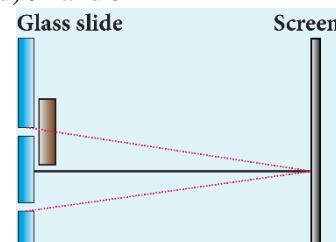




**I. Choose the correct answer**

[15 × 1 = 15]

- 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)  $\frac{D}{\sqrt{2}}$
- Two coherent monochromatic light beams of intensities  $I$  and  $4I$  are superposed. The maximum and minimum possible intensities in the resulting beam are  
(a)  $5I$  and  $I$  (b)  $5I$  and  $3I$  (c)  $9I$  and  $I$  (d)  $9I$  and  $3I$
- 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
- The telescopes which have mirror objectives area called\_\_\_\_\_ telescopes.  
(a) Reflecting (b) Refracting (c) Astronomical (d) Terrestrial
- The lens used to correct hypermetropia is \_\_\_\_\_ lens.  
(a) Concave (b) Convex (c) Bifocal (d) Cylindrical
- A ray of light strikes a glass plate at an angle  $60^\circ$ . 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
- The magnification of near point focusing of simple microscope is \_\_\_\_\_  
(a)  $m = 1 + \frac{D}{f}$  (b)  $m = \frac{D}{f}$  (c)  $m = 1$  (d)  $m = 0$
- The transverse nature of light is shown in,  
(a) Interference (b) diffraction (c) scattering (d) polarisation
- The wavelength  $\lambda_e$  of an electron and  $\lambda_p$  of a photon of same energy  $E$  are related by  
(a)  $\lambda_p \propto \lambda_e$  (b)  $\lambda_p \propto \sqrt{\lambda_e}$  (c)  $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$  (d)  $\lambda_p \propto \lambda_e^2$
- In photoelectric emission, a radiation whose frequency is 4 times threshold frequency of a certain metal is incident on the metal. Then the maximum possible velocity of the emitted electron will be  
(a)  $\sqrt{\frac{hv_0}{m}}$  (b)  $\sqrt{\frac{6hv_0}{m}}$  (c)  $2\sqrt{\frac{hv_0}{m}}$  (d)  $\sqrt{\frac{hv_0}{2m}}$
- When a metallic surface is illuminated with radiation of wavelength  $\lambda$ , the stopping potential is  $V$ . If the same surface is illuminated with radiation of wavelength  $2\lambda$ , the stopping potential is  $\frac{V}{4}$ . The threshold wavelength for the metallic surface is  
(a)  $4\lambda$  (b)  $5\lambda$  (c)  $\frac{5}{2}\lambda$  (d)  $3\lambda$
- The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is  
(a) 4125Å (b) 3750Å (c) 6000Å (d) 20625.Å



13. A light of wavelength 500 nm is incident on a sensitive metal plate of photoelectric work function 1.235 eV. The kinetic energy of the photo electrons emitted is (Take  $h = 6.6 \times 10^{-34}$  Js)
- (a) 0.58 eV                      (b) 2.48 eV                      (c) 1.24 eV                      (d) 1.16 eV
14. The work functions for metals A, B and C are 1.92 eV, 2.0 eV and 5.0 eV respectively. The metal/metals which will emit photoelectrons for a radiation of wavelength  $4100\text{\AA}$  is/are
- (a) A only                      (b) both A and B                      (c) all these metals                      (d) none
15. Emission of electrons by the absorption of heat energy is called.....emission.
- (a) Photoelectric                      (b) field                      (c) thermionic                      (d) secondary

**II. Answer any 5 of the following questions:**

**[5 × 2 = 10]**

16. Define wave front.
17. What are coherent sources?
18. What is resolution?
19. State Brewster's law.
20. What is photoelectric effect?
21. How will you define threshold frequency?
22. State de Broglie hypothesis.

**III. Answer any 5 of the following questions:**

**[5 × 3 = 15]**

23. What is astigmatism? What is its remedy?
24. What are the salient features of corpuscular theory of light?
25. List the uses of polaroids.
26. Give the definition of intensity of light according to quantum concept and its unit.
27. What is a photo cell? Mention the different types of photocells.
28. Define stopping potential.
29. A proton and an electron have same kinetic energy. Which one has greater de Broglie wavelength. Justify.

**IV. Answer the following questions:**

**[2 × 5 = 10]**

30. a. Obtain the equation for bandwidth in Young's double slit experiment.

[OR]

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

31. a. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.

[OR]

- b. List out the laws of photoelectric effect.