DPP No: 34

Maximum Time
50 Min

PHYSICS

TARGET
JEE-MAINS

SYLLABUS : GEOMETRICAL OPTICS

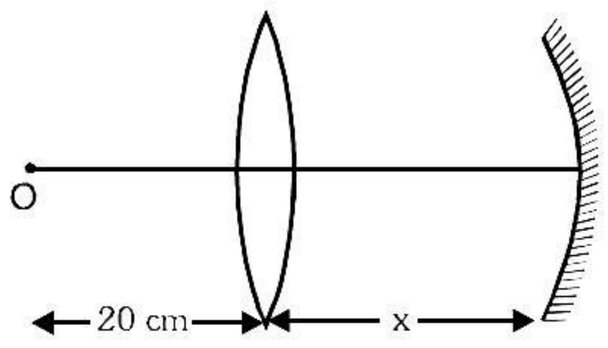
1. A biconvex lens is used to project a slide on screen. The slide is 2 cm high and placed at 10 cm from the lens. The image is 18 cm high. What is the focal length of the lens?

(A) 9 cm (B) 18 cm (C) 4.5 cm (D) 20 cm

2. The minimum distance between a real object and its real image formed by a thin converging lens of focal length f is

(A) 4f (B) 2f (C) f (D) f/2

3. A point object O is placed at a distance of 20 cm from a convex lens of focal length 10 cm as shown in figure. At what distance x from the lens should a concave mirror of focal length 60 cm, be placed so that final image coincides with the object–



(A) 10 cm

(B) 15 cm

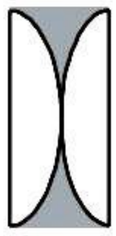
(C) 20 cm

(D) final image can never coincide with the object in the given conditions

4. The radius of the sun is 0.75×10^9 m and its distance from the earth is 1.5×10^{11} m. Find the diameter of the image of the sun formed by a lens of focal length 40 cm.

(A) 0.1 cm (B) 0.2 cm (C) 0.3 cm (D) 0.4 cm

5. Two plano-convex lenses each of focal length 10 cm & refractive index $\frac{3}{2}$ are placed as shown in the figure. In the space left, water $\left(\text{R.I.}=\frac{4}{3}\right)$ is filled. The whole arrangement is in air. The optical power of the system is (in dioptre):



(A) 6.67 (B) - 6.67 (C) 33.3 (D) 20

6. A plano-convex lens, when silvered at its plane surface is equivalent to a concave mirror of focal length 28 cm. When its curved surface is silvered and the plane surface not silvered, it is equivalent to a concave mirror of focal length 10 cm, then the refractive index of the material of the lens is:

(A) 9/14 (B) 14/9 (C) 17/9 (D) none

7. In the above question the radius of curvature of the curved surface of plano-convex lens is :

(A) $\frac{280}{9}$ cm (B) $\frac{180}{7}$ cm (C) $\frac{39}{3}$ cm (D) $\frac{280}{11}$ cm

8. The focal length of a plano-concave lens is – 10 cm, then its focal length when its plane surface is polished is (n = 3/2):

(A) 20 cm (B) – 5 cm (C) 5 cm (D) none of these

9. A convex lens of focal length 25 cm and a concave lens of focal length 20 cm are mounted coaxially separated by a distance d cm. If the power of the combination is zero, d is equal to

(A) 45 (B) 30 (C) 15 (D) 5

10. The dispersion of light in a medium implies that :

(A) lights of different wavelengths travel with different speeds in the medium

(B) lights of different frequencies travel with different speeds in the medium

(C) the refractive index of medium is different for different wavelengths

(D) all of the above.

11. Critical angle of light passing from glass to air is minimum for

(A) red (B) green (C) yellow (D) violet

12. A plane glass slab is placed over various coloured letters. The letter which appears to be raised the least is:

(A) violet (B) yellow (C) red (D) green

13. A medium has $n_v = 1.56$, $n_r = 1.44$. Then its dispersive power is:

(A) 3/50 (B) 6/25 (C) 0.03 (D) none of these

14. All the listed things below are made of flint glass. Which one of these have greatest dispersive power (ω).

(A) prism (B) glass slab (C) biconvex lens (D) all have same ω

15. Light of wavelength 4000 Å is incident at small angle on a prism of apex angle 4°. The prism has $n_v = 1.5$ & $n_r = 1.48$. The angle of dispersion produced by the prism in this light is:

(A) 0.2° (B) 0.08° (C) 0.192° (D) None of these

16. A simple microscope has a focal length of 5 cm. The magnification at the least distance of distinct vision is-

(A) 1 (B) 5 (C) 4 (D) 6

17. In a compound microscope, the intermediate image is -

(A) virtual, erect and magnified (B) real, erect and magnified

(C) real, inverted and magnified (D) virtual, erect and reduced

18. Two lenses of power -15D and +5D are in contact with each other. The focal length of the combination is

(A) – 20 cm (B) –10 cm (C) +20cm (D) +10 cm

19. A Galileo telescope has an objective of focal length 100 cm & magnifying power 50. The distance between the two lenses in normal adjustment will be

(A) 150 cm (B) 100 cm (C) 98 cm (D) 200 cm

20. The convex lens is used in-

(A) Microscope (B) Telescope (C) Projector (D) All of the above

21. The focal length of the objective of a microscope is

(A) arbitrary (B) less than the focal length of eyepiece

(C) equal to the focal length of eyepiece (D) greater than the focal length of eyepiece

22. An astronomical telescope has an eyepiece of focal-length 5 cm. If the angular magnification in normal adjustment is 10, when final image is at least distance of distinct vision (25cm) from eye piece, then angular magnification will be :

(A) 10 (B) 12 (C) 50 (D) 60

23. A person with a defective sight is using a lens having a power of +2D. The lens he is using is

(A) concave lens with $f = 0.5$ m (B) convex lens with $f = 2.0$ m

(C) concave lens with $f = 0.2$ m (D) convex lens with $f = 0.5$ m

24. The focal lengths of the objective and eye-lens of a microscope are 1 cm and 5 cm respectively. If the magnifying power for the relaxed eye is 45, then the length of the tube is :

(A) 30 cm (B) 25 cm (C) 15 cm (D) 12 cm

25. If the focal length of objective and eye lens are 1.2 cm and 3 cm respectively and the object is put 1.25 cm away from the objective lens and the final image is formed at infinity. The magnifying power of the microscope is :

(A) 150 (B) 200 (C) 250 (D) 400

ANSWER KEY

1.	(A)	**2.**	(A)	**3.**	(C)	**4.**	(D)	**5.**	(A)
6.	(B)	**7.**	(A)	**8.**	(C)	**9.**	(D)	**10.**	(D)
11.	(D)	**12.**	(C)	**13.**	(B)	**14.**	(D)	**15.**	(D)
16.	(D)	**17.**	(C)	**18.**	(B)	**19.**	(C)	**20.**	(D)
21.	(B)	**22.**	(B)	**23.**	(D)	**24.**	(C)	**25.**	(B)