NEET : CHAPTER WISE TEST-8

SUBJECT :- PHYSICS **DATE.....**

CLASS :- 12th **NAME.....**

CHAPTER :- RAY OPTICS **SECTION.....**

(SECTION-A)

1. A ray is reflected in turn by three plain mirrors mutually at right angles to each other. The angle between the incident and the reflected rays is

(A) $90°$ (B) $60°$

(C) $180°$ (D) None of these

2. To get three images of a single object, one should have two plane mirrors at an angle of

(A) 30° (B) 60° (C) 90° (D)150°

3. A light beam is being reflected by using two mirrors, as in a periscope used in submarines. If one of the mirrors rotates by an angle θ, the reflected light will deviate from its original path by the angle

(A) 2θ (B) 0^{o} (C) θ (D) 4θ

4. In a concave mirror experiment, an object is placed at a distance x_1 from the focus and the image is formed at a distance x_2 from the focus. The focal length of the mirror would be

(A) $x_1 x_2$ (B) $\sqrt{x_1 x_2}$

(C) $\frac{x_1 + x_2}{2}$ (D) $\sqrt{\frac{x_1}{x_2}}$

5. A ray of light is incidenting normally on a plane mirror. The angle of reflection will be

(A) $0°$

(B) $90°$

(C) Will not be reflected

(D) None of the above

6. A man having height 6 ft. He observes image of 2 ft height erect, then mirror used is

(A) Concave (B) Convex

(C) Plane (D) None of these

7. Two vertical plane mirrors are inclined at an angle of $60°$ with each other. A ray of light travelling horizontally is reflected first from one mirror and then from the other. The resultant deviation is

(A) $60°$ (B) $120°$

(C) $180°$ (D) $240°$

8. An object $5cm$ tall is placed $1m$ from a concave spherical mirror which has a radius of curvature of $20cm$ The size of the image is

(A) $0.11cm$ (B) $0.50cm$

(C) $0.55cm$ (D) $0.60cm$

9. A ray of light is incident at 50° on the middle of one of the two mirrors arranged at an angle of 60° between them. The ray then touches the second mirror, get reflected back to the first mirror, making an angle of incidence of

(A) 50° (B) 60° (C) 70° (D)80°

10. A plane mirror is approaching you at a speed of $10\,cm/sec$ You can see your image in it. At what speed will your image approach you

(A) $10cm/sec$ (B) $5cm/sec$

(C) $20cm/sec$ (D) $15cm/sec$

11. A concave mirror is used to focus the image of a flower on a nearby well 120cm from the flower. If a lateral magnification of 16 is desired, the distance of the flower from the mirror should be

(A) $8cm$ (B) $12cm$

(C) $80cm$ (D) $120cm$

12. All of the following statements are correct except

(A) The magnification produced by a convex mirror is always less than one

(B) A virtual, erect, same-sized image can be obtained using a plane mirror

(C) A virtual, erect, magnified image can be formed using a concave mirror

(D) A real, inverted, same-sized image can be formed using a convex mirror

13. An object of size $7.5cm$ is placed in front of a convex mirror of radius of curvature $25cm$ at a distance of $40cm$. The size of the image should be

(A) $2.3cm$ (B) $1.78cm$

(C) $1cm$ (D) $0.8cm$

14. Under which of the following conditions will a convex mirror of focal length *f* produce an image that is erect, diminished and virtual

(A) Only when $2f > u > f$

(B) Only when $u = f$

(C) Only when $u < f$

(D) Always

15. An object 2.5 *cm* high is placed at a distance of 10 *cm* from a concave mirror of radius of curvature 30 *cm* The size of the image is

(A) 9.2 *cm* (B) 10.5 *cm*

(C) 5.6 *cm* (D) 7.5 *cm*

16. A concave mirror of focal length *f* (in air) is immersed in water ($\mu = 4/3$). The focal length of the mirror in water will be

(A) f (B) $\frac{4}{3} f$

(C) $\frac{3}{4} f$ (D) $\frac{7}{3} f$

17. The refractive index of a certain glass is 1.5 for light whose wavelength in vacuum is 6000 Å. The wavelength of this light when it passes through glass is

