

Chapter 10

REFLECTION AND REFRACTION

SUMMARY:

- ◆ Light seems to travel in straight lines.
- ◆ Mirrors and lenses form images of objects. Images can be either real or virtual, depending on the position of the object.
- ◆ The reflecting surfaces, of all types, obey the laws of reflection. The refracting surfaces obey the laws of refraction.
- ◆ New Cartesian Sign Conventions are followed for spherical mirrors and lenses.
- ◆ Mirror formula, $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$, gives the relationship between the object-distance (u), image-distance (v), and focal length (f) of a spherical mirror.
- ◆ The focal length of a spherical mirror is equal to half its radius of curvature.
- ◆ The magnification produced by a spherical mirror is the ratio of the height of the image to the height of the object.
- ◆ A light ray travelling obliquely from a denser medium to a rarer medium bends away from the normal. A light ray bends towards the normal when it travels obliquely from a rarer to a denser medium.
- ◆ Light travels in vacuum with an enormous speed of $3 \times 10^8 \text{ m s}^{-1}$. The speed of light is different in different media.
- ◆ The refractive index of a transparent medium is the ratio of the speed of light in vacuum to that in the medium.
- ◆ In case of a rectangular glass slab, the refraction takes place at both air-glass interface and glass-air

interface. The emergent ray is parallel to the direction of incident ray.

- ◆ Lens formula, $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$, gives the relationship between the object-distance (u), image-distance (v), and the focal length (f) of a spherical lens.
- ◆ Power of a lens is the reciprocal of its focal length. The SI unit of power of a lens is *diopetre*.

