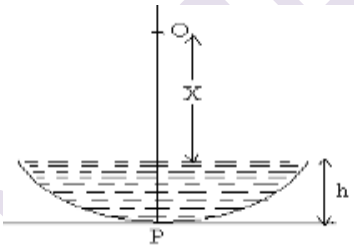
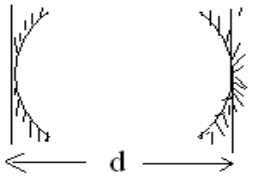
1. What changes in the focal length of a (1) concave mirror and (ii) convex lens occur, when the incident violet light on them is replaced by red light.
2. For the same angle of incidence the angles of refraction in three media A , B , C are 15^0 , 25^0, and 35^0 respectively. In which medium the velocity light is minimum.
3. If one face of a prism of prism angle 30^o and $\mu = \sqrt{2}$ is silvered, the incident ray retraces its initial path. What is the angle of incidence ?
4. Can two wavefronts cross each other? Explain.
5. Two thin lenses of power +6D and -2D are in contact. What is the focal length of the combination?
6. Two polaroids are placed 90^o to each other and the transmitted intensity is zero. What happens to the intensity of transmitted light when one more Polaroid is placed between these two bisecting the angle between them ?
7. A partially plane polarized beam of light is passed through a Polaroid. Show graphically the variation of the transmitted light intensity with angle of rotation of the Polaroid.
8. Explain how the polarization takes place? Write two uses of polaroid's?
9. How is the myopia defect of an eye corrected?
10. Draw diagram of reflecting type of telescope. Write its anyone advantage over refracting type telescope.
11. Water is poured into a concave mirror of radius R up to a height h as shown in the figure. What should be the value of X so that image of object O is formed on itself? Assuming μ is the refractive index of the water.



12. A point source is placed midway between two concave mirrors having equal focal length (f) as shown in fig. find the values of d for which only one image is formed.



13. Draw a neat labeled ray diagram for the astronomical telescope. Obtain expression for its magnifying power when image is formed at least distance of distinct vision.
14. When light undergoes refraction. What happens to its frequency.
15. A concave lens has the same radii of curvature for both sides and has a refractive index 1.6 in air. In the second case it is immersed inside a liquid of refractive index 1.4. Calculate the ratio of focal length of the lens in the two cases.
16. Define polarizing angle. Derive the relation connecting polarising angle and the refractive index of a medium.
17. What is interference of light? In Young's double slit experiment deduce the conditions for (i) constructive and (ii) destructive interference.

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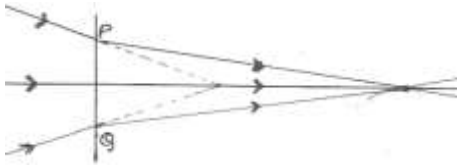
18. Draw a graph showing the variation of resultant intensity in the intereference pattern against position 'x' on the screen.
19. The polarizing angle of a medium is 60^{o}. What is the refractive index of the medium?
20. Sketch the path of light rays in air bubble formed in water.
21. What is the geometrical shape of a wavefront when a plane wave passes through a concave lens?
22. The magnifying power of an astronomical telescope in normal adjustment is 9 and the length of tube is 20 cm. What are the focal lengths of the objective and eye-piece?
23. What do you mean by coherent sources of light ? Can two 100 W bulbs placed at a small separation be coherent ? Explain.
24. An astronomical telescope uses an objective lens of focal length 15 m and eye lens of focal lengths 2 cm. the diameter of objective lens is 10 m. What is resolving power and magnifying power.[Take mean wavelength 6x10 -7 m.]
25. How can you convert unpolarized light into plane polarized light?
26. When will intensity of transmitted light be maximum if a Polaroid sheet is rotated between two crossed Polaroids?
27. State two necessary conditions for total internal reflection to take place.
28. Because this defect of an eye a person can focus either in vertical OR horizontal plane at a time. This arises due to distortion in the shape of cornea. Name the defect and suggest the correction for it.
29. How will the focal length of convex lens change, when
    a. monochromatic light is used in place of white light
    b. lens is immersed in water?
30. What are coherent sources? Can two sodium lamps act as coherent sources? Justify.
31. Write three differences between interference and diffraction pattern.
32. A convex lens is held under water. How will its power change? Explain.
33. Light is incident at 600 on glass slab. If reflected & refracted rays are perpendicular to each other then what is the refractive index of glass.
34. How does magnifying power of a microscope change on decreasing the aperture of its objective?
35. A point source of light is at the focus of a convex lens. What is the type of refracted wave front?
36. State Huygens's postulates. Draw diagrams to show the refracted wave front from a convex lens if paint source is at F.
37. Which type of waves can be polarised?
38. A screen is placed 80cm from an object. The image of the object on the screen is formed by a convex lens at two different locations, separated by 10cm. Calculate the focal length of the lens used.
39. Violet light is incident on a thin convex lens. If this light is replaced by red light, explain with reason, how the power of this lens would change?
40. Define the term wavefront. Draw the wavefront and corresponding rays in the case of a (i) Diverging spherical wave . (ii) Plant wave.
41. The line PQ in the adjoining ray diagram represents a lens. State, with proper reason, whether the lens is convex or concave.