(A) 4000 Å (B) 6000 Å

(C) 9000 Å (D) 15000 Å

18. A beam of light propagating in medium *A* with index of refraction *n* (*A*) passes across an interface into medium *B* with index of refraction *n*(*B*). The angle of incidence is greater than the angle of refraction; *v*(*A*) and *v*(*B*) denotes the speed of light in *A* and *B*. Then which of the following is true

(A) *v*(*A*) > *v*(*B*) and *n*(*A*) > *n*(*B*)

(B) *v*(*A*) > v(*B*) and *n*(*A*) < *n*(*B*)

(C) *v*(*A*) < *v*(*B*) and *n*(*A*) > *n*(*B*)

(D) *v*(*A*) < *v*(*B*) and *n*(*A*) < *n*(*B*)

19. A beam of light is converging towards a point I on a screen. A plane glass plate whose thickness in the direction of the beam = t, refractive index = μ, is introduced in the path of the beam. The convergence point is shifted by

(A) $t\left(1-\frac{1}{\mu}\right)$ away

(B) $t\left(1+\frac{1}{\mu}\right)$ away

(C) $t\left(1-\frac{1}{\mu}\right)$ nearer

(D) $t\left(1+\frac{1}{\mu}\right)$ nearer

20. The refractive indices of glass and water *w.r.t.* air are 3/2 and 4/3 respectively. The refractive index of glass *w.r.t.* water will be

(A) 8/9 (B) 9/8

(C) 7/6 (D) None of these

21. A mark at the bottom of a liquid appears to rise by 0.1 *m*. The depth of the liquid is 1 *m*. The refractive index of the liquid is

(A) 1.33 (B) $\frac{9}{10}$ (C) $\frac{10}{9}$ (B) 1.5

22. A ray of light is incident on the surface of separation of a medium at an angle 45° and is refracted in the medium at an angle 30°. What will be the velocity of light in the medium

(A) 1.96×10^8 *m/s* (B) 2.12×10^8 m/s

(C) 3.18×10^8 m/s (D) 3.33×18^8 m/s

23. Velocity of light in glass whose refractive index with respect to air is 1.5 is 2×10^8 *m/s* and in certain liquid the velocity of light found to be 2.5×10^8 *m/s*. The refractive index of the liquid with respect to air is

(A) 0.64 (B) 0.80 (C)1.20 (D)1.44

24. Which one of the following statements is correct

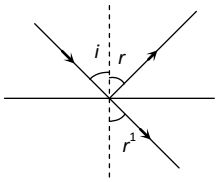
(A) In vacuum, the speed of light depends upon frequency

(B) In vacuum, the speed of light does not depend upon frequency

(C) In vacuum, the speed of light is independent of frequency and wavelength

(D) In vacuum, the speed of light depends upon wavelength

25. A ray of light is incident at an angle *i* from denser to rare medium. The reflected and the refracted rays are mutually perpendicular. The angle of reflection and the angle of refraction are respectively *r* and r', then the critical angle will be



(A) $\sin^{-1}(\sin r)$ (B) $\sin^{-1}(\tan r')$

(C) $\sin^{-1}(\tan i)$ (D) $\tan^{-1}(\sin i)$

26. With respect to air critical angle in a medium for light of red colour $[\lambda_1]$ is θ. Other facts remaining same, critical angle for light of yellow colour $[\lambda_2]$ will be

(A) θ (B) More than θ

(C) Less than θ (D) $\frac{\theta\lambda_1}{\lambda_2}$

27. Relation between critical angles of water and glass is

(A) $C_w > C_g$ (B) $C_w < C_g$

(C) $C_w = C_g$ (D) $C_w = C_g = 0$

28. Light wave enters from medium 1 to medium 2. Its velocity in 2nd medium is double from 1st. For total internal reflection the angle of incidence must be greater than

