COMMON SECOND MID-TERM TEST - 2022

A

Standard XII
PHYSICS

Reg.No.

Time : 1.30 hrs   Marks : 50

Part - I

I. Choose the correct answer: 10 x 1 = 10

1. A plane glass is placed over various coloured letters (violet, green, yellow, red). The letter which appears to be raised more is
   a) red   b) yellow   c) green   d) violet

2. A ray of light strikes a glass plate at an angle 60°. 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

3. Light transmitted by Nicol prism is
   a) partially polarised   b) unpolarised
   c) plane polarised   d) elliptically polarized

4. The transverse nature of light is shown in
   a) interference   b) diffraction   c scattering   d) polarisation

5. 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) $\lambda_p \propto \lambda_e^2$

6. 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) $\sqrt{\frac{hv_0}{2m}}$

7. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
   a) 2062.5 Å   b) 4125 Å   c) 3750 Å   d) 6000 Å

8. Emission of electrons by the absorption of heat energy is called _____ emission.
   a) photo electric   b) field   c) thermionic   d) secondary

9. In a hydrogen atom, the electron revolving in the fourth orbit, has angular momentum equal to
   a) $\frac{2h}{\pi}$ b) h   c) $\frac{h}{\pi}$ d) $\frac{4h}{\pi}$

10. The ratio between the radius of first three orbits of hydrogen atom is
    a) 1:2:3   b) 2:3:5   c) 1:4:9   d) 1:3:5

(2)   XII Physics

Part - II

II. Answer any 5 questions. (Q.No.17 is compulsory) $5 \times 2 = 10$

11. State Huygen's principle.
12. What is double refraction?
13. List the uses of polaroids.
14. What are the uses of X-rays?
15. Define - Threshold frequency.
16. List out the characteristics of photons.
17. The radius of the 5th orbit of hydrogen atom is 13.25 Å. Calculate the de Broglie wavelength of the electron orbitting in the 5th orbit.
18. Define Impact Parameter.

Part - III

III. Answer any 5 questions. (Q.No.20 is compulsory) $5 \times 3 = 15$

19. State and prove Brewster's law.
20. A diffraction grating consists of 4000 slits per centimeter. It is illuminated by a monochromatic light. The second order diffraction maximum is produced at an angle of 30°. What is the wavelength of the light used?
21. Differentiate between Fresnel and Fraunhofer diffraction.
22. Derive an expression for the de Broglie wavelength of electrons.
23. Give the applications of photocell.
24. Calculate the cut-off wavelength and cut-off frequency of X-rays from an X-ray tube of accelerating potential 20,000 V.
25. Write the properties of cathode rays.
26. Write down the drawbacks of Bohr atom model.

Part - IV

IV. Answer all the questions. $3 \times 5 = 15$

27. a) Obtain the equation for path difference and bandwidth in Young's double slit experiment.

(OR)

   b) Describe briefly Davisson - Germer experiment which demonstrated the wave nature of electrons.

28. a) Obtain Einstein's Photoelectric equation with necessary explanation.

(OR)

   b) Explain the J.J.Thomson experiment to determine the specific charge of electron.

29. a) Explain about compound microscope and obtain the equation for the magnification.

(OR)

   b) Discuss the spectral series of hydrogen atom.

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