PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

OPTICS

In Text Solved Examples

1. Prove that when a reflecting surface of light by an angle θ, the reflected light will be tited

by an angle 20.

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2. A man having height 6 m, want to see full height in mirror. They observe image of 2 m height erect, then used mirror is

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3. An object is placed at a distance of 20.0 cm from a concave mirror of focal length 15.0 cm.

(a) What distance from the mirror a screen should be placed to get a sharp image?

(b) What is the nature of the image?

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4. A thin rod of length f/3 is placed along the optical axis of a concave mirror of focal length f such that its image which is real and elongated just touches the rod. Calculate the magnification

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5. One type of transparent glass has refractive index 1.5. What is the speed of light through thi glass?

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6. Light travels from air into glass slab of thickness 50 cm and refractive index 1.5.

(i) What is the speed of light in glass?

(ii) What is the time taken by the light to

travel through the glass slab?

(iii) What is the optical path of the glass slab?

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7. Light travelling through tranparent oil enters in to glass of refractive index 1.5. If the refractive index of glass with repect to the oil is 1.25, what is the refractive index of the oil?

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8. A coin is at the bottom of a trough containing three immiscible liquids of refractive indies 1.3. 1.4 and 1.5. poured one above the other of height 30 cm, 16 cm, and 20 cm respectively. What is the apparent depth at which the coin appers to be when seen from air medium outside? In which medium the coin will be seen?

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9. What is the radius of the illumination when seen above from inside a swimming pool from a depth of 10 m on a sunny day? What is the total angle of view? [Give refractive index of water is 4/3]

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10. A optical fiber is made up of a core material with refractive index 1.68 and a cladding material of refractive index 1.44. What is the

acceptance angle of the fiber kept in air medium? What is the answer if there is no cladding?

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11. The thickness of a glass slab is 0.25 m. It has a refractive index of 1.5 A ray of light is incident on the surface of the slab at an angle of 60°. Find the lateral displacement of the light when it emerges from the other side of the mirror.

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12. Locate the image of the point object O in the situtaion shown. The point C denotes the centre of curvature of the separating surface.

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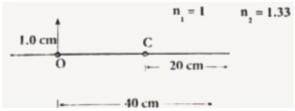
13. Find the size of the image formed in the given figure.



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14. A biconves lens has radil of curvature 20 cm and 15 cm each. The refractive index of the material of the lens is 1.5. What is its focal length? Will the focal length change if the lens is fipped by the side?

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15. Determine the focal length of the lens made up of a material of refractive index 1.52

as shown in the diagram. (Points C_1 and C_2 are the centers of curvature of the first and second surface).

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16. If the focal length is 150 cm for a glass lens, what is the power of the lens?

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17. What is the focal length of the combination if a lens of focal length - 70 c is brought in contact with a lens of focal length 150 cm? What is the power of the combination?

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18. An object of 5 mm height is placed at a distance of 15 cm from a convex lens of focal 10 cm. A second lens of focal length 5 cm is placed 40 cm from the first lens and 55 cm

from the object. Find

(a) the position of the final image.

(b) its nature and (c) its size.

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19. A monochromatic light is incident on as equallateral prism at an angle 30° and emerge at an angle of 75°. What is the angle of deviation produced by the prism?

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20. Light ray falls at normal incidence on the first face of an equilateral prism and emergres gracing the second face. What is the angle of deviation? What is the refractive indec of the material of the prism?

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21. The angle of minimum deviation for a prism is 37°.If the angle of prism is 60° , find the refractive index of the material of the prism.

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22. Find the dispersive power of flint glass if the refractive indices of flint for red, green and violet light are 1.613, 1.620 and 1.632 respectively.

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23. The wavelenght of light from sodium source in vacuum is 5893Å. What are its (a)

wavelenght, (b) speed and (c) frequency when this light travels in water which has a refractive index of 1.33.

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24. Two light sources with amplitudes 5 units and 3 units respectively interfere with each other. Calculate the ratio of maximum and minimum intensities.

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25. Two light sources of equal amplitudes interfere with each other. Calculate the ratio of maximum and minimum intensities.

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26. Two light sources have intensity of light as I_0, What is the intensity at a point where the two light waves have a phase difference of $\pi / 3$?

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27. The wavelenght of a light is 450 nm. How phase it will differ for a path of 3 mm?

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28. In Young's double silt experiment, the two slits are 0.15 mm apart. The light source has a wavelenght of 450 nm. The screen is 2 m away from the slits.

(i) Find the distance of the second bright frings and also third dark frings from the

central maximum.

(ii) Find the fringe width.

(iii) How will the frings pattern change if the screen is moved away from the silis?

(iv) what will happen to the fringe width if the whole setup is immersed in water of refractive index 4/3.

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29. Two lights of wavelenght 560 nm and are used in Young's double slit experiment. Find

the least distance from the centeral fringe where the bright fringe of the two wavelenght coindes. Give D = 1 m and d = 3 mm.

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30. Find the minimum thickness of a film of refractive index 1.25, which will storngly reffect the light of wavelenght 589 nm. Also find the minimum thikness of the film to be anti - reflecting.

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31. Light of wavelength 500 nm Pass through a slit of 0.2 mm wide. The diffraction pattern is formed on a screen 60 cm away. Determine the.

(i) angular spread of centeral maximum

(ii) the distance between the central maximum and the second minimum. `=

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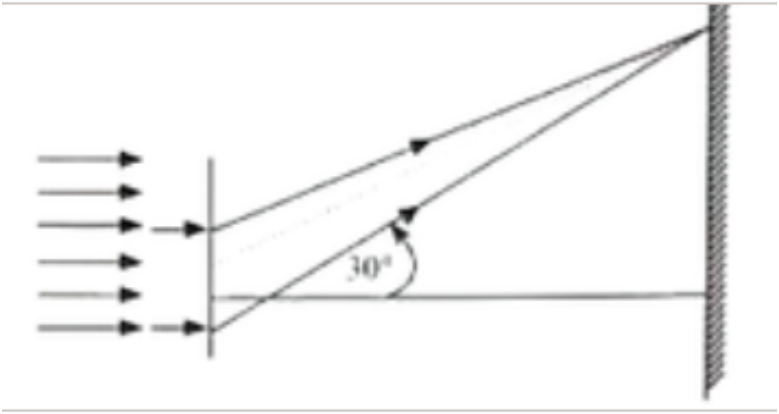
32. A monochromatic light of wavelenght 5000Å passes through a single slit producing diffraction pattern for the central maximum as shown in the figure. Determine that width of the slit.



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33. Calculate the distance for which ray optics is good aproximation for an aperture of 5 mm and wavelenght 500 nm.

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34. A diffraction grating consisting of 4000 slits per centimeter is illuminated with a monochromatic light that produces the second order diffraction at an angle of 30°. What is the wavelenght of the light used?