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42. A microscope is focused on a dot at the bottom of a beaker. Some oil is poured into the beaker to a height of 'α ' cm and it is found necessary to raise microscope through a vertical distance of 'β' cm to bring the dot again into focus. Express refractive index of oil in terms of 'α' and 'β'.
43. The value of Brewster's angle for a transparent medium is different for lights of different colors, why?
44. Write the relation between the angle of incidence (i), the angle of emergence (e), the angle of prism (A) and the angle of deviation (D) for rays undergoing refraction through a prism. What is the relation between andfor rays undergoing minimum deviation? Using this relation, write the expression for the refractive index (μ) of the material of a prism in terms of and the angle of minimum deviation (D_m).
45. Light of wavelength 550 nm. is incident as parallel beam on a slit of width 0.1mm. Find the angular width and the linear width of the principal maxima in the resulting diffraction pattern on a screen kept at a distance of 1.1m from the slit. Which of these widths would not change if the screen were moved to a distance of 2.2m from the slit?
46. Give two differences between fringes formed in single slit diffraction and Young's double slit experiment.
47. Light of wavelength 600nm is incident on an aperture of size 2mm. Calculate the distance up to which the ray of light can travel such that its spread is less than the size of the aperture.
48. A ray of light while traveling from a denser to a rarer medium undergoes total internal reflection. Derive the expression for the critical angle in terms of the speed of light in the respective media.
49. An astronomical telescope consists of two thin lenses set 36 cm apart and has a magnifying power 8. Calculate the focal lengths of the lenses.
50. Use the mirror formula to show that for an object lying between the pole and focus of a concave mirror, the image formed is always virtual in nature.
51. Give reasons for following observations on the surface of moon:
    a. Sun-rise and sun-set are abrupt
    b. Sky appears dark
    c. A rainbow is never observed.
52. A convex lens (of refractive index ng) has focal length f in air. Write an expression for its focal length when immersed in a liquid of refractive index nl. Use the expression to find the focal length of glass lens (n_l=1.5) when immersed in water (n_w=). (The focal length of lens in air is 25 cm.)
53. At what angle should a ray of light be incident on the face of prism of refracting angle 600 so that it just suffers total internal reflection at the other face? (R.I. of material of prism = 1.524)
54. Name two important conditions for interference to take place under Young's Double Slit Experiment .
55. A convex mirror of focal length f produces an image half of the size of the object. What is the distance of the object from the mirror?
56. Draw geometrical shape of a wave front emerging through an equilateral prism.
57. Laser light of wavelength 630nm incident on a pair of slits produces an interference pattern in which the bright fringes are separated by 8.3 mm. A second light produces an interference pattern in which bright fringes are separated by 7.6 mm. Find the wavelength of the second light.
58. What do you mean by the resolving power of an optical instrument? Write the formula for the resolving power of a microscope. How can the resolving power of microscope be increased?
59.
60. Why does dispersion take place in a glass prism? Draw the graph showing the variation of angle of deviation with the angle of incidence of light, incident on one face of a prism.
61. A double convex lens made of glass of refractive index 1.56 has both radii of curvature of magnitude 20 cm. If an object at a distance of 10 cm from this lens, find the position of the image formed.

