M.Sc DEGREE EXAMINATION,APRIL 2019
I Year II Semester
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. Establish the relation D $= \epsilon_o$ E+ P.
3. Define electrical susceptibility.
4. Can magnetic force does work on a charge. Justify?
5. Whether monopole exists in magnetism? explain.
6. Give the significance of displacement current.
7. Write Lorentz Gauge condition.
8. State Faraday's law of induction.
9. Differentiate between linear and circular polarization.
10. Define skin depth.
11. What are Alfven waves?
12. Define plasma oscillation.

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

Answer any **FIVE** questions

13. Find the electric field and capacitance of a parallel plate capacitor by solving Laplace equation.
14. Derive the Electrostatic energy in the presence of dielectrics.
15. Obtain the expression for magnetic vector potential.
16. Explain the invariance of Coulomb Gauge transformation.
17. Derive the plane electromagnetic wave equations in terms of A and ϕ.
18. Derive the cut-off wavelength for rectangular wave guide.
19. Describe the magneto-hydrodynamic equations.

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

Answer any **THREE** questions

20. Discuss the dielectric sphere in uniform electric field and obtain its potential distribution and electric field intensity.
21. Explain magnetic field in macroscopic media and obtain the expression for magnetization of a uniformly magnetized sphere.
22. State and explain Poynting's theorem
23. Discuss the plane electromagnetic waves in homogeneous isotropic conducting medium.
24. Discuss electron plasma oscillation and explain Pinch effect for plasma confinement in magnetic field.

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