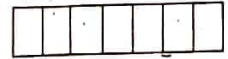


QUARTERLY EXAMINATION - 2023**12 - Std****PHYSICS**

Time : 3.00 Hrs

Marks : 70

PART - A**Choose the correct answer and write it with option:****15 x 1 = 15**

1. Two points A and B, are maintained at a potential of 7 V and -4 V respectively. The work done in moving 50 electrons from A to B is
(a) $8.80 \times 10^{-17} \text{ J}$ (b) $-8.80 \times 10^{-17} \text{ J}$ (c) $4.40 \times 10^{-17} \text{ J}$ (d) $5.80 \times 10^{-17} \text{ J}$
2. Which charge configuration produces a uniform electric field?
(a) point charge (b) uniformly charged infinite line
(c) uniformly charged infinite plane (d) uniformly charged spherical shell
3. The temperature coefficient of resistance of a wire is $0.00125 \text{ per } ^\circ\text{C}$. At 20°C , its resistance is Ω . The resistance of the wire will be 2Ω at
(a) 800°C (b) 700°C (c) 850°C (d) 820°C
4. A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of
(a) each of them increase (b) each of them decreases
(c) copper increases and germanium decreases
(d) copper decreases and germanium increases
5. An ideal Ammeter has
(a) zero resistance (b) infinite resistance (c) high resistance (d) low resistance
6. A current carrying coil is placed in a uniform magnetic field, the net force on it is always zero but net torque is (a) zero (b) not zero (c) maximum (d) minimum
7. Self induction of a solenoid is
(a) directly proportional to current flowing through a coil
(b) directly proportional to its length (c) directly proportional to area of cross section
(d) inversely proportional to area of cross section
8. In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6A, then that in the secondary coil is
(a) 2 A (b) 18 A (c) 12 A (d) 1 A
9. Which of the following is false for electromagnetic waves (a) transverse
(b) non-mechanical waves (c) longitudinal (d) produced by accelerating charges
10. Which one of them is used to produce a propagating electromagnetic wave?
(a) an accelerating charge (b) a charge moving with constant velocity
(c) a stationary charge (d) an uncharged particle
11. If V_g , V_x and V_m are the speed of gamma rays, X-rays and microwaves respectively in vacuum, then
(a) $V_g < V_x < V_m$ (b) $V_g > V_x > V_m$ (c) $V_g > V_x < V_m$ (d) $V_g = V_x = V_m$
12. The speed of light in an isotropic medium depends on (a) its intensity
(b) its wavelength (c) the nature of propagation (d) the motion of the source w.r.t medium
13. When a biconvex lens of glass having refractive index 1.47 is dipped in a liquid, it acts as a plane sheet of glass. This implies that the liquid must have refractive index,
(a) less than one (b) less than that of glass
(c) greater than that of glass (d) equal to that of glass

14. In a Wheatstone's bridge $P = 100\Omega$, $Q = 1000\Omega$ and $R = 40\Omega$. If the galvanometer shows zero deflection, determine the value of S
 (a) 400Ω (b) 450Ω (c) 500Ω (d) 300Ω
15. 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) 60°

PART - B**Answer any SIX questions and Question No. 19 is compulsory.** $6 \times 2 = 12$

16. What is known as superconductivity?
 17. State Coulomb's inverse law.
 18. What is wattless current?
 19. Compute the speed of the electromagnetic wave in a medium if the amplitude of electric and magnetic fields are $3 \times 10^4 \text{ N C}^{-1}$ and $2 \times 10^{-4} \text{ T}$, respectively.
 20. Why are e.m. waves non-mechanical?
 21. Distinguish between drift velocity and mobility.
 22. What is an equipotential surface?
 23. How will you define the unit of self inductance?
 24. Explain the reason for the glittering of diamond?

PART - C**Answer any SIX questions and Question No. 29 is compulsory.** $6 \times 3 = 18$

25. Derive an expression for electrostatic potential due to a point charge.
 26. Obtain the macroscopic form of Ohm's law from its microscopic form.
 27. State the applications of Seebeck effect.
 28. How is a galvanometer converted into an ammeter?
 29. Find the impedance of a series RLC circuit if the inductive reactance, capacitive reactance and resistance are 184Ω , 144Ω and 30Ω respectively. Also calculate the phase angle between voltage and current.
 30. How will you induce an emf by changing the area enclosed by the coil?
 31. Write down any six properties of electromagnetic waves.
 32. Obtain the equation for apparent depth.
 33. Give the application and disadvantage of capacitor.

PART - D**Answer all Questions :** $5 \times 5 = 25$

34. a) Calculate the electric field due to a dipole on its equatorial plane. ✓ **(OR)**
 b) Define absorption spectrum and explain the types of absorption spectrum. ✓
 a) Explain the determination of the internal resistance of a cell using potentiometer. **(OR)**
 b) Derive the mirror equation and the equation for lateral magnification.
 35. a) Derive the expression for the force on a current-carrying conductor in a magnetic field. **(OR)**
 b) Explain the construction and working of transformer.
 36. a) Obtain the expression for electric field due to a uniformly charged spherical shell. **(OR)**
 b) Write down Maxwell equations in Integral form. ✓
 37. a) Explain the working of a single-phase AC generator with necessary diagram. **(OR)**
 b) (i) State Kirchhoff's current rule & Kirchhoff's voltage rule.
 (ii) A cell supplies a current of 0.9 A through a 2Ω resistor and a current of 0.3 A through a 7Ω resistor. Calculate the internal resistance of the cell.

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