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35. A monochromatic light of wavelenght of 500 nm strikes a grating and produces foruth order bright line at an angle 30°. Find the number of slits per centimeter.

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36. The optical telescope in the Vainu Bappu observatory at Kavalur has an objective lens of

diameter 2.3.m. What is its angular resolution if the wavelenght of light used is 589 nm?

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37. Two polaroids are kept with their transmission axes inclined at 30°. Unpolarised light of intensity I falls on the first polaroid. Find out the intensity of light emerging from the second polaroid.

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38. Two polaroids are kept corssed $(\text{transmission axes at } 90^\circ)$ to each other.

(i) What will be the intensity of the light coming out from the seond polaroid when an unpolarised light of intensity I falls on the first polaroid?

(ii) What will be the intensity of light coming out from the second polaroid if a thrid polaroid is kept at 45° inclination to both of them.

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39. A light travels from air into water, the angle of refraction is 25° to the normal. Find the angle of incidence. Refractive index of water is 1.33 . $\mu_a = 1$

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40. What is the angle at which a glass plate of refractive index 1.65 is to be kept with respect to the horizontal surface so that an unpolarised light travelling horizontal after

reflection from the glass place is found to be plane polarised?

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41. A man with a near point of 25 cm reads a book small print using a maagnifying glass, a convex lens of focal length 5 cm.

(a) What is the closest and the farthest distance at which he should keep the lens from the page so that he can read the book when viewing through the magnifying glass?

(b) what is the maximum and the minimum magnification (magnifying power) possible using the above simple microscope?

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42. A microscope has an object and eyepiece of focal lenghts 5 cm and 50 cm respectively with tube length 30 cm. Find the magnification of the microscope in the (i) near point and (ii) normal focusing.

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43. A small telescope has an objective lens of focal length 125 cm and an eyepiece of focal length 2 cm. What is the magnification of the telescope? What is the separation between the objective and eyepiece? Two stars separated by 1' will appear at what separation when viewed through the telescope?

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44. Calculate the power of lens of the spectacles necessary to rectify the defect of nearsightedeness fof a person who could see clearly only up to a distance of 1.8 m.

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45. A person has farsightedness with the minimum distance he could see early is 75 cm. Calculate the poer of the spectacts necessary to recify the defect.

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Textual Evaluation Solved Multiple Choice Questions

1. The speed of light in an isotropic medium depends on,

A. its intensity

B. its wavelenght

C. the nature of propagation

D. the motion of the source w.r.to medium

Answer: A

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2. A rod of length 10 cm lies along the principal axis of a concave mirror of focal length 10 cm in such a way that its end closer to the pole is 20 cm away from the mirror. The length of the image is,

A. 2.5 cm

B. 5 cm

C. 10 cm

D. 15 cm

Answer: C

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3. An object is placed in front of a convex mirror of focal length dof f and the maximum and minimum distance of an object from the mirror such that the image formed is real and magnified.

A. 2f and c

B. c and ∞

C. f and O

D. None of these

Answer:

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4. For light incident from air onto a slab of refractive index 2. Maximum possible angle of refraction is,

A. 30°

B. 45°

C. 60°

D. 90°

Answer: C

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5. If the velocity and wavelength of light in air is V_a and λ_a and that in water is V_w and λ_w then the refractive index of water is,

A. $\frac{V_w}{V_a}$

B. $\frac{V_a}{V_w}$

C. $\frac{\lambda_w}{\lambda_a}$

D. $\frac{V_a\lambda_a}{V_w\lambda_w}$

Answer: A

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6. Stars twinkle due to

A. reflection

B. total internal reflection

C. refraction

D. polarisation

Answer: A::C

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7. When a biconvex lens of glass having refractive index 1.47 is dipped in a liquid, it acts as a plane sheet of glass. This implies that the liquid must have refractive index,

A. less that one

B. less than that of glass

C. greater than that of glass

D. equal to that of glass

Answer: A

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8. The radius of curvature of curved surface at a thin planoconvex lens is 10 cm and the

refractive index is 1.5. If the plane surface is silvered, then the focal length will be,

A. 5 cm

B. 10 cm

C. 15 cm

D. 20 cm

Answer: A::C

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9. An air bubble in glass slab of refractive index 1.5 (near normal incidence) is 5 cm deep when viewed from one surface and 3 cm deep when viewed from the opposite face. The thickness of the slab is,

A. 8 cm

B. 10 cm

C. 12 cm

D. 16 cm

Answer: A::B::C

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10. A ray of light travelling in a transparent medium of refractive index n falls, on a surface separating the medium from air at an angle of incidents of 45°. The ray can undergo total internal reflection for the following n,

A. n = 1.25

B. n = 1.33

C. n = 1.4

D. n = 1.5

Answer: A

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11. A plane glass is placed over a various coloured letters (violet, green, yellow, red) The letter which appears to be raised more is,

A. red

B. yellow

C. green

D. violet

Answer:

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12. Two point white dots are 1 mm apart on a black paper. They are viewed by eye of pupil diameter 3 mm approximately. The maximum distance at which these dots can be resolved

by the eye is, (take wavelength of light, λ = 500 nm)

A. 1 m

B. 5 m

C. 3 m

D. 6 m

Answer:

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13. In a Young's double-slit experiment, the slit separation is doubled. To maintain the same fringe spacing on the screen, the screen-to-slit distance D must be changed to,

A. 2D

B. $\frac{D}{2}$

C. $\sqrt{2}D$

D. $\frac{D}{\sqrt{2}}$

Answer: B::D

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14. Two coherent monochromatic light beams of intensities I and 41 are superposed. The maximum and minimum possible intensities in the resulting beam are

A. 51 and I

B. 5I and 3I

C. 9I and I

D. 9I and 3I

Answer: A::D

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15. When light is incident on a soap film of thickness 5×10^{-5} cm, the wavelength of light reflected maximum in the visible region is 5320 Å. Refractive index of the film will be,

A. 1.22

B. 1.33

C. 1.51

D. 1.83

Answer: A::C

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16. First diffraction minimum due to a single slit of width 1.0×10^{-5} cm is at 30°. Then wavelength of light used is,

A. 400 Å

B. 500 Å

C. 600 Å

D. 700 Å

Answer:

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17. A ray of light strikes a glass plate at an angle 60° . If the reflected and refracted rays are perpendicular to each other, the refractive index of the glass is,