(A) 30° (B) 60°

(C) 45° (D) 90°

29. Critical angle for light going from medium (i) to (ii) is θ. The speed of light in medium (i) is *v* then speed in medium (ii) is

(A) $v(1-\cos\theta)$ (B) $v/\sin\theta$

(C) $v/\cos\theta$ (D) $v(1-\sin\theta)$

30. If light travels a distance *x* in t_1 *sec* in air and 10 *x* distance in t_2 *sec* in a medium, the critical angle of the medium will be

(A) $\tan^{-1}\left(\frac{t_1}{t_2}\right)$ (B) $\sin^{-1}\left(\frac{t_1}{t_2}\right)$

(C) $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$ (D) $\tan^{-1}\left(\frac{10t_1}{t_2}\right)$

31. A normally incident ray reflected at an angle of 90^{o}. The value of critical angle is

(A) 45^{o} (B) 90^{o}

(C) 65^{o} (D) 43.2^{o}

32. A point source of light is placed 4 *m* below the surface of water of refractive index 5 / 3. The minimum diameter of a disc which should be placed over the source on the surface of water to cut–off all light coming out of water is

(A) 2 *m* (B) 6 *m* (C) 4 *m* (D)3 *m*

33. The radius of curvature for a convex lens is 40 *cm*, for each surface. Its refractive index is 1.5. The focal length will be

(A) 40 *cm* (B) 20 *cm*

(C) 80 *cm* (D) 30 *cm*

34. A convex lens of focal length 40 cm is in contact with a concave lens of focal length 25 cm. The power of combination is

(A) – 1.5 *D* (B) – 6.5 *D*

(C) + 6.5 *D* (D) + 6.67 *D*

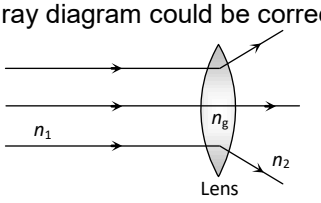
35. Two lenses of power +12 and – 2 diopters are placed in contact. What will the focal length of combination

(A) 10 *cm* (B) 12.5 *cm*

(C) 16.6 *cm* (D) 8.33 *cm*

(SECTION-B)

36. The ray diagram could be correct



(A) If $n_1 = n_2 = n_g$

(B) If $n_1 = n_2$ and $n_1 < n_g$

(C) If $n_1 = n_2$ and $n_1 > n_g$

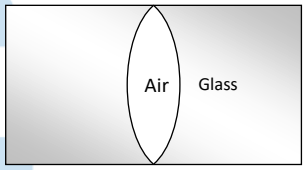
(D) Under no circumstances

37. A lens is placed between a source of light and a wall. It forms images of area A_1 and A_2 on the wall for its two different positions. The area of the source or light is

(A) $\frac{A_1 + A_2}{2}$ (B) $\left[\frac{1}{A_1} + \frac{1}{A_2}\right]^{-1}$

(C) $\sqrt{A_1 A_2}$ (D) $\left[\frac{\sqrt{A_1} + \sqrt{A_2}}{2}\right]^{2}$

38. In the figure, an air lens of radii of curvature 10 *cm* (R_1 = R_2 = 10 *cm*) is cut in a cylinder of glass $(\mu = 1.5)$. The focal length and the nature of the lens is



(A) 15 *cm*, concave

(B) 15 *cm*, convex

(C) ∞, neither concave nor convex

(D) 0, concave

39. f_v and f_r are the focal lengths of a convex lens for violet and red light respectively and F_v and F_r are the focal lengths of a concave lens for violet and red light respectively, then

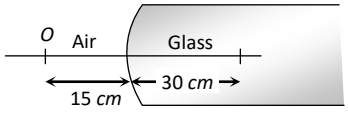
(A) $f_v < f_r$ and $F_v > F_r$

(B) $f_v < f_R$ and $F_v < F_r$

(C) $f_c > f_r$ and $F_v > F_r$

(D) $f_v > f_r$ and $F_v < F_r$

40. A point object *O* is placed in front of a glass rod having spherical end of radius of curvature 30 *cm*. The image would be formed at



