



BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – B.Optomety-2022/B.Optomety-2023

Course Name – Geometrical Optics

Course Code - BOPTOC205

(Semester II)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :
 - (i) Power of the lens is -40 D , calculate its focal length.
 - a) 4 m
 - b) -40 m
 - c) -0.025 m
 - d) -25 m
 - (ii) Which one of the following materials cannot be used to make a lens?
 - a) Glass
 - b) Plastic
 - c) Clay
 - d) Water
 - (iii) Lens which is thick at the center but thin at the edges is called
 - a) counter lens
 - b) fiber lens
 - c) converging lens
 - d) diverging lens
 - (iv) Focal point is also termed as
 - a) principal focus
 - b) focal length
 - c) focal plane
 - d) principal axis
 - (v) A magnifying glass is a
 - a) converging lens
 - b) concave lens
 - c) diverging lens
 - d) thick diverging lens
 - (vi) To produce a real, inverted and diminished image on film, a camera uses
 - a) converging lens
 - b) diverging lens
 - c) counter lens
 - d) fiber lens
 - (vii) Unit of magnification is
 - a) metre
 - b) diopter
 - c) no unit
 - d) m^{-1}

- (viii) Absolute refractive index of any medium is always
a) 1
b) > 1
c) < 1
d) 0
- (ix) Which of the following is used to split white light into different colours?
a) Glass slab
b) Convex lens
c) Concave lens
d) Prism
- (x) Red light is used for signals because it has
a) long wavelength
b) high intensity
c) high frequency
d) low refraction in the medium
- (xi) Which of the following is not an electromagnetic wave?
a) x-rays
b) cosmic rays
c) microwave
d) all of these
- (xii) The velocity of waves of all colours is same in
a) water
b) air
c) vacuum
d) glass
- (xiii) Total internal reflection can take place only if
a) light goes from optically rarer medium to optically denser medium.
b) light goes from optically denser medium to rarer medium.
c) the refractive indices of the two media are close to each other.
d) the refractive indices of the two media are widely different.
- (xiv) Mirage is an example of
a) total internal reflection of light
b) reflection of light
c) diffraction of light
d) scattering of light
- (xv) The power of lens of focal length 1 cm is
a) 1 D
b) 10 D
c) 100 D
d) 0.01 D

Group-B

(Short Answer Type Questions)

3 x 5=15

2. What is the basic difference between plane mirror and spherical mirror? (3)
3. Why do we prefer a convex mirror as a rear-view mirror in vehicles? (3)
4. Write short note on principal focus of spherical surfaces. (3)
5. Calculate the focal length of a plano convex lens for which the radius of the curved surface is 40 cm ($\mu = 1.5$). (3)
6. A thick convex lens ($\mu = 1.5$) of thickness 1 cm has radii of curvature 10 cm each. Find the positions of the principal points if the focal length is 10 cm. (3)

OR

A convex refracting surface of radius of curvature 20 cm separates two media of refractive indices $\frac{4}{3}$ and 1.60. An object is placed in the first medium ($\mu = \frac{4}{3}$) at a distance of 200 cm from the refracting surface. Estimate the position of the formed image. (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. What is optical path? How is it different from geometrical path? (5)
8. Explain all the cardinal points for a coaxial system. (5)
9. Two convex lenses of focal lengths 5 cm and 20 cm are kept separated by a distance 10 cm in air. Find the equivalent power of the lens combination. (5)
10. Explain the refraction of light through a glass-slab with neat ray diagram. (5)
11. Write short note on angular dispersion of a prism. (5)
12. Show that the deviation produced by a lens is independent of the position of the object. (5)

OR

Explain the nodal points of a thick lens with proper diagram. (5)
