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Roll No .....

EE-6001-CBGS

B.E. VI Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Electronic Magnetic Field Theory

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Describe cylindrical coordinate system and also deduce its conversion into spherical coordinate system. 7

   b) State and explain Divergence theorem and Stoke's theorem. Give the relevance of these theorems to electromagnetic problems. 7

2. a) State and explain Coulomb's law. 7

   b) Point charge 1μC and 2 μC are located at (3, 2, –1) and (–1, 1, 4) respectively. Calculate the electric force on at 10 nC charge located at (0, 3, 1) and the electric field intensity at that point. 7

3. a) Derive Laplace's and Poisson's equation and show that they have unique solution. 7

   b) State and explain Gauss's flux theorem. Also write limitations of Gauss's law. 7

4. a) Find the store energy in a system of four identical charges Q = 2 nC at the corners 1m on a side. 7

   b) Explain the concept of energy density for a parallel plate capacitor. 7

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5. a) Explain the method of electrical images and discuss its applications in the study of electromagnetic problems. 7

   b) Explain boundary relation in magnetic fields and hence explain magnetic boundary conditions. 7

6. a) A current element $\Delta l = 2\pi(0.6\, 1_x - 0.8 1_y)$ μA is situated at a point (4, –2, 3). Find the incremental field ΔH at a point (1, 3, 2). 7

   b) State and explain Ampere's law both in integral and differential form as used in magnetic fields. 7

7. a) Deduce Maxwell's equation in differential and integral form. 7

   b) Determine the inductance of solenoid, toroid and coaxial cable with equations. 7

8. a) State and prove pointing vector theorem. 7

   b) Explain the concept of polarization of waves. 7

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