10. RAY OPTICS AND OPTICAL INSTRUMENTS

1. Define focus of a concave mirror and convex mirror.
2. Write mirror equation and expression for magnification for mirrors
3. When light is refracted from one medium into another of higher refractive index, how do each of the following change:
   (a) wavelength
   (b) velocity
   (c) frequency
4. Write refractive index in terms of depth for light refracted from the bottom of a swimming pool.
5. What is total internal reflection? What conditions are required for this phenomenon to take place?
6. Write the relation between refractive index and critical angle of a medium.
7. Explain any 2 practical applications of total internal reflection.
8. What is a thin lens?
9. Derive the object-image relation for refraction at a spherical refracting surface.
10. State the sign of focal length and power of a convex and concave lens.
11. Derive the thin lens formula and lens maker's formula.
12. Define one dioptre.
13. A two-lens system can be considered to be equivalent to a single lens of focal length f the write f in terms of focal length of the single lens. Write Power of the combination and magnification of the combination.
14. Draw a ray diagram to show refraction by a prism. On the diagram indicate angles of incidence, refraction and deviation.
15. What is meant by angle of minimum deviation? Describe a method using which angle of minimum deviation can be measured.
16. Explain why does white light split to form a spectrum, when incident on a prism.
17. With the help of a diagram describe the working of a spectrometer.
18. Give reasons for the following:
   (a) why can you not see the sky as blue on the moon?
   (b) Formation of a rainbow
   (c) Clouds look white whereas sky looks blue during the day
   (d) A secondary rainbow is seen at times
19. Why is the focal length of the reading glasses of a person whose least distance of distinct vision has become 50 cm, which normally is 25 cm?
20. Draw ray diagrams and derive expressions for magnification for a
   (a) simple microscope
   (b) compound microscope
   (c) telescope
21. What is the resolving power of a telescope? How can it be improved?
22. What are reflecting telescopes? What advantage do they have over refracting telescopes?