A. $\sqrt{3}$

B. $\frac{3}{2}$

C. $\sqrt{\frac{3}{2}}$

D. 2

Answer: C

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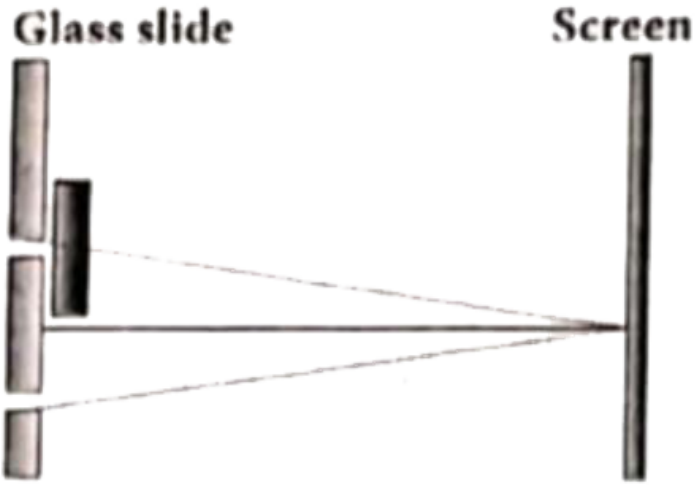
18. One of the of Young's double slits is covered with a glass plate as shown in figure.

The position of central maximum will,



A. get shifted downwards

B. get shifted upwards

C. will remain the same

D. data insufficient to conclude

Answer: A::D

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19. Light transmitted by Nicol prism is,

A. partiallypolarised

B. unpolarised

C. plane polarised

D. ellitpically polarised

Answer: A::D

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20. The transverse nature of light is shown in,

A. interference

B. diffraction

C. scattering

D. polarisation

Answer: A

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Textual Evaluation Solved Short Answer Question

1. State the laws of reflection.

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2. What is angle of deviation due to reflection?

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3. Give the characteristics of image formed by a plane mirror .

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4. Derive the relation between f and R for a spherical mirror.

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5. What are the Cartesian sign conventions for a spherical mirror?

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6. Obtain the equation for optical path of a medium of thickness d and refractive index n.

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7. State the laws of refraction

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8. What is angle of deviation due to refraction?

Watch Video Solution

9. What is principle of reversibility?

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10. What is relative refractive index?

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11. Obtain the equation for apparent depth.

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12. Why do stars twinkle?

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13. What is critical angle and total internal reflection?

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14. Obtain the equation for critical angle.

Watch Video Solution

15. Explain the reason for glittering of diamond

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16. What are mirage and looming?

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17. Write a short notes on the prisms making use of total internal reflection.

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18. What is Snell's window?

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19. Write a note on optical fibre.

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20. Explain the working of an endoscope.

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21. What are primary focus and secondary focus of convex lens?

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22. What are the sign conventions followed for lenses?

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23. Arrives at lens equation from lens maker's formula .

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24. Obtain the equation for lateral magnification for thin lens.

Watch Video Solution

25. What is power of a lens?

Watch Video Solution

26. Derive the equation for effective focal length for lenses in out of contact.

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27. What is angle of minimum deviation?

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28. What is dispersion?

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29. How are rainbows formed?

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30. What is Rayleigh's scattering?

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31. Why does sky appear blue?

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32. What is the reason for reddish appearance of sky during sunset and sunrise?

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33. Why do clouds appear white?

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34. What are the salient features of corpuscular theory of light?

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35. What is wave theory of light?

Watch Video Solution

36. What is electromagnetic wave theory of light?

Watch Video Solution

37. Write a short note on quantum theory of light.

Watch Video Solution

38. What is a wave front?

Watch Video Solution

39. What is Huygens' principle?

Watch Video Solution

40. What is interference of light?

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41. What is phase of a wave?

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42. Write the relation between path difference and phase difference?

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43. What are coherent sources?

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44. What is intensity division?

Watch Video Solution

45. How does wavefront division provide coherent source?

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46. How do source and images behave as coherent sources?

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47. What is bandwidth of interference pattern?

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48. What is diffraction?

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49. Differentiate between Fresnel and Fraunhofer diffraction.

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50. Discuss the special cases on first minimum in Fraunhofer diffraction.

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51. What is Fresnel's distance? Obtain the equation for Fresnel's distance.

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52. Mention the differences between interference and diffraction.

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53. What is a diffraction grating?

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54. What are resolution and resolving power?

Watch Video Solution

55. What is Rayleigh's criterion? .

Watch Video Solution

56. What is polarisation?

Watch Video Solution

57. Differentiate between polarised and unpolarised light

Watch Video Solution

58. Discuss polarisation by selective absorption.

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59. What are polariser and analyser?

Watch Video Solution

60. What are partially polarised light ?

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61. State and obtain Malus' law.

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62. List the uses of polaroids.

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63. State Brewster's law.

Watch Video Solution

64. What is angle of polarisation and obtain the equation for angle of polarisaition.

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65. Discuss about pile of plates.

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66. What is double refraction?

Watch Video Solution

67. Mention the types of optically active crystals with example.

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68. Discuss about Nicol prism.

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69. How is polarisation of light obtained by scattering of light?

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70. Discuss about simple microscope and obtain the equations for magnification for near point focusing and normal focusing.

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71. What are near point and normal focusing?

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72. Why is oil immersed objective preferred in a microscope?

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73. What are the advantages of using a reflecting telescope?

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74. What is the use of an erecting lens in a terrestrial telescope?

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75. What is the use of collimator?

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76. What are the users of spectometer?

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77. What is myopia? What is its remedy?

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78. What is hypermetropia?

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79. What is presbyopia?

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80. What is astigmatism?

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Textual Evaluation Solved Long Answer Question

1. Obtain the equation for lateral magnification for thin lens.

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2. Describe the Fizeau's method to determine speed of light.

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3. Obtain the equation for radius of illumination (or) Snell's window.

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4. Derive the equation for acceptanc angle and numerical aperture, of optical fiber. Acceptance angle in optical fibre:

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5. Obtian the equation for lateral displacement of light passing through a glass slab.

Watch Video Solution

6. Derive the equation for refraction at single spherical surface.

Watch Video Solution

7. Obtain lens maker's formula and medium its signification. Lens maker's formula and lens equation:

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8. Obtain the equation for lateral magnification for thin lens.

Watch Video Solution

9. Derive the equation for effective focal length for lenses in contact.

Watch Video Solution

10. Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refraction for refactive index of material of the prism.

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11. What is dipersion? Obtain the equation for dispersive power of a medium.

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12. Prove laws of reflection using Huygens' principal.

(OR) Proof for laws of reflection using Huygens' Principal:

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13. Prove laws of refraction using Hugyen's principle.

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14. Obtain the equaiton for resultant intensity due to interference of light.

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15. In Youngs double slit experiment, to increase the fringe width

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16. Obtain the equation for bandwidth in Young's double slit experimeet.

Conditon for bright fringe (or) maxima

Watch Video Solution

17. Obtain the equaitons for constructive and destructive interference for transmitted and reflected waves in thin films.

