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| Bon Secours College for Women Nationally Accredited with “A” Grade by NAAC (Affiliated to Bharathidasan University, Trichy-24) Recognized by UGC Under Section 2(f) & 12 (B)    Vilar Bypass, Thanjavur-613 006. |

**DEPARTMENT OF PHYSICS**

**ELECTROMAGNETIC THEORY**

**2 MARKS**

1. What is meant by dipole and dipole moment?
2. State Green’s theorem.
3. what is the importance of Coulomb’s law?
4. Obtain the differential form of gauss law.
5. Under static conditions what the electrical field and potential in a conductor.
6. Obtain Gauss’s law.
7. What is the total outward flux from the cube of side 1m,containing a volume charge density of 16xyzµc/m3.
8. Define Scalar Potential.
9. What are image charges?.
10. Define volume and surface charge density.
11. Define polarisation p for small volume element ΔV of a dielectric medium.
12. Define molecular polarisibility.
13. Give the expression for clausis Mossatti equation.
14. How does the electic field due to a pole of order l wary with l?
15. Show that a linear dielectric medium, the total electrostatic energy is w=1/2∫E.D d3 x.
16. What are dielectric materials?.
17. Define the term electrostatic potential energy?.
18. Define the term Multipole.
19. Define molecular polarizability.
20. Define torque on a complete circuit carrying circuit.
21. Define magnetic scalar potential.
22. what is gauge transformation?
23. Give an expression for magnetic moment density.
24. Show that in the gauge Δ.A=0,the vector potential A satisfies the Poission’s equation Δ2. A=µ0.J.
25. How is the magnetic moment of a circuit carrying current I defined? How it is related to the area of the circuit?
26. State Ampere’s law.
27. Define magnetic flux Density.
28. State biot savart law.
29. Define vector potential.
30. How did Maxwell generalised Ampere’s law?
31. Define B&E in terms of A, The related vector potential.
32. What is Lorentz condition?.
33. Give the differential form of Faraday’s equation.
34. what is Gauge invariance?
35. what is meant by poynting vector?
36. Define the phase velocity.
37. What is circularly polarized wave?.
38. What is meant by cavity and wave Guide?
39. What is meant by Skin depth?
40. What is Circular polarization?
41. Give the boundary conditions on TE waves and TM waves in a cylindrical wave guide.
42. Show that the phase velocity of electromagnetic wave in free space is 3×10 m/sec.
43. What are in homogenous waves?
44. Calculate the frequency at which the skin depth of sea water is 1m whose conductivity is 4.3s/m.

**5 MARKS:**

1. Write the laplace’s equation.Also state the two important properties of the solution of Laplace’s equation.
2. Solve by image technique for a point charge q in the vicinity of a conducting sphere.
3. Explain the discontinuities in the electric field and potential due to surface distribution of charges.
4. Find the potential and force on a point charge q placed near an insulated, conducting sphere with total charge Q, by the method of images.
5. Derive the differential and integral forms of Gauss law.
6. Derive the equation of electrostatic and obtain the expression for scalar potential.
7. Obtain differential form of gauss theorem.
8. Derive an expression for potential at any point due to dipole.
9. Obtain Poisson and Laplace equation. Discuss their importance. **.**Find an Expression for the electrostatic potentials due to charges in ponderable media and find the relation between D,E and P.
10. 2.Apply the method of images to find the potential for the case of a point charge q embedded in a Semi-infinite Dielectric E1 a distance d away feom a plane interface that seperates the first medium from another Semi-infinite dielectric E2.
11. Obtain the solution for the potential outside the sphere using green’s function for the sphere.

**10 MARKS**

1.Derive and comment onthe Expression for Er and Eo for a conducting sphere placed in an uniform electric field.

2.Explain the method of images for finding the potential in the pressure of boundary surfaces. Apply this method for the case of a point charge in the presence of a grounded conducting sphere. Find the charge density induced on the surface and the force acting on the charge.

3.Derive the expression for electrostatic potential and electric field intensity due to the conductinh sphere in the uniform electric field.

4.Explain in detail about greens theorem.

5.Determine the electric potential and total force acting on the sphere due to the point charge in the presence of grounded conducting sphere by the method of images.