M.SC. DEGREE EXAMINATION,APRIL 2018
I YEAR - II SEMESTER
Core Major -VI - ELECTRO MAGNETIC THEORY AND PLASMA PHYSICS

Time : 3 Hours   **Max.marks :75**

Section A $(10 \times 2 = 20 marks)$

Answer any **TEN** questions

1. State uniqueness theorem.

2. Write down the Laplace equation in spherical polar coordinates.

3. Write down the multipole expansion for the electrostatic potential.

4. State Ampere's law.

5. Define torque on the localized current distribution in an external magnetic induction.

6. Explain Faradays law of induction.

7. What are gange transformations?

8. What is Debye shielding.

9. Write short note on conservation of energy of electromagnetic field.

10. Define transverse waves.

11. Write down the inhomogeneous wave equation.

12. Define magnetosonic waves.

Section B $(5 \times 5 = 25 marks)$

Answer any **FIVE** questions

13. The potential V(r) is specified on the surface of a hollow sphere of radius R. Find the potential inside the sphere of radius R.

14. Solve the problem of dielectric sphere in a uniform field.

15. Obtain the magnetic vector potential in a macroscopic media.

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16. Obtain an impression for coulomb gange.

17. Derive Poynting vector.

18. Give an account on the polarization of electromagnetic wave.

19. Define the plasma confinement in a magnetic field.

Section C $(3 \times 10 = 30 marks)$

Answer any **THREE** questions

20. Obtain the solution and discuss in detail the Laplace equation in two dimensions.

21. Obtain the vector potential of a uniformly magnetized sphere in terms of spherical coordinates.

22. Explain the necessary theory on Maxwell's equations and Maxwell's displacement current.

23. Write in detail on reflection and refraction of electromagnetic waves at a plane interface between the dielectric.

24. Write an account on the principle theory of magneto hydrodynamics waves.