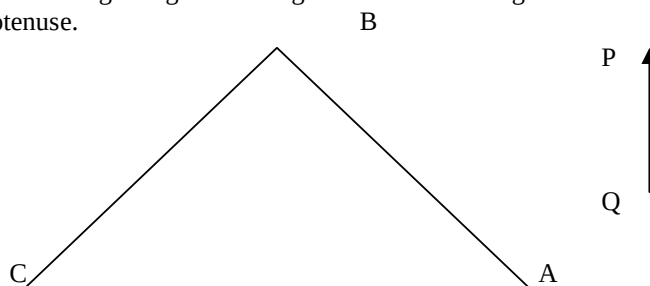


Class XII

7 UNIT VI b RAY OPTICS

1. Suppose x & y are distance of object and image respectively from a mirror. What shall be the shape of the graph between $1/x$ & $1/y$ for a concave mirror?
2. An object is seen first in red light and then in violet light through a simple microscope. In which case is the magnifying power of simple microscope greater?
3. A lens of glass is immersed in water. What will be its effect on the power of the lens?
4. A thin prism of 60° angle gives a deviation of 30° . What is the refractive index of material of prism?
(Ans: $\mu = 1.5$)
5. An object is placed in front of a right angled crown glass with critical angle of 41° . Trace the path of rays from P & Q, parallel to the hypotenuse.



6. What is the function of cladding in a typical optical fiber?
7. State the conditions for total internal reflection of light to take place.
8. How can you increase the magnifying power of a telescope?
9. Why is the secondary rainbow always fainter than the primary rainbow?
10. If $\mu_g = 3/2$ and $\mu_w = 4/3$, then what will be the value of $w \mu_g$?
11. What causes brilliance of diamond?

2 / 3 marks

12. Prove that virtual image produced by a convex mirror is always diminished in size & is located between the focus and the pole.
13. A glass slab is placed over a page in which letters are printed in different colours. Will image of all letters lie in the same plane?
14. Why does a parallel faced glass slab produce neither deviation nor dispersion?
15. Why do we prefer reflecting type telescope for astronomical purposes?
16. An object is placed in front of a convex mirror of focal length 60 cm. if image formed is half its size, find the position of image. $v = 30\text{cm}$
17. A mark is made at the bottom of a beaker and a microscope is focused on it. The microscope is then raised through 0.015 m to what height water must be poured into beaker to bring the mark again into focus? Given $\mu_w = 4/3$,
18. The radius of curvature of each surface of a convex lens of refractive index 1.5 is 0.40m calculate its power.
19. Derive the relation between refractive index of a medium and its critical angle.
20. Draw a ray diagram to show the formation of the image of an object placed between f and $2f$ of a thin concave lens. Deduce the relation between the object, image distance and focal length of the lens under this condition.
21. A ray of light is refracted through a prism in the position of minimum deviation. The angle of prism 60° and its refractive index 1.532. Calculate the angle of incidence & min deviation.
22. Show by ray diagrams how a totally reflecting glass prism can be used to deviate a ray of light through (i) 90° (ii) 180°
23. A converging lens has a focal length of 20cm in air. It is made of material of refractive index 1.6. if it is immersed in a liquid of refractive index 1.3, what will be its new focal length?
24. You are given two convex lens of short aperture having focal lengths 4 and 8 cm respectively. Which one of these will you use as an objective and which one as an eyepiece for constructing a compound microscope. Draw a ray diagram to show the formation of the image of a small object due to a compound microscope. Derive the expression for its magnifying power.
25. Define the term resolving power of a telescope. How does it get affected on

- (i) increasing the aperture of the objective lens?
- (ii) increasing the focal length of the objective lens?

26. Give reasons for the following observations made from earth.

- (i) sun is visible before the actual sunrise
- (ii) sun looks reddish at sunset.