

24144

B. Tech. 4th Semester (AEIE) F. Scheme

Examination, May-2014

ELECTROMAGNETIC THEORY

Paper-EE-208-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Question number 1 is compulsory, and attempt one question from each of the four sections. All questions carry equal marks.

1. (a) State coulomb's law and write the mathematical expression. 4
- (b) Define electric potential and potential difference. 3
- (c) What is Lorentz law of force ? 3
- (d) What do you mean by displacement current density ? 4
- (e) State lenz's law. 3
- (f) What is skin depth ? 3

Section-A

2. (a) State and explain Stoke's theorem. 10
- (b) Prove that the cylindrical coordinate system is orthogonal. 10
3. (a) What is the physical significane of divergence and curl of a vector ? 5

- (b) Derive the Laplace's equation. Discuss the use of Laplace's equation in rectangular, cylindrical and spherical coordinates. 15

Section-B

4. (a) State Gauss's theorem and explain why it is called divergence theorem ? 10
- (b) What is the method of images ? Explain its use by taking a specific example. 10
5. (a) Derive the boundary conditions for electric fields at the interface between two dielectrics ? 10
- (b) State and derive the equation of continuity. 10

Section-C

6. (a) State Ampere's law and briefly discuss its applications. 10
- (b) Write short note on magnetic vector potential. 10
7. (a) Briefly explain :
- (i) Magnetic dipole
- (ii) Energy in magnetic field 10
- (b) Derive magnetic boundary conditions at magnetic surfaces. 10

Section-D

8. (a) State and derive Maxwell's equation in differential and integral form. 10
- (b) What is Poynting vector ? Give its physical interpretation. 10
9. (a) What is a plane wave ? Derive the expression for velocity of the plane wave within a good conductor. 10
- (b) Derive the transmission and reflection coefficient for the electromagnetic waves. Discuss the above for an open loop and a short circuited line. 10