Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

EX-5001 (CBGS)

B.E. V Semester

Examination, November 2018

Choice Based Grading System (CBGS)

Electromagnetic Field Theory

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume any missing data.

1. a) State and prove Gauss's divergence theorem. Write equation for gradient, divergence and curl for cylindrical and spherical coordinate system.
   b) Calculate the potential at a point (i) Outside (ii) Inside a uniformly charged sphere of radius = (a).

2. a) Describe Coulomb's law. Determine the electric field due to line charge.
   b) Derive Poisson's and Laplace's equations and discuss their significance.

3. a) In free space $V = 6xy^2z + 8$, at point P(1, 2, –5), find $\bar{E}$ and P_v.
   b) State and verify the boundary value conditions for electric field.

4. a) State and prove Ampere's circuital law. Discuss its applications.
   b) Define magnetic dipole moment, magnetization vector and establish a relation between magnetic flux density, magnetic field intensity and magnetization vector.

5. a) A filamentary current of 10A is directed in from infinity to the origin on the positive x-axis and then base out to infinity along the positive y-axis. Use the Biot-Savart law to find H at P(0, 0, 1).
   b) Define vector magnetic potential and derive an expression for it. Relate it with magnetic flux.

6. a) What is toroid? Determine the self-inductance of toroid coils.
   b) Explain Maxwell's equation in integral and differential forms.

7. a) Determine the relation between E and H in a uniform plane wave.
   b) Define reflection coefficient and transmission coefficient. Derive relationship between them.

8. Write short notes on (any three):
   a) Polarization of waves
   b) Transmission line analogy
   c) Methods of images
   d) Faraday's Law
   e) Lorentz Force

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