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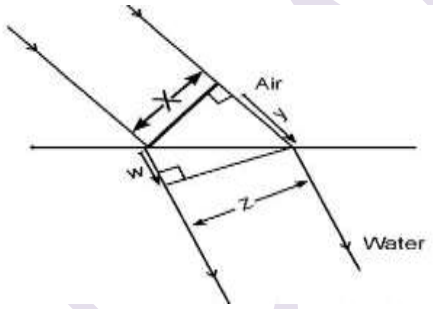
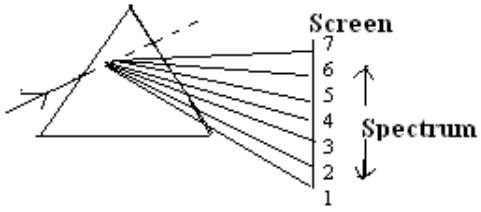
62. Define 'power of a lens'. Plot the graph showing the variation of power of a lens with the wavelength of the incident light. Prove that the equivalent power of the combination of two thin lenses in contact is the sum of their individual powers.
63. Use Huygens Principle to derive the relation where V_1 and V_2 are velocities in the two mediums.
64. What speed should a galaxy move with respect to us so that the sodium line at 589.0 nm is observed at 589.6 nm?
65. A fish in an aquarium approaches the left wall at a rate of 3 m/s and observes a fly approaching it at 8 m/s. If the refractive index of water is 4/3, find the actual velocity of the fly.
66. Show that if the angle of the prism is twice the critical angle of glass, there will be no emergent ray.
67. A ray enters a glass sphere of R.I. n = √3 at an angle of incidence 600 and is reflected and refracted at the farther surface of the sphere. Calculate the angle between the reflected and refracted ray at this surface.
68. A plane wave front of width X is incident on air –water interface and the corresponding refracted wave front has a width Z as shown. Express the refractive index of air with respect to water, in terms of the dimension shown.



69. A student performs an experiment with prism and he gives following statements. Justify his observations.(1) The colour at position 5 observes less refractive index of the material than the colour at position 3.(2) The colour at position 5 is same as that of light emitted from sodium lamp.



70. A slit of width d is illuminated by white light .For what value of d is the first minimum, for red light of wavelength=650 nm, located at point P? For what value of the wavelength of light will the first diffraction maxima also fall at P
71. Draw the variation of intensity with angle in single slit diffraction experiment. Derive the expression for the central fringe width .How ray optics is a limiting case of wave optics. Determine angular separation between central maximum and first order maximum of the diffraction pattern due to a single slit of width 0.25mm when light of wavelength 5890 A0 is incident on it normally
72. Three light rays red (R), green (G) and blue (B) are incident on a right angled prism 'abc' at faces 'ab'. The refractive indices of the material of the prism for red, green and blue wave lengths are1.39, 1.44 and 1.47 respectively. Out of the three, which colour ray will emerge out of the face 'ac'? Justify your answer. Trace the path of the green (G) ray after passing through the face 'ab'.

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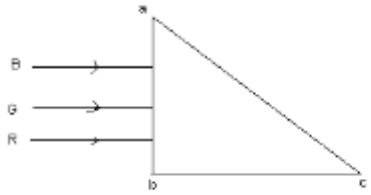