(A) 30 *cm* left (B) Infinity

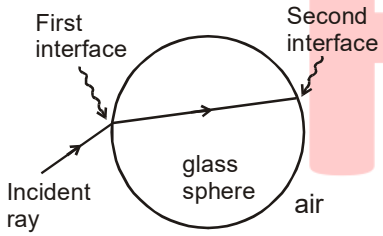
(C) 1 *cm* to the right (D) 18 *cm* to the left

41. When white light passes through a glass prism, one gets spectrum on the other side of the prism. In the emergent beam, the ray which is deviating least is or
Deviation by a prism is lowest for
(A) Violet ray (B) Green ray
(C) Red ray (D) Yellow ray

42. Angle of minimum deviation for a prism of refractive index 1.5 is equal to the angle of prism. The angle of prism is (cos 41° = 0.75)
(A) 62° (B) 41°
(C) 82° (D)31°

43. The respective angles of the flint and crown glass prisms are *A*' and *A*. They are to be used for dispersion without deviation, then the ratio of their angles *A*' /*A* will be
(A) $-\frac{(\mu_y - 1)}{(\mu_y' - 1)}$ (B) $\frac{(\mu_y' - 1)}{(\mu_y - 1)}$
(C) $(\mu_y' - 1)$ (D) $(\mu_y - 1)$

44. **Assertion :** A ray is incident from outside on a glass sphere surrounded by air as shown. This ray can not suffer total internal reflection at second interface.



Reason : For a ray going from denser to rarer medium, the ray may suffer total internal reflection.
(A) If both assertion and reason are true and reason is the correct explanation of assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of assertion.
(C) If Assertion is true but reason is false.
(D) If both assertion and reason are false.

45. Three prisms of crown glass, each have angle of prism 9° and two prisms of flint glass are used to make direct vision spectroscope. What will be the angle of flint glass prisms if μ for flint is 1.60 and μ for crown glass is 1.53
(A) 11.9° (B) 16.0°
(C) 15.3° (D) 9.11°

46. Minimum deviation is observed with a prism having angle of prism *A*, angle of deviation δ, angle of incidence *i* and angle of emergence *e*. We then have generally
(A) *i* > *e* (B) *i* < e
(C) *i* = *e* (D) *i* = *e* = δ

47. The path of a refracted ray of light in a prism is parallel to the base of the prism only when the
(A) Light is of a particular wavelength
(B) Ray is incident normally at one face
(C) Ray undergoes minimum deviation
(D) Prism is made of a particular type of glass

48. Match the corresponding entries of column–1 with column–2. [Where m is the magnification produced by the mirror]

Column–1	**Column–2**
(A) m = –2	(a) Convex mirror
(B) m = $-\frac{1}{2}$	(b)Concave mirror
(C) m = +2	(c) Real image
(D) m = $+\frac{1}{2}$	(d) Virtual image

(A) A $\rightarrow$ c and d; B $\rightarrow$b and d; C $\rightarrow$ b and c; D $\rightarrow$ a and d
(B) A $\rightarrow$ b and c; B $\rightarrow$b and c; C $\rightarrow$ b and d; D $\rightarrow$ a and d
(C) A $\rightarrow$a and c; B $\rightarrow$ a and d; C $\rightarrow$ a and b; D $\rightarrow$ c and d
(D) A $\rightarrow$a and d; B $\rightarrow$b and c; C $\rightarrow$ b and d; D $\rightarrow$ b and c

49. A biconvex lens has radii of curvature 20m each. If the refractive index of the material of the lens is 1.5 , the power of the lens is:
(A) +20D (B) +5D
(C) infinity (D) +2D

50. Two transparent media and are separated by a plane boundary. The speed of light in those media are $1.5\times10^8 ms^{-1}$ and $2.0\times10^8 ms^{-1}$, respectively. The critical angle for a ray of light for these two media is:
(A) $\sin^{-1}(0.750)$ (B) $\tan^{-1}(0.500)$
(C) $\tan^{-1}(0.750)$ (D) $\sin^{-1}(0.500)$