

Ray Optics and Optical Instruments

1. A concave mirror is held in water. What should be the change in the focal length of the mirror?
 - a) Halved
 - b) Doubled
 - c) Remains the same
 - d) Increases exponentially
2. Two concave mirrors have the same focal length but the aperture of one is larger than that of the other. Which mirror forms the sharper image and why?
 - a) Plane
 - b) Concave
 - c) Convex
 - d) Prism
3. A man stands in front of a mirror of special shape. He finds that his image has a very small head, a fat body, and legs of normal size. What can we say about the shapes of the three parts of the mirror?
 - a) Convex, Concave, Plane
 - b) The plane, Concave, Convex
 - c) Concave, Convex, Plane
 - d) Convex, Plane, Concave
4. Can the relative refractive index of a medium w.r.t. another medium be less than unity?
 - a) Insufficient data
 - b) Indefinite
 - c) No
 - d) Yes
5. Which of the following causes refraction of light?
 - a) Change in the density of light from one medium to another
 - b) Change in viscosity of light from one medium to another
 - c) Change in the speed of light from one medium to another
 - d) Change in direction of light from one medium to another
6. Frequency and wavelength change when light passes from a rarer to a denser medium.
 - a) True
 - b) False
7. The magnification of 'X' is more than unity. Identify X.

- a) Convex mirror
- b) Concave mirror
- c) Plane mirror
- d) Prism

8. What happens to the shining of diamond if it is dipped in a transparent oil?

- a) Reduces
- b) Increases
- c) Remains the same
- d) Becomes colorless

9. Calculate its focal length if the radii of curvature of a double convex lens are 10 cm, and 20 cm and its refractive index is 1.75.

- a) 50 cm
- b) 13 cm
- c) 8.9 cm
- d) 8 cm

10. If the radius of curvature of each face of the biconcave lens, made of glass of refractive index 1.25 is 50 cm, then what is the focal length of the lens in air?

- a) 30 cm
- b) -100 cm
- c) 100 cm
- d) -30 cm

11. What causes haloes (rings) around the sun or the moon?

- a) Total internal reflection
- b) Refraction of light
- c) Reflection of light
- d) Dispersion

12. Why is the sequence of colors in the secondary rainbow reverse of that in the primary rainbow?

- a) Refraction of light
- b) Two internal reflection
- c) Reflection of light
- d) Dispersion

13. Which of the following is a necessary condition for total internal reflection?

- a) The angle of incidence in the denser medium must be greater than the critical angle for the two media
- b) The angle of incidence in the rarer medium must be greater than the critical angle for the two media
- c) The angle of incidence in the denser medium must be lesser than the critical

angle for the two media

d) The angle of reflection in the denser medium must be greater than the critical angle for the two media

14. Which of the following color is the ocean?

- a) Black
- b) Orange
- c) Blue
- d) Red

15. The secondary rainbow is brighter than the primary rainbow.

- a) True
- b) False

16. 'X' is an optical illusion observed in deserts or over hot extended surfaces like a coal-tarred road, due to which a traveler sees a shimmering pond of water some distance ahead of him and in which the surrounding objects like trees appear inverted. Identify X.

- a) Mileage
- b) Mirage
- c) Optical activity
- d) Total internal reflection

17. Identify the principle behind the sparkling of diamonds.

- a) Total internal reflection
- b) Refraction
- c) Reflection
- d) Optical activity

18. How many types of spherical refracting surfaces are there?

- a) 2
- b) 3
- c) 4
- d) 5

19. Which among the following is a portion of a transparent refracting medium bound by one spherical surface and the other plane surface?

- a) Concave mirror
- b) Plane mirror
- c) Lens
- d) Prism

20. X is thicker in the middle than at the edges, whereas, Y is thicker at the edges than in the middle. Identify 'X' and 'Y'.

- a) X = concave lens; Y = convex lens
- b) X = convex lens; Y = concave lens
- c) X = plane lens; Y = convex lens
- d) X = concave lens; Y = plane lens

**ANSWERS-1.(C) 2.(B) 3.(A) 4.(D) 5.(C) 6.(B) 7.(B) 8.(A) 9.(C)
10.(B) 11.(C) 12.(B) 13.(A) 14.(C) 15.(B) 16.(B) 17.(A) 18.(A)
19.(C) 20.(B).**