73. For a ray of light traveling from a denser medium of refractive index n1 to a rarer medium of refractive index n2, prove that c=sin-1(n2/n1).Where c is the critical angle of incidence for the media.
74. With the help of a suitable ray diagram, derive the mirror formula for a concave mirror.
75. Consider coaxial system of two thin convex lenses of focal length f each separated by a distance d. Draw a ray diagram for image formation corresponding to an object at infinity placed on the principal axis in the following cases. (i) d< f (ii) d=f (ii)f<d<2f (iv) d=2f
76. A converging lens has a focal length 20cm in air. It is made of a material of refractive index 1.6 .It is immersed in a liquid of refractive index 1.3, what will be its new focal length? Draw the corresponding ray diagram.
77. A ray of light while travelling from a denser to a rarer medium undergoes total internal reflection. Derive the expression for the critical angle in terms of the speed of light in the respective medium.
78. The following are the observations regarding an unknown beam "X". What does each signify?
    a. "X" shows interference and diffraction .
    b. It travels in vacuum with the speed of 3x108m/s
    c. It does not get deflected on passing through an electric field
    d. After passing through a nicol prism, the intensity is reduced.
79. In a young's double slit experiment, the slits are separated by 0.28mm and the screen is 1.4m away. The distance between central bright fringe and fourth bright fringe is measured to be 1.2 cm. Determine the wave length of light used in the experiment.
80. State the law of Malus. If the angle between the pass axis of polarizer and the analyzer is 450. Find the ratio of intensities of the original light and the transmitted light after passing through the analyzer.
81. A screen is placed 2m away from a single narrow slit. Calculate the slit width if the first minimum lies 5mm on either side of the central maximum. The incident light wave has wave length of 5000 Å.
82. An astronomical telescope consists of two thin lenses set 36 cm apart and has a magnifying power 8. Calculate the focal length of the lenses for normal adjustment.
83. A convex lens of focal length 120 cm in air, is immersed in water whose refractive index is 4/3. Find the apparent change in the focal length of the lens.
84. Find the position of an object which when placed in front of a concave mirror or focal length 20 cm, produces a virtual image, which is twice the size of the object.
85. Why is diffraction of sound waves easier to observe than diffraction of light waves? What two main changes in diffraction pattern of a single slit will you observe when the monochromatic source of light is replaced by a source of white light?
86. Deduce lens maker's formula for a thin biconvex lens.
87. Derive Snell's law of refraction by drawing the refracted wave front corresponding to a plane wave front incident on the boundary separating a rarer medium from a denser medium.
88. 22Define resolving power of a compound microscope. How does the resolving power of a compound microscope change when
    a. refractive index of medium between the object and objective lens increases.
    b. wavelength of radiation is increased.

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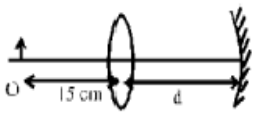
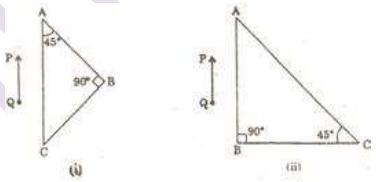
89. Derive the expression for the fringe width in Young's double slit interference experiment.
90. Derive an expression for the width of the central maxima for diffraction of light at a single slit. How does this width change with increase in width of the slit.
91. Draw the labeled diagram for the normal adjustment of an astronomical telescope Write expression for its magnifying power. Calculate the focal lengths of the objective and eyepiece as the magnifying power of telescope is 100 in the normal position .The distance between objective and eyepiece is 101cm.
92. Using the relation for refraction at a single spherical refracting surface, derive the lens maker's formula. Calculate the distance d, so that a real image of an object at O, 15cm in front of a convex lens of focal length10cm be formed at the same point O. The radius of curvature of the mirror is 20cm. Will the image be inverted or erect?



93. Light from an ordinary source (say a sodium lamp) is passed through a Polaroid sheet P1 .The transmitted light is then made to pass through a second Polaroid sheet P2 that can be rotated so that the angle (θ) between the two Polaroid sheets varies from 0^0 to $90^{0.}$ Show graphically the variation of the intensity of light, transmitted by P1 and P2, as a fuction of the angle θ. Take the incident beam intensity as I0. Why does the light from a clear blue portion of the sky, show a rise and fall of intensity when viewed through a Polaroid, which is rotated?
94. A right-angled crown glass prism with critical angle 41^0 is placed before an object PQ, in two positions as shown in the figures (i) and (ii). Trace the paths of the rays from P and Q the prisms in the two cases.



95. Describe diffraction of light due to a single slit. Explain formation of a pattern of fringes obtained on the screen and plot showing variation of intensity with angle θ in single slit diffraction.
96. What is meant by a linearly polarised light? Which type of waves can be polarised? Briefly explain a method for producing polarised light.
97. Two polaroids are placed at 90^0 to each other and the intensity of transmitted light is zero. What will be the intensity of transmitted light when one more polaroid is placed between these two bisecting the angle between them? Take intensity of unpolarised light as I.
98. Write two differences between diffraction and interference pattern.A beam of light consisting of two wavelengths, 650 nm and 520 nm, is used to obtain interference fringes in a Young's double-slit experiment.
    a. Find the distance of the fourth dark fringe on the screen from the central maximum for wavelength 650 nm.
    b. What is the least distance from the central maximum where the bright fringes due to both the wavelengths coincide? Given d=2mm and D=120cm.

