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OPTICS

1.An achromatic combination is to be made using a convex and concave lens. The two lenses should have

(a) their powers equal

(b)their refractive indices equal

(c)their dispersive powers equal

(d) the product of their powers and dispersive powers equal

2.An achromatic convergent system of focal length + 20 cm is made of power in the ratio 1:2 .Their focal length must be respectively

(a)10 cm ,-20 cm   (b)20 cm,10 cm

(c)-10 cm, -20 cm   (d)20 cm,- 10 cm

3.The image of an object formed by a device is always virtual and small .The device may be

(a)convex lens   (b)concave mirror

(c)glass plate   (d) concave lens

4.A person cannot see clearly objects placed at a distance more than 40 cm. He is advised to use lens of power

(a)-2.5 D   (b)+2.5 D   (c)-6.25 D   (d)+1.5

5.A person can see objects only at distance greater than 40 cm. He is advised to use lens of power

(a)+2.5 D   (b)+1.5 D   (c)-2.5 D   (d)-6.25 D

6.In displacement method, the lengths of image in two position of the lens between the object and the screen are 9 cm and 4 cm respectively .The length of the object must be

(a)6.25cm   (b)1.5 cm   (c)6 cm   (d)36 cm

7.A light wave enters from air into a medium of refractive index 1.5 .The speed of light in the medium will be

(a)2 x 10^8 m/s   (b)4.5 x 10^8 m/s

(c)3 x 10^8 m/s   (d)(330/1.5)m/s

8.The angle of a prism is 60°.What is the angle of incidence for minimum deviation ?The refracting index of the material of the prism is $\sqrt{2}$.

(a)45°   (b)60°   (c)30°   (d)$sin^{-1}(2/3)$

9.The length of a telescope is 100 cm and magnificent is 9 .The focal length of the objective and the eye lens are respectively nearly

(a)90 cm and 10 cm   (b)85 cm and 15 cm

(c)80 cm and 20 cm   (d)95 cm and 5 cm

10. When a ray is refracted from one medium into another, the wavelength changes from 6000$\dot{A}$ to 4000 $\dot{A}$.The critical angle for a ray from the second medium will be

(a)$cos^{-1}\frac{2}{3}$ (b)$sin^{-1}\frac{2}{3}$ (c)$tan^{-1}\frac{3}{2}$ (d)$sin^{-1}\frac{2}{\sqrt{13}}$

11.A fish in water sees an object which is 24 cm above the surface of water. The height of the object above the surface of water that will appear to the fish is

(a)24 cm   (b)32cm   (c)18 cm   (d)48 cm

12.A man can see an object upto a distance of one meter from his eye .For correcting his eye sight ,so that he can see an object at infinity , he requires a lens of power

(a)+0.5 D   (b)+1.0 D

(c)+2.0 D   (d)-1.0 D

13.A boy stands straight infront of a mirror at a distance of 30 cm from it .He sees his erect image whose height is 1/5 of his height .The mirror he is using is

(a)plane   (b)convex

(c)concave   (d)plano-concave

14.A man is 180 cm tall and his eyes are 10 cm below the top of his head .In order to see his entire height is 1/5 of his real height. The mirror he is using is

(a)180 cm   (b)90 cm   (c)85 cm   (d)170 cm

15.A thin oil layer floats on water .A ray of light making an angle of incidence of 40° shins on oil layer .The angle of refraction of the light ray with water surface is (n_{oil}=1.45,n_{water}=1.33)

(a)36.1°   (b)44.5°   (c)26.8°   (d)28.9°

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

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(a)0.11 cm   (b)0.50 cm

(c)0.55 cm   (d)0.60 cm

17.As an object gets closer to the focal point of a converging lens from infinity ,its image

(a)become smaller   (b)remains of the same size

(c)gets farther from the lens

(d)gets closer to the lens

18.Image formal by a convex spherical mirror is

(a)virtual   (b)real   (c)enlarged   (d)inverted

19.An object 15 cm high is placed 10 cm from the optical centre of a thin lens. Its image is formed 25 cm from the optical center on the same side of the lens as the object .The height of the image is

(a)2.5 cm   (b)0.2 cm   (c)16.7 cm   (d)37.5 cm

20. A convex lens of power +6 dioptres is placed in contact with a concave lens of power-4 dioptres. What will be the nature and focal length of this combination?

(A) concave, 2.5 cm   (B) convex, 50 cm

(C) concave, 20 cm   (D) convex, 100 cm

21. A thin symmetric convex lens of refractive index of the material 1.5 and radius of curvature 0.5 m is immersed in water of refractive index 4/3. It focal length will be

(A) 0.20 m   (B) 4.00 m   (C) 2.00m   (D) 0.02m

22. 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 undergoes minimum deviation

23. An object I cm tall is placed 4 cm in front of a mirror. In order to produce an upright images of m height one needs a

(A) convex mirror of radius of curvature 12 cm

(B) concave mirror of radius of curvatures 12 cm

(C) concave mirror of radius of curvature 4 cm

24. An object is placed first at infinity and then at 20 cm from the object-side focal plane of a convex lens. The two images of the thus formed are 5 cm apart. The focal length of the lens is

(A) 5 cm   (B) 10 cm   (C) 15 cm   (D) 20 cm

25. If the top half of a convex lens is converted with black paper,

(A) the bottom half of the image with disappear

(B) the top half of the will disappear

(C) the magnification will be reduced to half

(D) the intensity will be reduced to half

26. A convex lens is immersed in a liquid of refractive index greater than that of glass. It will behave as a

(A) convergent lens   (B) divergent lens

(C) plane glass   (D) homogeneous liquid

27. The distance between an object and the screen is 100 cm. A lens produces an image on the screen when placed at either of two position 40 cm apart. The power of the positions 4 cm apart. The power of the lens is approximately

(A)3 D   (B) D   (C) 7 D   (D) 9 D

28. The image distance of an object placed 10 cm in front of a thin lens of focal length +5 cm is

(A) 6.5 cm   (B) 8.0 cm   (C) 9.5 cm   (D) 10.0 cm

29. The angular magnification of a telescope which contains an objective of focal length f^1 and eyepiece of focal length f^2 is

(A) $\frac{f2}{f1}$ (B)$\frac{f1+f2}{f2}$ (C) $\frac{f1}{f2}$ (D) $\frac{f1f2}{f1+f2}$

30. Four convergent lenses have focal length 100 cm, 10 cm, 4 cm, and 0.3 cm. For a telescope with maximum possible magnification, we choose the lenses of focal lengths.

(A) 100 cm, 0.3 cm   (B) 10 cm, 0.3 cm

(C) 10 cm, 4 cm   (D) 100 cm, 4 cm