



(Autonomous/Affiliated to Anna University)
Coimbatore – 641 032

Degree / Branch : B.E/EEE

Semester / Year: III / II

Subject Code & Title: 14E304 – ELECTROMAGNETIC THEORY

UNIT 1 VECTOR ANALYSIS

Part-A

(Short Questions)

1. What is meant by scalar field? Give two examples.
2. What is meant by vector field? Give two examples.
3. State the differential surface elements in cartesian co-ordinate system.
4. State the differential surface elements in cylindrical co-ordinate system.
5. State the differential surface elements in spherical co-ordinate system.
6. State the various differential volume elements in three co-ordinate system.
7. What is a unit vector?
8. Give the relation between cylindrical and cartesian co-ordinate system.
9. Give the relation between spherical and cartesian co-ordinate system.
10. Find the dot product of the vectors if $\vec{A} = 2\vec{a}_x - 3\vec{a}_y$ and $\vec{B} = -\vec{a}_x + 2\vec{a}_z$.
11. Define Line charge density.
12. Define surface charge density.
13. Define volume charge density.
14. Define Electric Field Intensity.
15. Give the expression for D and E in terms of surface charge density.
16. Give the expression for D and E in terms of volume charge density.
17. Give the expression for D and E in terms of line charge density.
18. Define Surface integral.
19. Define line integral.
20. Define volume integral.
21. State coulomb's law.
22. Define electric field intensity.
23. Define point charge.
24. What are the types of charge distribution?
25. State the coulomb's law in vector form.

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UNIT II ELECTROSTATICS

Part-A

(Short Questions)

1. State Gauss's Law.
2. Give the Mathematical representation of Gauss's law.
3. Name any four applications of Gauss's Law in electrostatics.
4. What is meant by Gaussian surface?
5. Define electric flux density and electric field intensity.
6. State the relation between electric flux density and intensity.
7. Under what condition will the electric field (E) be solenoidal?
8. Define D in line, surface and volume charge distribution.
9. List the properties of electric flux lines.
10. Define divergence.
11. List the properties of divergence of vector field.
12. State divergence theorem.
13. List the properties of gradient.
14. Define Gauss law for magnetic field.
15. Give the expression for potential due to point charge not at origin.
16. Define potential difference and give its unit.
17. Give the expression for potential due to line charge distribution.
18. Give the expression for potential due to surface charge distribution.
19. Give the expression for potential due to volume charge distribution.
20. Give the expression of E for a coaxial cable.
21. What is meant by potential gradient?
22. Express potential gradient for various coordinate systems.
23. What is an electric dipole?
24. Define energy density.
25. Define dipole moment. Give its unit.

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UNIT III CONDUCTORS, DIELECTRICS AND CAPACITORS

Part-A

(Short Questions)

1. Define current and current density. Give its unit.
2. Give the relation between current and current density.
3. State continuity equation of current in point form and integral form.
4. State the continuity equation of current.
5. Define point form of ohm's law.
6. List the properties of a conductor.
7. List the properties of a dielectric material.
8. Define relaxation time.
9. What is polarization?
10. State the Boundary condition at the interface between two perfect dielectrics.
11. What is meant by dielectric strength?
12. Give the value of tangential and normal components of D and E at the boundary between a conductor and a dielectric.
13. Explain the concept of capacitance.
14. Write the Laplace's equation.
15. Write the Poisson's equation.
16. List the properties of Laplacian.
17. Express Laplacian in various coordinate systems.
18. Define bound charge.
19. Calculate the energy stored in a capacitor which has been charged to a voltage of V. Assume the capacitance value of the capacitor to be C farad.
20. Give the values of normal component and tangential components at boundary between two perfect dielectrics.
21. State the expression for energy stored in a capacitor.
22. State the capacitance of a spherical capacitor.
23. State the capacitor of a coaxial capacitor.
24. What is capacitance?
25. Give the general expression for capacitance of a multi-dielectric capacitor.

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UNIT IV MAGNETO STATICS

Part-A

(Short Questions)

1. Define magnetic field intensity. Give its unit.
2. Define magnetic flux density. Give its unit.
3. State Stoke's theorem.
4. Define curl.
5. Express curl in various coordinate systems.
6. List the properties of curl.
7. State Biot-Savart law.
8. State Ampere's circuit law.
9. State the point form of Ampere's law.
10. State the expression for Biot-Savart law in terms of distributed sources.
11. What is the relation between magnetic field intensity and magnetic flux density?
12. What is permeability?
13. State the point form and integral form of Maxwell's equation from Gauss law for magnetic field.
14. State point form and integral form of Maxwell's equation derived from Ampere's circuit law.
15. What is meant by magnetic torque?
16. Write the expression of Gauss's law for magnetic fields.
17. Define magnetic dipole.
18. Define self inductance.
19. Define mutual inductance.
20. Write the tangential and normal components in the boundary between two magnetic materials.
21. Give the expression for the inductance of a coaxial cable.
22. Give the expression for the inductance of a toroid.
23. Give the expression for the inductance of a solenoid.
24. Give the expression for energy stored in the magnetic field.
25. State any two similarities and dissimilarities between electric and magnetic circuit.

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UNIT V ELECTRO MAGNETIC WAVES

Part-A

(Short Questions)

1. State Faraday's law of electromagnetic induction.
2. State Lenz law.
3. Write the point form of Maxwell's equation for static fields.
4. Write the point form of Maxwell's equation for time varying fields.
5. Write the integral form of Maxwell's equation for free space.
6. Write the integral form of Maxwell's equation for good conductor.
7. State the Maxwell's equation derived from Faraday's law.
8. State the Maxwell's equation derived from Ampere's law.
9. What is meant by Poynting vector? What is the SI unit for this vector?
10. State Poynting theorem.
11. State the point form and integral of Poynting theorem.
12. What is meant by power loss in plane conductor?
13. Define wave?
14. What is an electromagnetic wave?
15. Define propagation constant.
16. Define attenuation constant.
17. Define wavelength.
18. What is meant by transverse electromagnetic wave.
19. What is meant by uniform plane wave.
20. Write the general wave equation interms of electric and magnetic fields.
21. State the phasor form of wave equation.
22. Define skin depth.
23. What is Brewster angle?
24. Define critical angle for total reflection.
25. What is standing wave ratio?

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