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4E4133**4E4133**

B.Tech. IV Sem.(Main/Back) Examination, May - 2018
Electronics & Comm.

4EC4A Electromagnetic Field Theory

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting One question from each unit. All questions carry Equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

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Unit - I

1. a) Give the basic concept of transformation of one coordinate system to another? (8)
- b) Express the vector $B = (10/r)a_r + r \cos \theta a_\theta + a_\phi$, in Cartesian and cylindrical coordinates. Find B (-3,4,0) and B $(5, \pi/2, -2)$. (8)

OR

1. a) Given point P (-2, 6, 3) and vector $A = ya_x + (x+z)a_y$, express P and A in cylindrical and spherical coordinates. Evaluate A at P in the cartesian, cylindrical system. (8)
- b) State, Explain and Proof Green's Theorems. (8)

Unit - II

2. a) Explain Field Mapping and Concept of field Cells. (8)
- b) In a field $E = -50y \mathbf{i}_x - 50y \mathbf{i}_y + 30y \mathbf{i}_z$ V/m, calculate the different amount of work done in moving $2\mu C$ Charge a distance $5\mu C$ from A (1,2,3) to B (2,4,1). (8)

OR

2. a) Explain and Proof Gauss's Law. (8)
- b) Explain the Phenomena of Continuity equation for current? (8)

Unit - III

3. a) Explain Bio Savart Law? (8)
b) Describe the concept of Energy stored in magnetic field? (8)

OR

3. a) Explain Ampere's Circuital Law? (8)
b) Explain analogy between electrical and magnetic field? (8)

Unit - IV

4. a) Explain the phenomena of Reflection of uniform plane wave? (8)
b) Explain Maxwell's Equations for time varying fields? (8)

OR

4. a) An A.C. voltage source $V = V_m \sin(\omega t)$ is connected across a parallel plate capacitor C. Verify that the displacement current in the capacitor is the same as the conduction current in the wire. (8)
b) Can a static magnetic field exist in the interior of a perfect conductor? Explain. Can a time varying magnetic field explain. (8)

Unit - V

5. a) Explain the EMI error in equipments. (8)
b) What is Susceptibility testing, where and for what purpose it is used explain. (8)

OR

5. Write short note on : ersahilkagyan.com

- a) Shielding and Grounding. (8)
b) Radiation from a small current element. (8)