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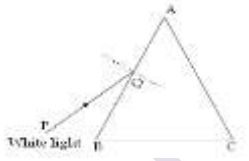
99. What is polarization of light? State Brewster's law for polarization and hence deduce an expression for polarizing angle. A polarizer and an analyzer are oriented so that maximum light is transmitted. What fraction of maximum light is transmitted if analyzer is rotated at 30º and 60º. Write two applications of polarizers.
100. Explain the phenomenon of diffraction of light at a single slit to show the formation of diffraction fringes.
101. A slit of width 'd' is illuminated by light of wave length $6500A^0$. For what value of 'd' will the first minimum fall at an angle of diffraction of $30^{0.}$
102. Verify Snell's law of refraction using Huygens' wave theory.
103. A white light ray incident on face AB of prism is shown in fig. Complete the path of three rays: red, yellow and blue. At what angle should a ray of light be incident on one face of a prism of refracting angle 60 so that it just suffers total internal reflection at the other face ? The refractive index of material of the prism is 1.524.



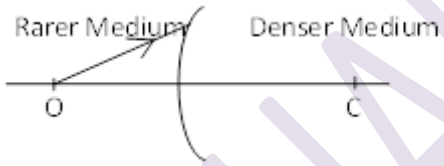
104. What do you mean by diffraction of light? State the basic condition for diffraction of light to take place.
105. Find an expression for fringe width in Young's double slit experiment. Sketch the intensity distribution of this interference pattern.
106. Draw a labeled diagram of an astronomical telescope. Write expressions for its resolving power and magnifying power.
107. Explain the formation of a secondary rainbow with the help of a suitable diagram.
108. In a Young's Double Slit Experiment conducted with white light (4000 Å - 7000 Å), consider two points P1 and P2 on the screen at y1 = 0.2 mm and y2 = 1.6 mm respectively. Determine the wavelengths which form maxima at these points.
109. Draw a labelled ray diagram of an astronomical telescope, forming an image at infinity. An astronomical telescope uses two lenses of powers 10 D and 1D respectively.State with reason, which lens is preferred as objective and eye-piece.Calculate the magnifying power of the telescope, if the final image is formed at the near point.How does the light gathering power of a telescope change, if the aperture of the objective lens is doubled?
110.
111. Draw a labelled ray diagram showing the image formed by a compound microscope. Write the expressions for its magnifying power.Define the term resolving power of a microscope. How does the resolving power of a compound microscope change on decreasing the diameter of its objective lens?Increasing the focal length of its objective lens? Justify your answer in each case.
112. Explain briefly the use of optical fibers as a transmission medium with a suitable diagram.
113. Draw a labeled diagram of a compound microscope. Write expressions for its resolving and magnifying powers. The focal lengths of objective and eye lens of a compound microscope are 2 cm and 5 cm respectively. The tube length is 8 cm. What is its magnifying power?
114. What is the effect on the interference pattern observed in a Young's double slit experiment in the following cases:
    a. Screen is moved away from the plane of the slits.

b. Separation between the slits is increased
c. Widths of the slits are doubled
d. Monochromatic Red light is replaced by blue light, Give reasons for your answer.

115. A converging lens of focal length 6.25 cm is used as a magnifying glass. If the near point of the observer is 25 cm from the eye and lens is held close to the eye, calculate (i) the distance of the object from the lens, (ii) the angular magnification (magnifying power). Also find the angular magnification (magnifying power) when the final image is formed at infinity.

116. In a double slit experiment, the angular width of a fringe is found to be 0.20 on a screen placed 1 m away. The wavelength of the light used is 600 nm. What will be the angular width of the fringe if the entire experimental apparatus is immersed in water? (R.I. of water = 4/3)

117. A spherical surface of radius of curvature R1 separates a rarer and denser medium as shown in the figure. Complete the path of the incident ray of light, showing the formation of a real image. Hence derive the relation connecting object distance 'U', image distance 'V', radius of curvature R and refractive indices n1 and n2 of two media.



