

Optics Important question for CBSE class 12:

1.

**Derive the mirror formula for concave mirror.**

2.

**Show that refractive index = real depth/apparent depth.**

3.

**Derive the relation between critical angle and refractive index of the medium.**

4.

**Obtain lens formula for a thin convex lens when the image is real.**

5.

**Two thin convex lenses of focal lengths  $f_1$  and  $f_2$  are kept in contact with each other coaxially. Deduce an expression for the effective focal length of the combination.**

6.

**Derive an expression for dispersive power of a prism.**

7.

**What is meant by 'normal adjustment' in case of an astronomical telescope? With the help of a neat and labeled ray diagram, obtain an expression for the magnifying power of the telescope in normal adjustment.**

8.

**In the experiment on diffraction due to a single slit, show that the angular width of the central maximum is twice that of the first order secondary maximum.**

9.

**An unpolarised light is incident on the boundary between two transparent media. State the condition when the reflected wave is totally plane polarized. Find out the expression for the angle of incidence in this case.**

10.

**. Using Huygen's wave theory, verify the first law of reflection.**

11.

**. Using Huygen's wave theory, verify the Snell's law.**

12.

**. Derive an expression for the refractive index of the material of prism.**

13.

**With the help of a ray diagram, show the formation of image of a point object by refraction of light at a convex spherical (convex) surface separating two media of refractive indices  $n_1$  and  $n_2$  ( $n_2 > n_1$ ) respectively. Using this diagram, derive the relation  $\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$ . Also write the sign conventions used and assumptions.**

14.

**Derive lens maker's formula.**

15.

**. With the help of a neat and labeled ray diagram, explain the working of a compound microscope. Also derive an expression for its magnifying power.**

16.

**Derive a mathematical expression for the width of interference fringes obtained in Young's double slit experiment with the help of a suitable diagram.**

17.

**Describe diffraction of light due to a single slit. Explain the formation of a pattern of fringes on the screen and plot showing variation of intensity with angle  $\theta$  in single slit diffraction.**

18.

. Draw ray diagram for astronomical telescope with image at near point. Derive expression for magnification.

19.