

PHYS 1200 Physics of Everyday Experience

Review questions and exercises for Lecture 30 (L&O-2)

1. What is the phenomenon of dispersion?
2. What phenomenon is the cause of blue skies and red sunsets?
3. What is the law of reflection?
4. Describe the characteristics of the image formed by a plane mirror.
5. How tall must a plane mirror be so that a person can see from his head to his toe?
6. How are parallel light rays reflected by a concave mirror?
7. How are parallel light rays reflected by a convex mirror?
8. What is a real image and a virtual image?
9. What type of mirror is used to produce a magnified image of an object?
10. What type of mirror is used to provide a wide angle view?

Answers:

1. Dispersion is the name for the fact that the index of refraction of a material depends on the wavelength of light. Dispersion is observed when a beam of white light enters a prism and emerges as multiple beams of different colors. It is also the phenomenon that causes the formation of rainbows due to the dispersion of sunlight from water droplets in the atmosphere.
2. Blue skies and red sunsets are the result of the scattering of sunlight from air molecules. The scattering depends strongly on wavelength.
3. The angle of reflection = the angle of incidence
4. A plane mirror produces a virtual image that is upright, the same size as the object, and located the same distance behind the mirror as the object is in front of the mirror.
5. A person can see her entire self with a plane mirror that is half as tall as she is.
6. A concave mirror reflects parallel rays to a single focus point.
7. A convex mirror causes parallel rays to diverge after reflection.
8. In a real image, light rays actually converge at the image location. In a virtual image, light rays diverge when they leave the object and appear to come from a point where no light rays actually are.
9. A concave mirror can be used to give a magnified image.
10. A convex mirror is used to provide a wide angle view.