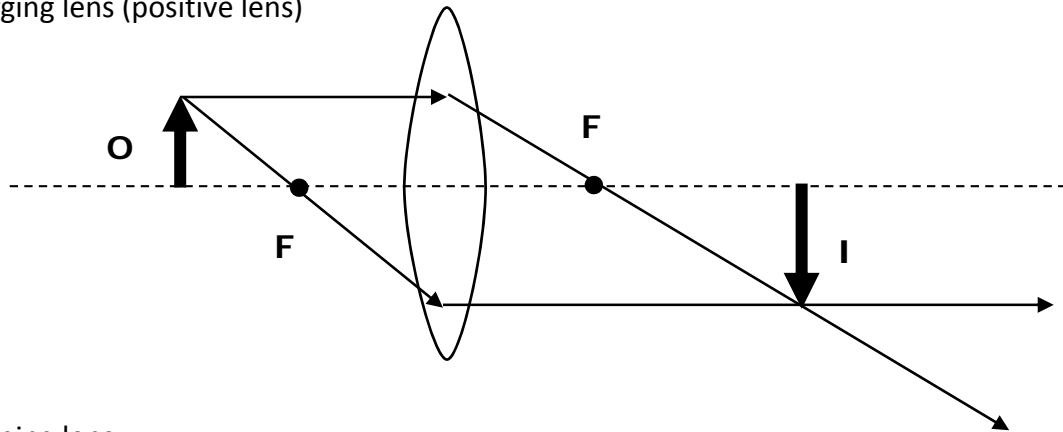
11. Concave mirror



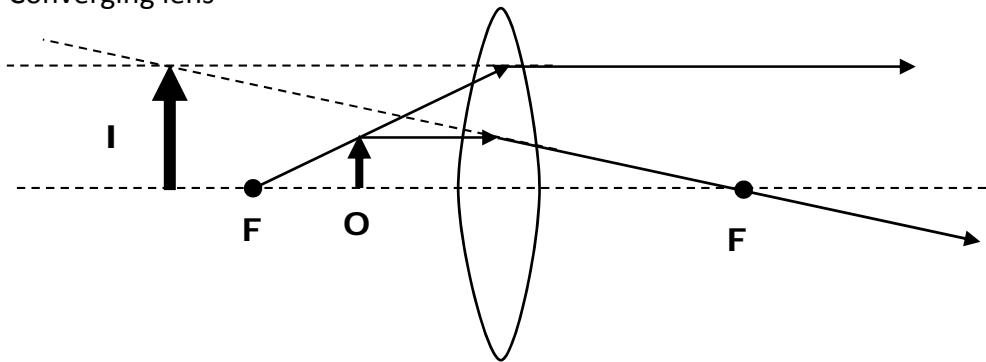
12. Convex mirror



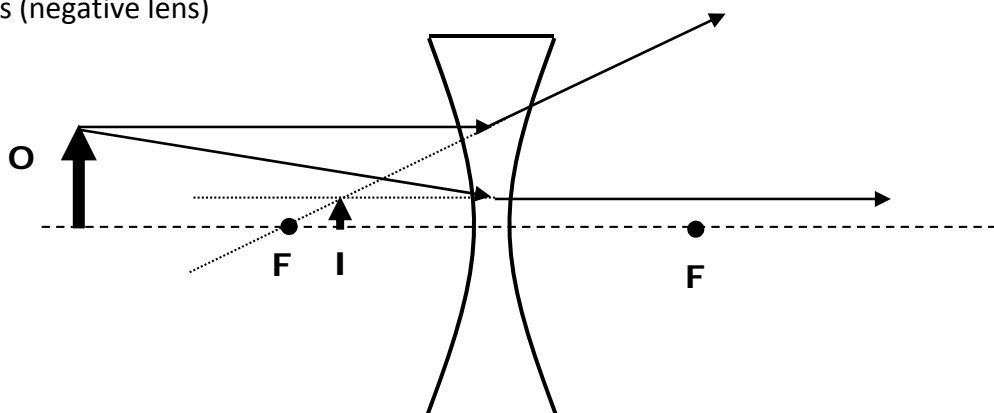
13. Converging lens (positive lens)



14. Converging lens



15. Diverging lens (negative lens)



Answers and solutions

1. The law of refraction
2. A converging lens causes parallel light rays to converge to a focus point.
3. A diverging lens cause parallel light rays to diverge from a focal point.
4. For an object located well beyond the focal point of a converging lens, the image is real, and inverted.
5. A converging lens can be used to produce an enlarged image if the object is placed within the focal length of the lens.
6. The lens in the human eye is flexible so that its focal length can be changed.
7. A diverging lens is used to correct nearsightedness.
8. A converging lens is used to correct farsightedness.
9. Astigmatism is due to an irregularity in the curvature of the cornea or lens of the eye.
10. Plane mirrors only produce VIRTUAL images (light appears to come from behind the mirror). The image is the same distance behind the mirror as the object is in front of it; it is upright and the same size as the object.
11. Real, inverted, diminished
12. Virtual, upright, diminished
13. Real, inverted, enlarged
14. Virtual, upright, enlarged (magnifying lens)
15. Virtual, upright, diminished