Interference in thin films:

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18. Discuss diffraction at single slit and obtain the consition for n^{th} minimum. Diffraction at single slit:

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19. Discuss the diffraction at a grating and obtain the condition for the n^{th} maximum.

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20. Discuss the experiment to determine the wavelenght of monochromatic light using diffraction grating.

Experiment to determine the wavelenght of monochromatic light:

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21. Discuss the experiment determine the wavelenght of different colours using diffraction grating.

Determination of wavelenght of diferent colours:

Watch Video Solution

22. Obtain the equation fot resolving of optical instrument.

Watch Video Solution

23. Discuss about simple microscope and obtain the equation for magnificaiton for near

point focusing and normal focusing.

Simple microscope:

24. Explain about compound mircoscope and obtain the equation for magnification.

Compound microscope:

25. The resolving power of a microscope is

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26. What is the use of astronomical telescope?

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27. Mention different parts of spectrometer and explain the prelimainary adjustments, Spectrometer:

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28. Explain the experimental deterimental of material of the prism using spectrometer. Determination of refractive index of material of the prism.

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Textual Evaluation Solved Iv Conceptual Question

1. Why are dish antennas curved?

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2. What type of lens is formed by a bubble inside water?

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3. It is possible for two lenses to produce zero power?

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4. The sky looks blue due to

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5. Why is yellow light preferred to during fog?

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6. Two independent monochromatic sources cannot act as coherent sources, why?

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7. Does diffraction take place at the Young's double slit?

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8. Is there any difference between coloured light obtained from prism and colours of soap bubble?

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9. Answer the following questions:

(c) When a tiny circular obstacle is placed in the path of light from a distant source, a bright spot is seen at the centre of the shadow of the obstacle. Explain why?

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10. When a wave undergoes reflection at a denser medium, what happens to its phase?

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Textual Evaluation Solved V Numerical Problems

1. An object is placed at a certain distance from a convex lens of focal length 20 cm. Find the distance of the object if the image obtained is. magnified 4 times.

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2. A compound microscope has a magnification of 30. The focal length of eye

piece is 5 cm. Assuming the final image to be at least distance of distinct vision, find the magnification . produced by the objective.

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3. An object is placed in front of a concave mirror of focal length 20 cm. The image formed is three times the size of the object. Calculate two possible distances of the object from the mirror.

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4. A small bulb is placed at the bottom of a tank containing water to a depth of 80 cm. What is the area of the surface of water through which light from the bulb can emerge out? Refractive index of water is 1.33. (Consider the bulb to be a point source.)

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5. A thin converging glass lens made of glass with refractive index 1.5 has a power of +5.0 D.

When this lens is immersed in a liquid of refractive index n, it acts as a divergent lens of focal length 100 cm. What must be the value of n?

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6. If the distance D between an object and screen than 4 times the focal length of a convex lens, then there are two positions of the lens for which image are formed on the screen. This method is called conjugate

method. If d is the distance between the two positions of the lens, obtain the equation for focal length of the convex lens.

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7. A beam of light of wavelength 600 nm from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2 m away. What is the distance between the first dark fringe on either side of the central bright fringe?

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8. In Young's double slit experiment, the slits are 2 mm apart and are illuminated with a mixture of two wavelength λ_0 = 750 nm and λ = 900 nm. What is the minimum distance from the common central bright fringe on a screen 2 m from the slits where a bright fringe from one interference pattern coincides with a bright fringe from the other?

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9. In Young's double slit experiment, 62 fringes are seen in visible region for sodium light of wavelength 5893 Å. If violet light of wavelength 4359 Å is used in place of sodium light, then what is the number of fringes seen?

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10. A compound microscope has a magnifying power of 100 when the image is formed at infinity. The objective has a focal length of 0.5

cm and the tube length is 6.5 cm. What is the focal length of the eyepiece.

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Additional Quesiton Multiple Choice Questions

1. When a ray of light enters a glass slab from air

A. its wavelenght decreases

B. its wavelenght increases

C. its frequency increases

D. neither is wavelenght nor its frequency changes

Answer: A::C::D

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2. A source emits sound of frequency 600 Hz inside water. The frequency heard in air (velocity of sound in water = 1500 m/s , velocity of sound in air = 300 m/s) will be

A. 300 Hz

B. 120 Hz

C. 600 Hz

D. 6000 Hz

Answer:

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3. Two beams of red and violet colours are made to pass separately through a prism (angle of the prism is 60°). In the position of

minimum deviation, the angle of refraction will be

A. 30° for both the colours

B. greater for the violet colour

C. greater for the violet colour

D. equal but not 30° for both the colours

Answer: B::C

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4. To get three images of a single obiect, one should have two plane mirror at an angle of

A. 60°

B. 90°

C. 120°

D. 30°

Answer:

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5. Which of the following is used in optical fibres?

A. Total internal reflection

B. Diffraction

C. Refraction

D. Scattering

Answer: A::C

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

A. $+10$

B. -20

C. -10

D. $+20$

Answer: A

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7. The refractive index of glass is 1.520 for red light and 1.525 for blue light. Let δ_1 and δ_2 angles of minimum deviation for red and blue light respectively in a prism of this glass, then

A. δ_1. Can be less than or greater than δ_2 depending upon the values of δ_1 and δ_2

B. $\delta_1 > \delta_2$

C. $\delta_1 < \delta_2$

D. $\delta_1 = \delta_2$

Answer:

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8. Time image formed by an objective of a compound microscope is

A. a) virtual and diminished

B. b) real and diminished

C. c) real and enlarged

D. d) virtual and enlarged

Answer: A::D

Watch Video Solution

9. An astronomical telescope has a large aperture to,

A. a) reduce spherical aberration

B. b) have high resolution

C. c) increase span of observation

D. d) have low dispersion

Answer: A

Watch Video Solution

10. Two plane mirros are inclined to each other at an angle of 60°. A point object is placed in between them. The total number of images produced by both the mirror is

A. 2

B. 4

C. 5

D. 6

Answer:

Watch Video Solution

11. A boy 1.5 m tall with his eye level at 1.38 m stands before a mirror fixed on a wall. The minimum length of mirror required to view the complete image of boy is

A. 0.75 m

B. 0.06 m

C. 0.69 m

D. 0.12 m

Answer:

Watch Video Solution

12. A pencil of light rays falls on a plane mirror and forms a real image, so the incident rays are

A. a) parallel

B. b) diverging

C. c) converging

D. d) statement is false

Answer: C

Watch Video Solution

13. For a real object, which of the following can produce a real image?

A. a) plane mirror

B. b) concave lens

C. c) convex lens

D. d) concave mirror

Answer: A::C

Watch Video Solution

14. Which mirror is to be used to obtain a paralle beam of light from a small lamp?

A. a) plane mirror

B. b) Convex mirror

C. c) Concave mirror

D. d) None of the above

Answer: A::C

Watch Video Solution

15. When a plane electromagnetic wave enters a glass slab, then which of the following will not change?

A. a) Wavelength

B. b) Frequency

C. c) Speed

D. d) Amplitude

Answer: C

Watch Video Solution

16. If wavelenght of light in air is $2400 \times 10_{-10}$ m, then what will be the wavelenght of light in glass $(\mu = 1.5)$?