118. In Young's double slit experiment, monochromatic light of wavelength 630 nm illuminates the pair of slits and produces an interference pattern in which two consecutive bright fringes are separated by 8.1 mm. Another source of monochromatic light produces the interference pattern in which the two consecutive bright fringes are separated by 7.2 mm. Find the wavelength of light from the second source.What is the effect on the interference fringes if the monochromatic source is replaced by a source of white light?

UNIT DERIVATIONS

1. **Define the wavefront , draw the diagram of spherical , plane and cylindrical wavefront**
2. **Prove the law of reflection and law of refraction with help of snell's law**
3. **Explain the young's double slit experiment**
4. **Derive the expression for resultant amplitude for coherent source. Hence find the condition for bright and dark fringe.**
5. **Find the expression for fringe width for double slit.**
6. **What is diffraction , explain the single slit experiment, find width of central maximum**
7. **What is the polarization. Find the relation between refractive index and polarizing angle**
8. **Derive the mirror formula, give the Cartesian coordinate of sign convention.**
9. **Derive the relation between refractive index real depth and apparent depth .**
10. **Find the relation between image distance , object distance and refractive index, from rare to denser. For convex refracting for real and virtual**

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11. **Expression from denser to rare for convex refracting and concave refracting.**
12. **Derive the lens maker formula .**
13. **Derive the lens formula for convex lens for real and virtual image**
14. **Derive the lens formula for concave lens**
15. **Derive the lens combination formula .**
16. **Derive the deviation formula for prism.**
17. **Derive the prism formula.**
18. **Draw the labelled diagram for compound microscope at normal adjustment and at least distance of least vision, hence find the expression for magnifying power.**
19. **Draw the labelled diagram for astronomical telescope at normal adjustment and at least distance of least vision, hence find the expression for magnifying power.**
20. **What is the reflecting type telescope , give its advantage on refracting type telescope?**
21. **What is the scattering of light then explain why sun appear of reddish colour, and sky appears blue?**
22. **Draw the labelled diagram of human eyes. Explain the defects in the eye, how they can be removed, with the help of diagram**

1.When a photon collides with an electron, which characteristics of the photon increases?
2.Which characteristics donot support the wave nature of light?
3.what are the laws of refraction?
4.A star appear yellow . If it starts accelerating towards earth, how will its colour appears to change.
5.Two points A and B are situated at the same distance from the source of light, but in opposite direction from it.What is the phase difference between the light waves passing through A and B?
6.When the light is polarized by reflection , what is the angle between reflected and refracted rays.
For double refracting crystal the refractive indices , for the ordinary and extraordinary denoted by μo and μe. What is the relation valid along the optical axis of the crystal.
8.What is the angle between planes of electric and magnetic field oscillation in case of light waves?
9.What is the colour of the interference fringe nearest to the white central maximum incase of white light? What happens to the fringe pattern when YDS experiment is performed in water instead of air?
11. 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 arts of the mirror?
12. In which direction relative to the normal, does a ray of light bend, when it enters obliquely a medium in which its speed is increased?
13. For the same angle of incidence, the angles of refraction in three different media A,B and C are 15° ,25° and 35°,respectively. In which medium will the velocity of light be minimum?
14. For what angle of incidence, the lateral shift produced by a parallel sided galss slab is maximum?
15. If a plane glass slab is placed on letters of different colours, the red coloured letters appear more raised up. Why?
16. Does refraction in a water tank make apparent depth same throughout?
17. The critical angle for glass-air interface is ic. Will the critical angle for glass-water interface be greater than or less than ic?
18. An air bubble in a jar of water shines brightly. Why?
19.What happens to the shining of diamond if it is dipped in a transparent oil?
20.What type of a lens is a tumbler filled with water?
21.What type of a lens is an air bubble inside water? Give reason also.
22.A lens immersed in a transparent liquid is not visible. Under what condition can this happen?
23. A lens whose radii of curvature are different is forming the image of an object placed on its axis. If the lens is placed with its faces reversed, will the position of the image change?

