M.Sc.DEGREE EXAMINATION,APRIL 2020
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 Differential form of Gauss's Law.
2. Give examples for polar and non polar molecules.
3. Express Ampere's Law in integral form.
4. State Biot Savart's Law.
5. Define Lorentz force.
6. Define Maxwell's displacement current.
7. Write the properties of non-conducting media.
8. What is meant by retarded potentials?
9. What happens when you increase the temperature of the gas?
10. Give the criteria for plasma.
11. State Maxwell's equation in integral form.
12. Define polarization vector P.

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

Answer any **FIVE** questions

13. Obtain the solution of Laplace equation in spherical-polar coordinates.
14. Find the potential inside and outside the uniformly magnetised sphere.
15. Derive an expression for the magnetic field in a localised current carrying loop.
16. What are the differences in the propagation and general behaviour between TE and TM modes in rectangular waveguide?
17. What are the significances of Alfven waves?
18. State the condition to be satisfied by vector and scalar potentials for Lorentz gauge.
19. Derive an expression for electrostatic energy in the presence of dielectric medium.

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

Answer any **THREE** questions

20. Develop multipole expansion upto quadrapole term.

21. Derive an expression for the magnetostatic energy in terms of magnetic field.

22. Derive an expression for the Poynting vector and comment on the results.

23. Show that the plane electromagnetic waves follow the laws of reflection.

24. Derive a relation for the frequency of plasma oscillation starting from the appropriate fluid equation.

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