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B. Tech. EXAMINATION, 2020

(Fifth Semester)

(C Scheme) (Main Only)

(EE)

EE305C

Electromagnetic Fields

Time : 2½ *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Give physical significance of divergence.

(b) State and explain Coulomb's law in electrostatics. Express it mathematically for two point charges.

2. (a) Explain the concept of vector magnetic potential. What is its unit ?

(b) Determine the magnetic field H ρ for a solid cylindrical conductor of radius *a*, where the current I is uniformly distributed over the cross-section.

3. (a) Explain Biot-Savart's law and Faraday's law.

(b) Discuss Poisson's and Laplace equations.

4. Give short notes on the following :

(a) Magnetic Vector Potential

(b) Ampere's Law of Force.

5. State and prove Maxwell's equation and its physical interpretations.

6. (a) What do you mean by Uniform Plane Wave ? Discuss basic Properties of Plane wave.

(b) Four 10 *n*C positive charges are located in the $z = 0$ plane at the corners of a square 8 cm on a side. A fifth 10 *n*C positive charge is located at a point 8 cm distant from each of the other charges. Calculate the magnitude of the total force on the fifth charge for $\in = \in 0$.

7. (a) Discuss wave propagation in a conductor. Derive Relevant equations.

(b) Derive basic equation for electromagnetic waves in free space in terms of E and H.

8. Discuss the following :

(i) Equation of continuity for time varying field

(ii) Wave propagation in good dielectric.