A. 1600 Å

B. 7200 Å

C. 1080 Å

D. None of these

Answer: A

 Watch Video Solution

17. Why is refractive index in a transparent medium greater that one?

A. Because the speed of light in vacuum is always less that speed in a transparent medium.

B. Because the speed of light in vacuum is always greater than the speed in a transparent medium.

C. Frequency of wave changes when it crosses medium

D. None of these.

Answer: A::B::C::D

Watch Video Solution

18. The wavelenght of sodium light in air is 5890Å. The velocity of light in air is $3 \times 10^8 ms^{-1}$ The wavelenght of light in a glass of refractive index 1.6 would be close to

A. 5890Å

B. 3681Å

C. 9424Å

D. 15078Å

Answer: A::C

Watch Video Solution

19. A glass slab $(\mu = 1.5)$ of thickness 6 cm is placed over a paper. What is the shift in the letters?

A. 4 cm

B. 2 cm

C. 1 cm

D. None of these.

Answer: B::C

Watch Video Solution

20. Light traveling from a transparent medium to air undergoes that internal reflection at an angle of incident of 45°. Then refractive index of the medium may be

A. 1.5

B. 1.3

C. 1.1

D. $\frac{1}{\sqrt{2}}$

Answer:

Watch Video Solution

21. A point source of light is placed 4 cm 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. infnite

B. 6 cm

C. 4 cm

D. 3 cm

Answer:

Watch Video Solution

22. In optical fibres, propagation of light is due to

A. diffraction

B. total internal reflection

C. reflection

D. refraction

Answer: A::C

Watch Video Solution

23. Sparking of diamond is due to

A. a) reflection

B. b) dispersion

C. c) total internal reflection

D. d) high refractive index of diamond

Answer: A::C

 Watch Video Solution

24. For a given lens, the magnification was found to be twice as large as when object was 0.15 m distant from it as when the distance was 0.2 m. The focal length of the lens is

A. 1.5 m

B. 0.20 m

C. 0.10 m

D. 0.05 m

Answer: A

Watch Video Solution

25. Two lenses of focal legths f_1 and f_2 are kept in contact coaxially. The resultant power of combination willl be

A. $\frac{f_1 f_2}{f_1 - f_2}$

B. $\frac{f_1 + f_2}{f_1 f_2}$

C. $f_1 + f_2$

D. $\frac{f_1}{f_2} + \frac{f_2}{f_1}$

Answer: A::B

Watch Video Solution

26. Two lenses of power 3D and -1D are kept in contact. What is focal length and nature of combined lens?

A. 50 cm, convex

B. 200 cm, convex

C. 50 cm, concave

D. 200 cm, concave

Answer: A::C

Watch Video Solution

27. If two thin lenses are kept coaxially together, then their power is proportonal $(R_1, R_2 \text{being the radii of curved surfaces})$ to

A. $R_1 + R_2$

B. $\left[\frac{R_1 + R_2}{R_1 R_2}\right]$

C. $\left[\frac{R_1 R_2}{R_1 R_2}\right]$

D. none of these

Answer: A::B

Watch Video Solution

28. A ray incident at 15° on one refracting surface of a prim of angle 60°,suffers a

deviation of 55°. What is the angle of emergance?

A. 95°

B. 45°

C. 30°

D. none of these

Answer:

Watch Video Solution

29. Dispersion of light is caused due to

A. a) Wavelength

B. b) intensity of light

C. c) density of medium

D. d) none of these

Answer: A

 Watch Video Solution

30. White light is incident on one of the refracting surfaces of a prism of angle 50°. If the refractive indices for red and blue colours are 1.641 and 1.659 respectively. The angular separation between these two colours when they emerge out of the prism is

A. 0.9°

B. 0.09°

C. 1.8°

D. 1.2°

Answer:

Watch Video Solution

31. The sky would appear red instead of blue if

A. atmospheric particles scatter blue light more than red light

B. atmospheric particles scatter all colours equally

C. atmospheric particle scatter red light more than blue light

D. the sun was much hotter

Answer: A::B::C::D

Watch Video Solution

32. A setting sun appears to be at an altitude higher than it really is. This is because of

A. a) absorption of light

B. b) reflection of light

C. c) refraction of light

D. d) dispersion of light

Answer: A::C

 Watch Video Solution

33. The reddish appearance of rising and setting sun is due to

A. reflection of light

B. diffraction of light

C. scattering of light

D. interference of light

Answer: A::C

Watch Video Solution

34. In the formation of a rainbow, the light from the sun on water droples undergoes

A. dispersion only

B. only total internal reflection

C. dispersion and total internal reflection

D. none of these

Answer: A::B

Watch Video Solution

35. The angular magnification of a simple microscope can be increased by increasing

A. focal length of lens

B. size of object

C. aperture of lens

D. power of lens

Answer:

Watch Video Solution

36. For compound microscope $f_0 = 1cm$, $f_e = 2.5cm$. An object is placed at distance 1.2 cm from objective lens. What

should be length of microscope for normal adjustment?

A. 8.5 cm

B. 8.3 cm

C. 6.5 cm

D. 6.3 cm

Answer:

Watch Video Solution

37. Magnifying power of an astronomical telescope for normal vision with usual notation is

A. a) $-f_0 / f_e$

B. b) $-f_0 \times f_e$

C. c) $-f_e / f_0$

D. d) $-f_0 + f_e$

Answer:

Watch Video Solution

38. F_1 and F_2 are focal length of objective and eyepiece respectively of the telescope. The angular magnification for the given telescope is equal to

A. $\frac{F_1}{F_2}$

B. $\frac{F_2}{F_1}$

C. $\frac{F_1 F_2}{F_1 + F_2}$

D. $\frac{F_1 + F_2}{F_1 F_2}$

Answer: A::B

Watch Video Solution

39. Focal length of objective and eyepiece of telescope are 200 cm and 4 cm respectively. What is length of telescope for normal adjustment?

