M.Sc. DEGREE EXAMINATION,NOVEMBER 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. What is Laplace equation? Give its significance
2. Establish the relation D $= \epsilon_o$ E+ P.
3. Define electrical susceptibility of a dielectrics
4. State Ampere's Law.
5. What you mean by localized charge distribution?
6. Write the Lorentz guage condition
7. What is Lorentz force? Write its expression.
8. Give the Physical meaning of the equation div B = 0
9. What is Lenard Wizard potential?
10. Define skin depth
11. What are Alfven waves?
12. What is magnetic confinement of Plasma?

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

Answer any **FIVE** questions

13. Obtain the solution of Laplace equation in spherical polar coordinates.
14. Derive the Electrostatic boundary conditions.
15. Obtain the expression for magnetic vector potential.
16. Derive the Maxwell's equation in terms of vector and scalar magnetic potentials.
17. Describe electromagnetic momentum and electromagnetic energy.
18. Derive the cut-off wavelength for rectangular wave guide.
19. Discuss the electron plasma oscillation and derive the plasma frequency.

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

Answer any **THREE** questions

20. Derive the expression for electric field inside and outside a dielectric medium in the presence of field.
21. Describe the uniformly magnetized sphere in magnetic field and obtain its expression for magnetic induction and magnetostatic energy.
22. Explain Coulomb gauge and obtain the expression for current densities using the same.
23. Discuss the reflection and refraction of electromagnetic waves at a plane dielectric interface and derive the Fresnel's equations.
24. Derive the magneto- hydrodynamic equations for plasma.

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