STD : XII   **HALF PORTION –II**   MARKS : 70

SUB : PHYSICS   TIME : 3 Hrs

I. Choose the correct answer.   15 X 1 =15

1. Stars twinkle due to

    (a) reflection   (b) total internal reflection   (c) refraction   (d) polarization

2. The relation between the focal length and radius of curvature in spherical mirror is ____

    (a) 2f = R   (b) 2R = f   (c) $f = \frac{2}{R}$ (d) none of these

3. The radius of curvature of curved surface at a thin plano convex lens is 10 cm and the refractive index is 1.5. If the plane surface is silvered, then the focal length will be,

    (a) 5 cm   (b) 10 cm   (c) 15 cm   (d) 20 cm

4. Two coherent monochromatic light beams of intensity I and 4I are superposed , the maximum and minimum possible intensities in resulting beam are ___

    (a) 5 I & I   (b) 5 I & 3I   (c) 9I & I   (d) 9I & 3I

5. The transverse nature of light is shown in

    (a) interference   (b) diffraction   (c) scattering   (d) polarization

6. A monochromatic light of wavelength of 500 nm strikes a grating and produces fourth order maximum at an angle of 30°. Find the number of slits per centimeter.

    (a) 25 x $10^{-3} cm^{-1}$ (b) 2.5 x $10^3 cm^{-1}$ (c) 2.5 x $10^3 cm$ (d) 25 x $10^3 cm$

7. Emission of electrons by the absorption of heat energy is called………emission.

    a) photoelectric b) field   c) thermionic   d) secondary

8. The wavelength λe of an electron and λp 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) $\lambda_p \propto \lambda_e{}^2$

9. If V = 54v calculate the de. Broglie wavelength of a particle .

    a)16.7 A^o b) 167 A^o c) 1.67 A^o d) 0.167 A^o

10. Calculate the radius of $^{197}_{79}AU$ nucleus.

    a) 6.97 F   b) 69.7 F   c) 6.97 X 10^{10}F   d) 69.7 X 10^{10}F

11. The second excited state of an hydrogen atom

    a) $-13.6\ ev$ b) $-1.51\ ev$ c) $-3.4\ ev$ d) $-1.54\ ev$

12. The charge of canal rays particle

    a) positive   b)negative   c)neutral   d) not defined

13. The zener diode is primarily used as

    a) Rectifier   b) Amplifier   c) Oscillator   d) Voltage regulator

14. The barrier potential of a silicon diode is approximately,

    a) 0.7 V   b) 0.3V   c) 2.0 V   d) 2.2V

15. The efficiency of an half wave rectifier is

    a) 40.8 %   b) 40.6 %   c) 40.5 %   d) 40.4 %

II. Answer any six of the following questions (Q.no 21 is compulsory).   6 X 2 =12

16. Define impact parameter.

17. Define curie.

18. What do you mean by doping .

19. Distinguish between intrinsic and extrinsic semiconductors.

20. What is photoelectric effect?

21. How many photons per second emanate from a 50 *mW* laser of 640 *nm*?

22. Obtain the relation between phase difference and path difference.

23. State Malus' law.

24. What is dispersion.

III. Answer any six of the following questions (Q.no 31 is compulsory).   6 X 3 =18

25. What are critical angle and total internal reflection?

26. What is Rayleigh's scattering?

27. Mention the differences between interference and diffraction.

28. What is a photo cell? Mention the different types of photocells.

29. How does photocurrent vary with the intensity of the incident light?

30. Discuss the alpha decay process with example.

31. How many photons of frequency 10^{14}Hz will make up 19.86 J of energy?

32. Distinguish between avalanche breakdown and Zener breakdown.

33. Define forbidden energy gap.

III. Answer any five of the following questions   5 X 5 =25

34. State and prove De Morgan's first and second theorem.

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

36. Derive the energy expression for an electron is the hydrogen atom using Bohr atom model.

37. What do you mean by electron emission? Explain briefly various methods of electron emission.

38. Give the applications photocell.

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

40. Obtain lens maker's formula and mention its significance.