A. 196 cm

B. 204 cm

C. 250 cm

D. 225 cm

Answer: B::C::D

Watch Video Solution

40. For normal vision, eye the least distance of object from eye?

A. 30 cm

B. 25 cm

C. Infinite

D. 40 cm

Answer: B::C

Watch Video Solution

41. The focal length of the objective and eyepiece of a telescope are respectively 100 cm and 2 cm. The moon subtends angle of 0.5°, the angle subtended by the moon's image will be

A. 10°

B. 25°

C. 100°

D. 75°

Answer: B

Watch Video Solution

42. A person cannot clearly see distance more than 40 cm. He is advised to use lens of power.

A. $-2.5D$

B. $2.5D$

C. $-6.25D$

D. $1.5D$

Answer: B::D

Watch Video Solution

43. The light gathering power of a camera lens depends on

A. a) its diameter only

B. b) ratio of diameter and focal length

C. c) product of focal length and diameter

D. d) wavelenght of the light used

Answer:

Watch Video Solution

44. Amount of light entering into the camera depends upon

A. a) focal length of objective lens

B. b) product of focal length and diameter of the objective lens

C. c) distance of object from camera

D. d) aperture setting of the camera

Answer: A::C

Watch Video Solution

45. Line spectrum can be obtained from

A. sun

B. candle

C. mercury vapour lamp

D. electic bulb

Answer: A::C

 Watch Video Solution

46. The production of band spectra is caused by

A. atomic nuclei

B. hot metals

C. molecules

D. electrons

Answer:

Watch Video Solution

47. If two mirrors are kept at 60° to each other and a body is placed at the middle, then total number of images formed is

A. six

B. four

C. five

D. three

Answer:

Watch Video Solution

48. A point source kept at a distance of 1000 m has a illumination I. To change the illumination to 16I, the new distance should become

A. 250 m

B. 500m

C. 750 m

D. 800 m

Answer: B

Watch Video Solution

49. A concave mirror of focal length 15 cm forms an image having twice linear

dimensions of the object. The position of the object when the image is virtual will be

A. 22.5 cm

B. 7.5 cm

C. 30 cm

D. 45 cm

Answer: C

Watch Video Solution

50. When a ray of light enters a glass slab from air

A. its frequency and velocity change

B. only frequency changes

C. its frequency and wavelenght change

D. its frequency does not change

Answer: A::C::D

Watch Video Solution

51. A light wave of frequency ν and wavelength λ travels from air to glass. Then,

A. ν changes

B. ν does not change λ. Changes

C. λ does not change

D. ν and λ change

Answer: A::B::C::D

Watch Video Solution

52. In refraction, light waves are bent on passing from one medium to the second medium, because in the second medium.

A. the frequency is different

B. the coefficient of elasticity is different

C. the speed is different

D. the amplitude is smaller

Answer: D

 Watch Video Solution

53. A ray of light having wavelenght 720 nm enters in a glass of refractive index 1.5 The wavelenght of the ray within the glass will be

A. 360 nm

B. 480 nm

C. 720 nm

D. 1080 nm

Answer:

 Watch Video Solution

54. Brilliance of a diamond is due to

A. shape

B. cutting

C. reflection

D. total internal reflection

Answer: A::C

Watch Video Solution

55. An endoscope is employed by a physician to view the internal parts of a body organ. It is based on the principle of

A. refraction

B. reflection of light

C. total internal reflection

D. dispersion of light

Answer: A::C

Watch Video Solution

56. Mirage is formed due to _____ .

A. reflection of light

B. refraction of light

C. total internal reflection of light

D. diffraction of light

Answer: A::C

Watch Video Solution

57. Two lenses of power + 12D and - 2D are combined together. What is their equivalent focal length?

A. 10 cm

B. 12.5 cm

C. 16.6 cm

D. 8.33 cm

Answer: A::C

Watch Video Solution

58. If two lenses of power + 1.5 and + 1.0 D are placed in contact, then the effective power of combination will be

A. 2.5 D

B. 1.5 D

C. 0.5 D

D. 3.25 D

Answer: B::D

Watch Video Solution

59. The angle of a prism is 6° and its refractive index for green light is 1.5. If a green ray passes through it, the deviation will be

A. 30°

B. 15°

C. 3°

D. 0°

Answer: C

Watch Video Solution

60. Sky appears to be blue in clear atmosphere due to light's

A. diffraction

B. dispersion

C. scattering

D. polarisation

Answer: A::C

Watch Video Solution

61. One can not see through fog, because

A. fog absorbs the light

B. light suffers total reflection at droplets

C. refractive index of the fog is infinity

D. light is scattered by the droplets

Answer: A::B::C::D

 Watch Video Solution

62. Fraunhofer lines of the solar system is an example of

A. emission lines spectrum

B. emission band spectrum

C. continuous emission spectrum

D. line absorption spectrum

Answer: A::B

Watch Video Solution

63. A person using a lens as a sample microscope sees an

A. inverted virtual image

B. inverted real magnified image

C. upright virtual image

D. upright real magnified image

Answer: A::D

Watch Video Solution

64. Four lenses of focal length + 10 cm, + 50 cm, + 100 cm and + 200 cm are available for making an astronomical telescole. To produce the largest magnification, the focal length of the eyepiece should be

A. $+10cm$

B. $+50cm$

C. $+100cm$

D. $+200cm$

Answer: A::C

Watch Video Solution

65. The camera lens has an aperture of f and the exposure time is 1/60 s. What will be the new exposure time if the aperture become 1.4 f?

A. $\frac{1}{42}s$

B. $\frac{1}{56}s$

C. $\frac{1}{72}s$

D. $\frac{1}{31}s$

Answer:

Watch Video Solution

66. For a person near point of vision is 100 cm. Then the power of lens he must wear so as have normal vision, should be

A. $+1D$

B. $-1D$

C. $+3D$

D. $-3D$

Answer: C::D

Watch Video Solution

67. Ray optics is valid, when characteristic dimensions are much larger than the wavelenght of light.

A. much smaller than the wavelenght of light

B. much larger than the wavelenght of light

C. of the same order as the wavelenght of light

D. of the order of one millimetre

Answer:

Watch Video Solution

68. A tall man of height 6 feet, want to see his full image. Then required minimum length of the mirror will be

A. 12 feet

B. 3 feet

C. 6 feet

D. any length

Answer: C

Watch Video Solution

69. The refractive index of water is 1.33. What will be the speed of light in water?

A. $3 \times 10^8 ms^{-1}$

B. $2.26 \times 10^8 ms^{-1}$

C. $4 \times 10^8 ms^{-1}$

D. $1.33 \times 10^8 ms^{-1}$

Answer: A::B

Watch Video Solution

70. A beam of monochromatic light is refracted from vacuum into a medium of

refractive index 1.5. The wavelenght of refracted light will be

A. same

B. dependent on intensity of refracted light

C. larger

D. smaller

Answer: A::B::C::D

 Watch Video Solution

71. Optical fibers are based on

A. total internal reflection

B. less scattering

C. refraction

D. less absorption coefficient

Answer: A::C

Watch Video Solution

72. A convex lens is dipped in a liquid, whose refractive index is equal to the refractive index of the lens. Then, its focal length will

