ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

SOLUTION TO WORK SHEET: 40.

Subject : PHYSICS

Date : 23.11.2020

CLASS : XII

Topic: Lenses, the lens formula related sums, condition of casting real images of a fixed object on a fixed screen by a convex lens in different cases.

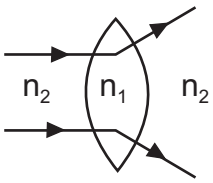
Chapter: Refraction of light at Spherical surface

1: What sort of lens will an air bubble in water behave like?

(a) biconvex (b) concavo-convex (c) convexo-concave (d) biconcave

Ans. (d) biconcave

2: Observe the behaviour of the light rays as shown in the picture. The relation of n_1 and n_2 is



(a) $n_2 > n_1$ (b) $n_1 > n_2$ (c) $n_1 > n_2$ (d) $n_1 = n_2$

Ans. (a) $n_2 > n_1$

3: An object behaves like a convex lens in air and a concave lens in water. The refractive index of the material of the object is

(a) less than air (b) more than both water and air (c) more than air but less than water
(d) almost equal to water

Ans. (c) more than air but less than water

4: The optical centre of a lens is a fixed point whose position is

(a) within the lens (b) outside the lens (c) on the principal axis of the lens
(d) at the focus of the lens

Ans. (c) on the principal axis of the lens

5: A convex lens of focal length 20 cm is placed on a plane mirror A point object is placed at a distance of 20 cm above the lens along it axis. What will be the final image distance from the lens?

(a) 10 cm (b) infinity (c) 20 cm (d) 0

Ans. (c) 20 cm

6: If an object is placed at the focus of a concave lens, the image will be formed

(a) at infinity (b) at the mid-point of the optical centre and the focus
(c) at the optical centre (d) at the focus

Ans. (b) at the mid-point of the optical centre and the focus

7: The focal length of a convex lens is f. If an object be placed at a distance u from the lens, the condition of formation of an inverted image of equal size as the object is

(a) $u = 2f$ (b) $u > 2f$ (c) $f < u < 2f$ (d) $0 < u < f$

Ans. (a) $u = 2f$

9: A point object is placed at the centre of a glass sphere. If radius of the sphere is 6 cm and refractive index of the material is 1.5, then the distance of the virtual image from the surface of the sphere will be

(a) 2 cm (b) 4 cm (c) 6 cm (d) 12 cm

Ans. (c) 6 cm

10: An object is placed at a distance of 20 cm from a convex lens of focal length 10 cm. The image distance is

(a) 20 cm (b) 6.67 cm (c) 10 cm (d) 30 cm

Ans. (a) 20 cm

11: The size of the image of an object which is at infinity, as formed by a convex lens of focal length 30 cm is 2 cm. If a concave lens of focal length 20 cm is placed between the convex lens and the image at a distance at 26 cm from the convex lens, the real size of the image would be

(a) 1.25 cm (b) 2.5 cm (c) 1.05 cm (d) 2 cm

Ans. (b) 2.5 cm

12: A convex lens of focal length 30 cm produces 5 times magnified real image of an object. What is the object distance ?

(a) 36 cm (b) 25 cm (c) 30 cm (d) 150 cm

Ans. (a) 36 cm

13: To determine the focal length of a thin convex lens, if red light is used instead of blue light the focal length of the lens

(a) increases (d) decreases (c) remains same (d) cannot be determined

Ans. (a) increases

14: Two thin lenses of focal lengths f_1 and f_2 are kept is contact co axially. The power of the combination is given by

(a) $\sqrt{\frac{f_1}{f_2}}$ (b) $\sqrt{\frac{f_2}{f_1}}$ (c) $\frac{f_1 + f_2}{2}$ (d) $\frac{f_1 + f_2}{f_1 f_2}$

Ans. (d) $\frac{f_1 + f_2}{f_1 f_2}$

15: A thin glass (refractive index, μ =1.5) lens has optical power of -5 D in air. Its optical power in a liquid medium with refractive index 1.6 will be

(a) 1D (b) -1D (c) 25 D (d) -25 D

Ans. (a) 1D