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24.What happens to focal length of a convex lens, when it is immersed in water ?
25.How does the focal length of a convex lens change if monochromatic red light is used instead of violet light?
26.The radii of curvature of both the surfaces of a lens are equal. If one of the surfaces is made plane by grounding, how will the focal length and power change?
27.A glass prism is held in water. How is the angle of minimum deviation affected?
28.A ray of light is normally incident on one face of an equilateral prism.Trace the course of the ray through the prism and emerging from it.
29. What will be the colour of the sky in the absence of atmosphere?
30. Why do clouds appear white?
31. Why do sometimes we observe haloes (rings) round the sun or the moon?
32. Bees can see objects in the ultraviolet light while human beings cannot do so. Why?
33. A chicken wakes up early in the morning and goes to sleep by sunset. Why?
35. Why is the focal length of an objective in compound microscope little shorter than the focal length of the eyepiece?
36. You are provided with four lenses of focal length 1 cm, 3cm, 10cm and 100cm. Which two would you prefer for a microscope and which two for a telescope?
37. Can we increase the range of a telescope by increasing the diameter of its objective?
38. A telescope has been adjusted for the relaxed eye. You are asked to adjust it for the least distance of distinct vision, then how will you change the distance between the two lenses?
39. The distances of an object and its real image, measured from the focus of a concave mirror, are a and b respectively. Show that f2 = ab.
40.A ray of light goes from medium 1 to medium 2. velocities of light in the two media are c1 and c2 respectively. For an angle of incidence q in medium 1, the corresponding angle of refraction in medium 2 is q/2.
(i) Which of the two media is optically denser and why?
(ii) Establish the relationship between q, c1 and c2.
41.A beam of light converges at a point on the screen. A plane parallel glass plate is introduced in the path of this converging beam. How will the point of convergence be affected? Draw the relevant ray diagram.
42. A microscope is focused on a dot at the bottom of a beaker. Some oil is poured into the beaker to a height of y cm and it is found necessary to raise the microscope through a vertical distance of x cm to bring the dot again into focus. Express refractive index of oil in terms of x and y.
43. A ray of light while traveling from a denser to a rarer medium undergoes total reflection. Derive the expression for the critical angle in terms of the speed of light in the respective media.
44.Explain the twinkling of stars. Why do the planets not show twinkling effect?
45. Only the stars near the horizon twinkle while those overhead do not twinkle. Why?
46.Show that a convex lens produces an N times magnified image when the objet distances, from the lens, have magnitudes (f ± f / N). Here f is the magnitude of the focal length of the lens. Hence find the two values of object distance, for which a convex lens, of power 2.5D, will produce am image that is four times as large as the object?
47.Use the lens equation to deduce algebraically what you know otherwise from explicit ray diagrams. (a) An object placed within the focus of a convex lens produce a virtual and enlarged image. (b) A concave lens produces a virtual and diminished image independent of the location of the object.
48. A beam of white light on passing through a hollow prism gives no spectrum. Why?
49. Give reasons for the following observations on the surface of the moon: (i) Sunrise and sunset are abrupt. (ii) Sky appear dark. (iii) A rainbow is never formed.
50. The bottom of a container is a 4.0 cm thick glass. (m=1.5) slab. The container contains two immiscible liquids And B of depths 6.0 cm and 8.0 cm respectively. What is the apparent position of a scratch on the outer surface of the bottom of the glass slab when viewed through the container? Refractive indices of A and B are 1.4 and 1.3 respectively.

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51. The refractive index of water is 4/3. Obtain the value of the semivertical angle of the cone within which the entire outside view would be confined for a fish under water. Draw an appropriate ray diagram.
52. A lens forms a real image of an object. The distance of the object to the lens is 4 cm and the distance of the image from the lens is v cm. The given graph shows the variation of v with u. (i) What is the nature of the lens? (ii) Using this graph, find the focal length of this lens.
53. A ray of light passes through an equilateral glass prism, such that the angle of incidence is equal to the angle of emergence. If the angle of emergence is ¾ times the angle of the prism, Calculate the refractive index of the glass prism.
54. State the conditions which must be satisfied for two light sources to be coherent.
55. Two independent light sources cannot act as coherent sources. Why?
56. No interference pattern is detected when two coherent sources are infinitely close to one another. Why?
57. If the path difference produced due to interference of light coming out of two slits for yellow colour of light at a point on the screen be 3l/2, what will be the colour of the fringe at the point. Give reason also.
58. What happens to the interference pattern if the phase difference between the two sources varies continuously?
59. Radiowaves diffract pronouncedly around the buildings, while light waves, which are e.m. waves do not why?
60. Coloured spectrum is seen, when we look through a muslin cloth. Why.

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