A. become zero

B. becomes infinite

C. remain unchanged

D. become small, but non - zero

Answer: B::C

 Watch Video Solution

73. A convex lens and a concave lens, each havaing same focal length of 25 cm, are put in contact to from a combination of lenses. The power of the combination (in diopter) is

A. zero

B. 25

C. 50

D. infinite

Answer:

Watch Video Solution

74. The focal length of a converging lens is measured for violet, green and red colours. If is f_v, f_G and f_R respectively. We will get

A. $f_v = f_G$

B. $f_G = f_R$

C. $f_v < f_R$

D. $f_v > f_R$

Answer:

Watch Video Solution

75. Rainbow is formed due to combination of

A. refraction and scattering

B. refraction and absorption

C. dispersion and total internal reflection

D. dispersion and focusing

Answer: A::C::D

Watch Video Solution

76. The blue colour of the sky is due to the phenomenon of

A. scattering

B. dispersion

C. reflection

D. refraction

Answer: A::C

Watch Video Solution

77. An astronomical telescope of ten fild angular magnification has a length of 44 cm. The focal length of the object is

A. 4 cm

B. 40 cm

C. 44 cm

D. 440 cm

Answer: A::B::C::D

Watch Video Solution

78. Exposure time of a camera lens at the $\frac{f}{2.8}$ setting is $\frac{1}{200}$ second. The correct time of exposure at $\frac{f}{5.6}$ is

A. 0.20 second

B. 0.40 second

C. 0.02 second

D. 0.04 second

Answer: B::C::D

Watch Video Solution

79. Which of the following is not due to total internal reflection?

A. Working of optical fibre

B. Difference between apparent and real depth of a pond

C. Mirage on hot summer day

D. Brillance of diamond

Answer: A::B::C::D

 Watch Video Solution

80. An object is at a distance of 0.5 in front of a plane mirror. Distance between the object and image is

A. 0.25 m

B. 0.5 m

C. 1.0 m

D. 2.0 m

Answer: A

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81. An object moves towards a stationary plane mirror at a speed of $4ms^{-1}$ with what speed will his image move towards him?

A. $2ms^{-1}$

B. $4ms^{-1}$

C. $8ms^{-1}$

D. the image will stay at rest

Answer:

Watch Video Solution

82. If two mirrors are kept at 60° to each other and a body is placed at the middle, then total number of images formed is

A. six

B. four

C. five

D. three

Answer:

Watch Video Solution

83. If an object is placed at 10 cm infront of a concave mirror of focal length 15 cm. The magnification of image is

A. -1.5

B. 1.5

C. -3

D. 3

Answer: C

Watch Video Solution

84. An object of length 2.5 cm is placed at the principal axis of a concave mirror at a distance 1.5 f. The image height is

A. $+5m$

B. $-5m$

C. $-10m$

D. $+10m$

Answer:

Watch Video Solution

85. Which of the following mirror is used by a dentist to examine a small cavity?

A. Concave mirror

B. Concave mirror

C. Combination of (a) and (b)

D. None of these

Answer: A::C

Watch Video Solution

86. When a ray of light enters from one medium to another, then which of the following does not change?

A. Frequency

B. Wavelenght

C. Speed

D. Amplitude

Answer: C

Watch Video Solution

Watch Video Solution

87. When light travels from one medium to the other medium of which the refractive index is different, then which of the following will change?

A. Frequency, wavelength and velocity

B. Frequency and wavelength

C. Frequency and velocity

D. Wavelength and velocity

Answer: A::C::D

Watch Video Solution

88. The time taken by the light to cross a glass of thickness 4 mm and refractive index $(\mu = 3)$, will be

A. 4×10^{-11} sec

B. 16×10^{-11} sec

C. 8×10^{-11} sec

D. 24×10^{-11} sec

Answer: A::C::D

 Watch Video Solution

89. The critical angle of a medium with respect to air is 45°. The refractive index of medium is

A. 1.41

B. 1.2

C. 1.5

D. 2

Answer: A::D

Watch Video Solution

90. If the critical angle for total internal reflection from a medium to vacuum is 30°, then velocity of light in the medium is

A. $6 \times 10^8 m/\sec$

B. $2 \times 10^8 m/\sec$

C. $3 \times 10^8 m/\sec$

D. $1.5 \times 10^8 m/\sec$

Answer: A::C

Watch Video Solution

91. When a ray of light enter from one medium to another, its velocity is doubled. The critical angle for the ray for two internal reflection will be

A. 30°

B. 60°

C. 90°

D. Informatino is incomplete

Answer: C

Watch Video Solution

92. A driver at a depth 12 m inside water $(\mu = 4/3)$ see the sky in a cone of semi-vertical angle is

A. $\sin^{-1}\left(\frac{4}{3}\right)$

B. $\tan^{-1}\left(\frac{4}{3}\right)$

C. $\sin^{-1}\left(\frac{3}{4}\right)$

D. 90°

Answer: A::C::D

Watch Video Solution

93. The principal behind optical fibres is

A. total internal reflection

B. total external reflection

C. both (a) and (b)

D. diffraction of light

Answer: A::C

Watch Video Solution

94. Air bubble in water behaves as

A. some times conacave, sometimes convex lens

B. concave lens

C. convex lens

D. always refactnf surface

Answer: A::C

Watch Video Solution

95. A convex lens of 40 cm focal length is combined with a concave lens of focal length 25 cm. The power of combination is

A. $-1.5D$

B. $-6.5D$

C. $+6.6D$

D. $+6.5D$

Answer: A::D

Watch Video Solution

96. Two thin lenses, one of focal length + 60 cm and the other of focal length - 20 cm are put in contact, the combined focal length is,

A. 15 cm

B. $-15cm$

C. $-30cm$

D. 30 cm

Answer: C

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97. How does refractive index (μ) of a material vary with respect to wavelenght (λ). (A and B are constants).

