60962

Reg. No. | | | | | | | | |

II Semester M.Sc. Degree Examination, November - 2022

PHYSICS

ELECTRODYNAMICS

(CBCS Scheme Repeaters)

Paper : 202

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates : **All Parts are compulsory**

PART - A

Answer any Four of the following: **(4×5=20)**

1. By applying Gauss law obtain an expression for electric field intensity at any point outside the charged solid sphere.
2. State and explain Biot Savart's Law.
3. What are Coulomb and Lorentz gauges? Explain.
4. State and prove Poynting's theorem.
5. What are guided waves? Explain.
6. Write a note on Minkowski four vector space.

PART - B

Answer any FOUR of the following: **(4×10=40)**

7. Obtain the general solution to the three dimensional Laplace's equation in Cartesian Coordinates.
8. Derive the multipole expansion of the magnetic vector potential and hence show that magnetic monopole does not exist.
9. Obtain expressions for energy and momentum for monochromatic wave.
10. Derive the reflection and transmission coefficient for a plane wave incident normally on the boundary between two dielectrics.
11. Obtain an expression for the power radiated by an oscillating electric dipole.
12. Discuss the transformation of electric and magnetic fields under Lorentz transformations.

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PART - C

Answer any TWO of the following : **(2×5=10)**

13. Two spheres of charges +10C and +40C are placed 0.12 m apart. Find the position of the point between them where the electric field intensity is zero.

14. A parallel plate capacitor has square plates 1.0 cm on a side. It is being charged so that electric field in the gap between plates rises steadily at the rate of 3×10^6 Vm^{-1} s^{-1}. Determine the displacement current.

15. Calculate the skin depth of Ag of conductivity 10^6 $(ohm\text{-}m)^{-1}$ for a frequency of 100MHz.

16. A point charge of 10 μ C is moving with velocity $\hat{i}+\hat{j}+\hat{k}$ ms^{-1} in a magnetic field $\vec{B}$ of 0.5 $\hat{k}$ T. Calculate the force on the charge.