SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
M.Sc.Physics - END SEMESTER EXAMINATIONS - NOV' 2024
SEMESTER - II

20PPHCT2006 - Electro Magnetic Theory and Plasma Physics

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Discuss about Laplace equation and its Uniqueness theorem.
2. Write notes on Molecular polarizability and electrical susceptibility.
3. State and explain Biot-Savart Law and Ampere's circuital law.
4. Derive an expression for electromagnetic vector and scalar potentials.
5. What are Alfven waves? Derive an expression for Alfven velocity.
6. Elaborate the multipole expansion of electrostatic potential.
7. Derive the equation for magnetic vector potential.
8. State and explain Faraday's laws of Induction.

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Explain in detail about Laplace equation in three dimensions and its solution in spherical polar coordinates.
10. Derive an expression for electrostatic energy in a dielectric sphere kept in a uniform field.
11. Explain in detail about the Magnetostatic energy in a uniformly magnetized sphere.
12. Discuss the propagation of electromagnetic waves in a rectangular wave guide.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Show that the Maxwell's equations are invariant under gauge transformations. Discuss the significance of this invariance.

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