M.M.A HIGHER SECONDARY SCHOOL-PAPPANADU

STD:XII   FULL PORTION MODEL QUESTION PAPER-III-2022-2023   TIME:3.00 HOURS

SUB: PHYSICS   MARKS:70

I) CHOOSE THE CORRECT ANSWER: 15×1=15

1. Which of the following has negative temperature coefficient of resistance?
a) copper   b) tungsten   c) carbon   d) silver

2. Emission of electrons by the absorption of heat energy is called………emission.
a) thermionic   b) field   c) photoelectric   d) secondary

3. Two metallic spheres of radii 1 cm and 3 cm are given charges of -1×10^{-2} C and 5×10^{-2} C respectively.
 If these are connected by a conducting wire, the final charge on the bigger sphere is
a) 1×10^{-2} C   b) 2×10^{-2} C   c) 3×10^{-2} C   d) 4×10^{-2} C

4. The given electrical network is equivalent to

a) OR gate   b) AND gate   c) NOT gate   d) EX-OR gate
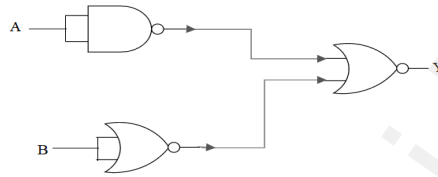
5. The stopping potential of a metal surface is independent of
a) frequency of incident light   b) intensity of incident light
 c) the nature of the metal surface   d) speed of the electron emitted

6.Which of the following is an electromagnetic wave?
a) α - rays   b) β - rays   c) γ - rays   d) all of them

7. If an object is placed 20 cm in front of a convex lens of focal length 7.5 cm then find the position of the image is
a) 24 cm   b) 30 cm   c) 12 cm   d) 15 cm

8. The materials used in Robotics are
 a) Aluminium and silver   b) Silver and gold   c) Copper and gold   d) Steel and aluminum

9. The vertical component of Earth's magnetic field at a place is equal to the horizontal component.
What is the value of angle of dip at this place?
a) 30° b) 45° c) 60° d) 90°

10. 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

11. In a series resonant RLC circuit, the voltage across 100 Ω resistor is 40 V. The resonant
 frequency ω is 250 rad/s. If the value of C is 4 μF, then the voltage across L is
a) 1 V   b) 400 V   c) 600 V   d) 4000 V

12. The half-life period of a radioactive element A is same as the mean life time of another radioactive element B. Initially both have the same number of atoms. Then
a) A and B have the same decay rate initially   b) A and B decay at the same rate always
c) A will decay at faster rate than B   d) B will decay at faster rate than A

13. The unit of the number of electric lines of force passing through a given area is
a) no unit   b) NC^{-1} c) $Nm^{2}C^{-1}$ d) Nm

14. An electron is moving with a velocity of 3 x 106 ms-1 perpendicular to a uniform magnetic field of induction 0.5 T. The force experienced by the electron is
a) 2.4 x 10^{-13} N   b) 13.6 x 10^{-21} N   c) 13.6 x 10^{-11} N   d) zero

15. The zener diode is primarily used as
a) Rectifier   b) Amplifier   c) Oscillator   d) Voltage regulator

II) ANSWER ANY SIX QUESTIONS:Q.NO:24 IS COMPULSORY: 6×2=12
16. What is meant by hysteresis?
17. Define curie.
18. Sometimes we notice that the ceiling fan does not start rotating as soon as it is switched on. But when we rotate the blades, it starts to rotate as usual. Why it is so?
19. Write any two uses of Ultra Violet radiation.
20. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it.
21. State Fleming's right hand rule.
22. Define one electron volt.
23. What is principle of reversibility?
24. Determine the wavelength of light emitted from LED which is made up of GaAsP semiconductor whose forbidden energy gap is 1.875 eV. Mention the colour of the light emitted (Take h = 6.6×10^{-34} Js).

III) ANSWER ANY SIX QUESTIONS:Q.NO:33 IS COMPULSORY: 6×3=18
25. List out the laws of photoelectric effect.
26. What is Seebeck effect? Write the applications of Seebeck effect.
27. Obtain the equation for refractive index of material of the prism.
28. Mention the rules are followed while drawing electric field lines for charges.
29. An ideal transformer has 460 and 40,000 turns in the primary and secondary coils respectively. Find the voltage developed per turn of the secondary if the transformer is connected to a 230 V AC mains.The secondary is given to a load of resistance 10^4 Ω. Calculate the power delivered to the load.
30. Explain the ampitude modulation with necessary diagrams.
31. Give an account of magnetic Lorentz force.
32. Differentiate between Fresnel and Fraunhofer diffraction.
33. Find the (i) angular momentum (ii) velocity of the electron revolving in the 5th orbit of hydrogen atom. (h = 6.6×10^{-34} Js, m = 9.1×10^{-31} kg)

IV) ANSWER ALL THE QUESTIONS: 5×5=25
34. (a) Explain the working of a single-phase AC generator with necessary diagram.
                                    [OR]
   (b) Obtain the equation for radius of illumination (or) Snell's window.
35. (a) Explain the construction and working of a full wave rectifier.
                                    [OR]
   (b) Discuss about the simple microscope and obtain the equations for magnification for near point focusing and normal focusing.
36. (a) Calculate the electric field due to a dipole on its axial line
                                    [OR]
   (b) Obtain the law of radioactivity.
37. (a) what is absorption spectrum?. Explain the types of absorption spectrum.
                                    [OR]
   (b) Describe the microscopic model of current and obtain general form of Ohm's law.
38. (a) Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.
                                    [OR]
   (b) Derive the expression for the force on a current-carrying conductor in a magnetic field.

****

Prepared by: M.Tamizharasan.M.Sc.,B.Ed.,
                    PGT in physics,
                    M.M.A Hr Sec School- Pappanadu,
                    Thanjavur dt.

Edit with WPS Office