

SECOND MIDTERM EXAM - 2022

12 - STD

TIME : 1.30 HRS

PHYSICS

MARKS : 50

PART - A

I. Answer all the questions.

15 x 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) $\frac{D}{2}$ b) $\sqrt{2}D$ c) $\frac{D}{\sqrt{2}}$ d) $2D$
- First diffraction minimum due to a single slit of width 1.0×10^{-5} cm is at 30° . The wavelength of light used is
 a) 600 \AA b) 700 \AA c) 400 \AA d) 500 \AA
- The ratio of maximum and minimum intensities in an interference pattern is $36:1$. What is the ratio of the amplitudes of the two interfering waves.
 a) $7:5$ b) $5:7$ c) $9:1$ d) $1:9$
- Resolving power of Telescope is $R_r =$
 a) $\frac{1.22\lambda f}{a}$ b) $\frac{1.22f}{\lambda a}$ c) $\frac{a}{1.22\lambda f}$ d) $\frac{fa}{1.22\lambda}$
- The angular resolution of human eye is approximately (in radian)
 a) 4×10^{-4} b) 3×10^{-4} c) 2×10^{-4} d) 1×10^{-4}
- The wave associated with a moving particle of mass 3×10^{-6} g has the same wave length as an electron moving with a velocity $6 \times 10^6 \text{ ms}^{-1}$. The velocity of the particle is (in ms^{-1})
 a) 1.82×10^{-18} b) 9×10^{-2} c) 3×10^{-31} d) 1.82×10^{-15}
- The wavelength λ_e of an electron and λ_p of a photon of same energy 'E' are related by
 a) $\lambda_p \times \lambda_e$ b) $\lambda_p \times \sqrt{\lambda_e}$ c) $\lambda_p \times \frac{1}{\sqrt{\lambda_e}}$ d) $\lambda_p \times \lambda_e^2$
- The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
 a) 4125 \AA b) 3750 \AA c) 6000 \AA d) 2063 \AA
- Find its voltage of de Braglie lie Wavelength 1 \AA
 a) 160 V b) 110 V c) 150.6 V d) 160.5 V
- Which among is not a Thermionic emission.
 a) CRT b) electron microscopes c) x-ray tube d) photo multiplier
- For coherent sources
 a) amplitude must be same b) constant phase difference is required
 c) Both (a) and (b) are correct d) Both (a) and (b) are incorrect
- An unpolarised beam of intensity $2a^2$ passes through thin polaroid. Assuming zero Absorption in the polaroid, the intensity of emergent plane polarised light.
 a) $2a^2$ b) a^2 c) $\sqrt{2}a^2$ d) $\frac{a^2}{2}$

13. The critical angle of certain medium is $\sin^{-1}\left(\frac{3}{5}\right)$ the polarising angle of the medium is
 a) $\sin^{-1}\left(\frac{4}{5}\right)$ b) $\tan^{-1}\left(\frac{5}{3}\right)$ c) $\tan^{-1}\left(\frac{3}{4}\right)$ d) $\tan^{-1}\left(\frac{4}{3}\right)$
14. If 'h' is planck's constant in SI system, then the momentum of a photon of wavelength 0.01 \AA is
 a) $10^{-2} h$ b) h c) $10^2 h$ d) $10^{12} h$
15. If the Kinetic energy of the particle is increased to 16 times its previous value, the percentage change in the de-Braglie wavelength of the particle is
 a) 25 b) 75 c) 60 d) 50.

PART - B

II. Write any FOUR questions and Q.No.18 is compulsory.

4 x 2 = 8

16. Write down any four properties of PHOTONS.
 17. What is called continuous x-ray Spectra?
 18. How many photons per second emanate from a 50mW laser of 640nm?
 19. State Brewster's Law.
 20. What is called Fresnel's distance.
 21. What is myopia? What is its remedy?
 22. What are the shapes of wavefront a) source at infinite b) point source

PART - C

III. Write any FOUR questions and Q.No.25 is compulsory.

4 x 3 = 12

23. Compare diffraction and Interference.
 24. State MALVS Law. Write its equation. $I = I_0 \cos^2 \theta$
 25. A microscope has an objective and eyepiece of focal length 5 cm and 50 cm respectively with tube length 30cm. Calculate the magnification (m) at near point.
 26. Enumerate the photo electric effect Laws.
 27. Define (i) Work function (ii) Stopping potential
 28. What is photocell? Mention its type of cells.
 29. Why do we not see the Wave properties of a baseball?

PART - D

IV. Answer all questions.

3 x 5 = 15

30. What is X-rays? How do we obtain characteristic x-ray spectra by explain with Transition levels. (OR)
 Explain how frequency of incident light varies with stopping potential
 31. Obtain the equation for resolving power of microscope. (OR)
 By Huygens principle, explain and prove law of refraction.
 32. Explain Davisson - Germer experiment with neat diagram. (OR)
 Explain near point focussing and normal focussing magnification.