A. $\mu = A + \frac{B}{\lambda^2}$

B. $\mu = A + B\lambda^2)$

C. $\mu = A + \frac{B}{\lambda}$

D. $\mu = A = B\lambda$

Answer: A::B::D

Watch Video Solution

98. A prism of a refracting angle 60° is made with a material of refractive index μ. For a certain wavelength of light, the angle of

minimum deviation is 30°. For this wavelength, the value of μ of material is

A. 1.82

B. 1.414

C. 1.503

D. 1.231

Answer: A::D

Watch Video Solution

99. Refractive index of red and violet light are 1.52 and 1.54 respectively. If the angle of prism in 10°. The angular dispersion will be

A. 0.02°

B. 0.20°

C. 3.06°

D. 30.6°

Answer: B

Watch Video Solution

100. In a simple microscope, if the final image is located at 25 cm from the eye placed close to the lens, then magnifying power is

A. $\frac{25}{f}$

B. $1+\frac{25}{f}$

C. $\frac{f}{25}$

D. $\frac{F}{25}+1$

Answer: A::B

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101. Magnification at least distance of distinct vision is 25 cm of a simple microsope of focal length 5 cm is

A. 2

B. 5

C. 4

D. 6

Answer:

Watch Video Solution

102. Magnification of a compound is 30. Focal length of eyepiece is 5 cm and the image is formed at a distance of distinct vision of 25 cm. The magnification of the objective lens is

A. 6

B. 5

C. 7.5

D. 10

Answer:

Watch Video Solution

103. The astronomical microscope consists of objective and eyepiece. The focal length of the objective is

A. equal to that of the eyepiece

B. shorter than that of the eyepiece

C. greater than that of the eyepiece

D. five times shorter than that of eyepiece

Answer: A::C

Watch Video Solution

104. The number of lenses in terrestrial telescope is

A. 2

B. 4

C. 3

D. 6

Answer: C

Watch Video Solution

105. An achromatic combination of lenses is formed by joining

A. 2 convex lens

B. 1 convex, 1 concave lens

C. 2 concave lenses

D. 1 convex and 1 plane mirror

Answer: A::C

Watch Video Solution

106. Amount of light entering into the camera depends upon

A. diameter only

B. ratio of focal length and diameter

C. product of focal length and diameter

D. only one of the focal length

Answer: A::B::C::D

Watch Video Solution

107. Myopia is corrected by using a

A. cylindrical lens

B. bifocal lens

C. convex lens

D. concave lens

Answer: A::C

Watch Video Solution

108. The critical angle for total internal reflection in diamond is 24.5°. The refractive index of diamond is

A. 2.41

B. 1.41

C. 2.59

D. 1.59

Answer:

Watch Video Solution

109. When a glass lens with $\mu = 1.47$ is immersed in a troug of liquid, it looks to be disappeared. The liquid in the trough could be

A. water

B. keronsene

C. glycerine

D. alcohol

Answer: C

Watch Video Solution

110. In optical fibres, the refractive index of the core is

A. greater than that of the cladding

B. equal to that of the cladding

C. smaller than that of the cladding

D. independent of that of the cladding

Answer: A::C::D

Watch Video Solution

111. For a wavelength of light λ and scattering object of size 'a', all wavelength are scattered nearly equally , if

A. $a = \lambda$

B. $a > > \lambda$

C. $a < < \lambda$

D. $a \geq \lambda$

Answer: A::B::D

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112. Two coherent monochromatic light beams of intensities I and 41 are superposed. The maximum and minimum possible intensities in the resulting beam are

A. 5I and I

B. 9I and I

C. 5I and 3I

D. 9I and 3I

Answer: A::D

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113. In yound's double slit experiment, the separation between the slits is halved and distance between the slits and screen is doubled. The figure width is

A. unchanged

B. halved

C. doubled

D. quadrupled

Answer: A::D

Watch Video Solution

114. In a young 's double slit experiment, 12 fringes are observed to be formed in a certain segment of the screen, when light of wavelenght 600 nm is used. If the wavelenght of light is changed to 400 nm. Number of fringes observed in the same segment of the screen is given by

A. 12

B. 18

C. 24

D. 30

Answer: A

 Watch Video Solution

115. Consider fraunhoffer diffraction pattern obtained with a single slit illuminated at normal indicent. At the angular position of the first diffraction minimum the phase different

between the wavelets from the opposite edge of the slits is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. 2π

D. π

Answer: B

Watch Video Solution

116. A beam of light of wavelenght 600 nm from a distant source falls on a single slit 1.00 nm wide and the resulting diffraction pattern is observed on a screen 2 m away. The distance between the first dark fringes on either side of the central bright fringe is

A. 1.2 cm

B. 1.2 mm

C. 2.4 cm

D. 2.4 mm

Answer: B::D

Watch Video Solution

117. A young's double slit experiment uses a monochromatic source. The shape of the interference fringes formed on a screen is

A. hyperbola

B. circle

C. straight line

D. parabola

Answer: A::B

Watch Video Solution

118. The initial shape of the wavelenght of the beam is

A. plannar

B. Convex

C. Concave

D. convex near the axis and concave near the periphery

Answer: A

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119. The angle of incident at which reflected light is totally polarised for reflection from air to glass (refractive index μ) is

A. $\sin^{-1}(\mu)$

B. $\sin^{-1}\left(\frac{1}{\mu}\right)$

C. $\tan^{-1}\left(\frac{1}{\mu}\right)$

D. $\tan^{-1}(\mu)$

Answer: A

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120. According to Huygen's principal light is a front of

A. particle

B. rays

C. wave

D. none of the above

Answer: A

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121. Which one of the following phenomena is not explained by Huygen's construction of wavefront?

A. refraction

B. reflection of light

C. diffraction

D. origin of spectra

Answer: A::C

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Additional Quesiton Ii Additional Problems

1. Light from a point source in air falls on a spherical glass surface (n = 1.5 and radius of curvature = 20 cm). The distance of the light source from the glass surface is 100 cm. At what position the image is formed ?

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2. Find the value of critical angle for a material of refractive index $\sqrt{3}$.

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3. The radius of curvature of each face of biconcave lens, made of glass of refractive index 1.5 is 30 cm. Calculate the focal length of the lens in air.

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4. The radii of curvature of the faces of a double convex lens are 10 cm and 15 cm. If focal length is 12 cm. What is the refractive index of glass?

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5. A double convex lens made of glass of refractive index 1.5 has both radii of curvature 20 cm each. Find the focal length of the lens. If an object is placed at a distance of 15 cm from this lens, find the position of the image formed.

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6. The image obtained with a convex lens is erect and its length is four times the length of the object. If the focal length of the lens is 20 cm, calculate the object and image distances.

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7. The radius of curvature of each surface of a convex lens of refractive index 1.5 is 40 cm. Calculate its power.

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8. A ray of light incident on an equilateral glass prism shows minimum deviation of 30°. Calculate the speed of light through the prism.

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9. Two sources of intensity I and 4I are used in an interference experiment. Find the intensity at points where the waves from two sources

superimpose with a phase difference

(i) zero (ii) $\frac{\pi}{2}$ and (iii) π.

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10. Assume that light of wavelength 600 Å is coming from a star. What is the limit of resolution of telescope whose objective has a diameter of 100 inch?

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11. Two polarising sheet have their polarising directions parallel so that the intensity of the trasmitted light in maximum. Through what angle must the either sheet be turned if the intensity is to drop by one- half?

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