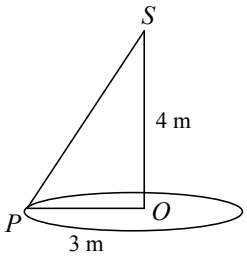
DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 7**

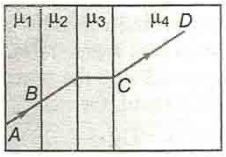
Topic :- RAY OPTICS AND OPTICAL INSTRUMENTS

1. An object is viewed through a compound microscope and appears in focus when it is 5 mm away from the objective lens. When a sheet of transparent material 3 mm thick is placed between the objective and the microscope, the objective lens has to be moved 1 mm to bring the object back into the focus. The refractive index of the transparent material is
   a) 1.5 b) 1.6 c) 1.8 d) 2.0
2. An achromatic prism is made by combining two prisms $P_1(\mu_v = 1.523, \mu_r = 1.515)$ and $P_2(\mu_v = 1.666, \mu_r = 1.650)$; where μ represents the refractive index. If the angle of the prism P_1 is 10°, then the angle of the prism P_2 will be
   a) 5° b) 7.8° c) 10.6° d) 20°
3. Two thin lenses of focal length 20 cm and 25 cm are in contact. The effective power of the combination is
   a) 4.5 D b) 18 D c) 45 D d) 9 D
4. A lens is made of flint glass (refractive index = 1.5). When the lens is immersed in a liquid of refractive index 1.25, the focal length
   a) Increase by a factor of 1.25 b) Increases by a factor of 2.5
   c) Increases by a factor of 1.2 d) Decreases by a factor of 1.2
5. A student can distinctly see the object upto a distance 15 cm. He wants to see the black board at a distance of 3 m. Focal length and power of lens used respectively will be
   a) $-4.8\ cm, -3.3\ D$ b) $-5.8\ cm, -4.3\ D$ c) $-7.5\ cm, -6.3\ D$ d) $-15.8\ cm, -6.3\ D$
6. A source is at 4m height above the centre of a circular table of a circular table of radius 3m. The ratio of illuminance at O and P will be

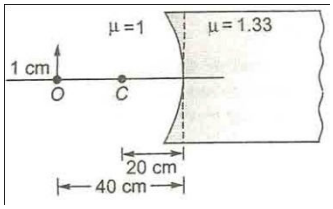


a) $\frac{64}{125}$ b) $\frac{125}{64}$ c) 1 d) $\frac{16}{25}$

7. At the time of total solar eclipse, the spectrum of solar radiation would be
   a) A large number of dark Fraunhoffer lines
   b) A less number of dark Fraunhoffer lines
   c) No lines at all
   d) All Fraunhoffer lines changed into brilliant colours
8. Sir C.V. Raman was awarded Nobel Prize for his work connected with which of the following phenomenon of radiation
   a) Scattering b) Diffraction c) Interference d) Polarization
9. A rectangular tank of depth 8 meter is full of water ($\mu = 4/3$), the bottom is seen at the depth
   a) 6 m b) 8/3 cm c) 8 cm d) 10 cm
10. A ray of light passes through four transparent medium with refractive indices μ_1,μ_2,$\mu_3$and μ_4 as shown in the figure. The surfaces of all media are parallel. If the emergent ray CD is parallel to the incident ray AB. We must have



   a) $\mu_1 = \mu_2$ b) $\mu_2 = \mu_3$ c) $\mu_3 = \mu_4$ d) $\mu_3 = \mu_1$
11. A lamp is hanging at a height of 40 cm from the centre of the table. If its height is increased y 10 cm, the illuminance of the lamp will decreased by
   a) 10% b) 20% c) 27% d) 36%
12. For a optical arrangement shown in the figure. Find the position and nature of images



   a) 32 cm b) 0.6 cm c) 6 cm d) 0.5 cm
13. In a compound microscope, the intermediate image is
   a) Virtual erect and magnified b) Real, erect and magnified
   c) Real, inverted and magnified d) Virtual, erect and reduced
14. The index of refraction of diamond is 2.0. The velocity of light in diamond is approximately
   a) 1.5×10^{10}cms^{-1} b) 2×10^{10}cms^{-1} c) 3.0×10^{10}cms^{-1} d) 6×10^{10}cms^{-1}
15. The speed of light in media M_1 and M_2 is 1.5×10^8 m/s and 2.0×10^8 m/s respectively. A ray of light enters from medium M_1 to M_2 at an incidence angle i. If the ray suffers total internal reflection, the value of i is
   a) Equal to $\sin^{-1}\left(\frac{2}{3}\right)$ b) Equal to or less than $\sin^{-1}\left(\frac{3}{5}\right)$
   c) Equal to or greater than $\sin^{-1}\left(\frac{3}{4}\right)$ d) Less than $\sin^{-1}\left(\frac{2}{3}\right)$
16. An air bubble in sphere having 4 cm diameter appears 1 cm from surface nearest to eye when looked along diameter. If ${}_a\mu_g = 1.5$, the distance of bubble from refracting surface is
   a) 1.2 cm b) 3.2 cm c) 2.8 cm d) 1.6 cm

17. The refractive index of a material of a planoconcave lens is $5/3$, the radius of curvature is 0.3 m. The focal length of the lens in air is

a) -0.45m b) -0.6m c) -0.75m d) -1.0m

18. The angle of minimum deviation for an incident light ray on an equilateral prism is equal to its refracting angle. The refractive index of its material is

a) $\frac{1}{\sqrt{2}}$ b) $\sqrt{3}$ c) $\frac{\sqrt{3}}{2}$ d) $\frac{3}{2}$

19. When a white light passes through a hollow prism, then

a) There is no dispersion and no deviation
b) Dispersion but no deviation
c) Deviation but no dispersion
d) There is dispersion and deviation both

20. A point source of light moves in a straight line parallel to a plane table. Consider a small portion of the table directly below the line of movement of the source. The illuminance at this portion varies with this distance r from the source as

a) $\propto \frac{1}{r}$ b) $\propto \frac{1}{r^2}$ c) $\propto \frac{1}{r^3}$ d) $\propto \frac{1}{r^4}$