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SECOND MID TERM TEST

Std : 12 **PHYSICS**

Marks: 35 **Time : 1.30 Hrs**

I. Choose the Correct Answers : **10x1=10**

1. 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) $\frac{D}{\sqrt{2}}$
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
3. 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) 400A° b) 500A° c) 600A° d) 700A°
4. The transverse nature of light is shown in
   a) interference b) diffraction c) scattering d) polarisation
5. If a beam of unpolarised light is incident on a reflecting glass surface at an angle of 57.5°, then the angle between the reflected and refracted beam will be
   a) 45° b) 60° c) 90° d) 30°
6. The wavelength λ_e of an electron and λ_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) $\lambda_p \propto \lambda_e^2$
7. The wave associated with a moving particle of mass $3x10^{-6}$g has the same wavelength as an electron moving with a velocity $6x10^{6}ms^{-1}$. The velocity of the particle is
   a) $1.82x10^{-18}ms^{-1}$ b) $9x10^{-2}ms^{-1}$ c) $3x10^{-31}ms^{-1}$ d) $1.82x10^{-15}ms^{-1}$
8. Two radiations with photon energies 0.9eV and 3.3 eV respectively are falling on a metallic surface successively. If the work function of the metal is 0.6eV, then the ratio of maximum speeds of emitted electrons will be
   a) 1:4 b) 1:3 c) 1:1 d) 1:9
9. The threshold wavelength for a metal surface whose photoelectric work function is 3.313eV is
   a) 4125A° b) 3750A° c) 6000A° d) 2062.5A°
10. The cut off wavelength of the x-ray tube with accelerating potential 20,000V is
    a) 6.24A° b) 6200A° c) 0.062A° d) 0.62A°

II. Answer any 3 Questions. (Q.No. 15 is compulsory) **3x2=6**

11. State Huygens' Principle?
12. What is myopia? What is its remedy?
13. Define work function of a metal. Give its unit.
14. What is a photo cell? Mention the different types of photocells.
15. Two light sources of equal amplitudes interfere with each other. Calculate the ratio of maximum and minimum intensities.

III. Answer any 3 Questions. (Q.No.20 is compulsory) **3x3=9**

16. What is Fresnel's distance? Obtain the equation for Fresnel's distance.
17. State and Prove Brewsters law.
18. Derive an expression for de Broglie wavelength of Electrons.
19. List out the laws of photoelectric effect.
20. Calculate the momentum and de-broglie wave length of an
    (i) an electron with Kinetic energy 2eV
    (ii) a bullet of 50g fired from riffle with a speed of 200 m/s.

IV. Answer all the questions : **2x5=10**

21. a) Obtain the equation for band width in Young's double slit experiment.

    (or)

    b) Explain about compound microscope and obtain the equation for magnification.
22. a) Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.

    (or)

    b) Obtain Einstein's photoelectric equation with necessary explanation.