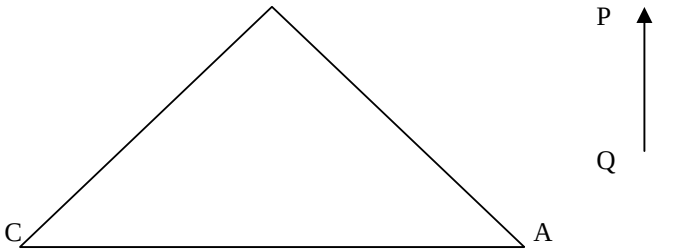
Class XII **Assignment 7**

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 60^0 angle gives a deviation of 30^0. 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 41^0. 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 $_a\mu_g = 3/2$ and $_a\mu_w = 4/3$, 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= 30cm
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 $_a\mu_w = 4/3$,
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 60^0 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) 90^0 (ii) 180^0
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.