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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE)/(Electrical & Electronics)/

(Electronics & Electrical) (2011 Onwards)

(Sem.–4)

ELECTROMAGNETIC FIELDS

Subject Code : BTEE-403

M.Code: 57106

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define current density at a given point.
- b) Write the expression for energy stored in magnetic field.
- c) Define Electric Dipole,
- d) State the condition for the vector F to be solenoidal.
- e) Write down the magnetic boundary conditions.
- f) What is Lorentz force?
- g) Mention the properties of uniform plane wave.
- h) What is the effect of permittivity on the force between two charges?
- i) State Maxwell's third equation.
- j) State Gauss law for magnetic field.



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SECTION-B

- 2. Derive the expression for force on a moving charge in a magnetic field.
- 3. Derive Poisson's equation.
- 4. Explain the importance of cylindrical and spherical coordinate systems with suitable example for study of electromagnetics.
- 5. What is meant by skin depth of conductor? How it is related to attenuation constant? How does it depend upon conductivity and frequency?
- 6. A 300Hz uniform plane wave propagates through fresh water for which $\sigma = 0$, $\mu_r = 1$, $\epsilon_r = 7.8$.

Calculate :

- a) Attenuation constant.
- b) The phase constant.



- 7. Using Maxwell equations, derive the Poynting's theorem.
- 8. a) Derive the equation of continuity for time varying fields.
 - b) State and explain the electrostatic boundary conditions existing at the boundary between two dielectrics.
- 9. Write short notes on the following :
 - a) Uniqueness Theorem
 - b) Reflection by perfect insulator at oblique incidence.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.