



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 131407**

Roll No.

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### **B. Tech.**

(SEM. IV) THEORY EXAMINATION, 2014-15  
**ELECTROMAGNETIC FIELD THEORY (EMFT)**

Time : 2 Hours]

[Total Marks : 50

- 1 Attempt **any four** question. All parts carry **3.5×4=14** equal marks.
- State divergence theorem and Stroke theorem.
  - Explain the physical interpretation of curl.
  - Convert the Cartesian coordinate system into cylindrical coordinate system.
  - Transform the point P(1,1,6) in spherical coordinate system.
  - Explain the gradient of a scalar field. Also explain its physical interpretation.
  - Write the laplace equation in all three coordinate system.
- 2 Attempt **any two** questions. All Question carry **6×2=12** equal marks.
- Find the potential function and electric field intensity for the region between two concentric right circular cylinder where  $V=V_0$  at  $r=a$  and  $V=0$  at  $r=b$  ( $b>a$ )?

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- (b) Find the electric field intensity due to infinitely long charged wire(line charge).
- (c) Derive Energy Density in electrostatic field.

3 Attempt **any two** questions. All Question carry  $6 \times 2 = 12$  equal marks.

- (a) State and explain maxwell's equations in differential and integral form.
- (b) Explain magnetic boundary conditions.
- (c) State and explain Bio savart law. Derive magnetic field intensity due to infinitely long wire carrying current I.

4 Attempt **any two** questions. All Question carry  $6 \times 2 = 12$  equal marks.

- (a) Find the value of  $\alpha, \beta$ , for good conductors. Show that angle of characteristic impedance is always  $45^\circ$  for good conductors.
- (b) Derive the mathematical expression for poynting theorem.
- (c) Find the expression for  $\alpha, \beta, \gamma$ , for lossless or perfect dielectric medium. A 10 GHZ plane wave traveling in free space has an amplitude of  $E_x = 10$  V/m. Find  $V, \eta, \beta, \lambda$  and the amplitude of H.