Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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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.

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 $\sigma = 0$, $\mu_r = 1$, $\varepsilon_r = 7.8$.

   Calculate :

   a) Attenuation constant.

   b) The phase constant.

SECTION-C

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.