

**B. Tech. DEGREE EXAMINATION, MAY - 2015**

**(Examination at the end of Second Year)**

**ELECTRICALS AND ELECTRONICS**

**Paper - III : Electromagnetic Field Theory**

**Time : 3 Hours**

**Maximum Marks : 75**

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*Answer question No.1 compulsory*

*(15)*

*Answer ONE question from each unit*

*(4 × 15 = 60)*

- 1)**
- a) State Coulomb's law
  - b) State Gauss law.
  - c) State ohm's law in point form.
  - d) Write equation for energy stored in the capacitor
  - e) Define Ampere's law of force.
  - f) Write Ampere's circuital law in integral form.
  - g) What is continuity equation?
  - h) What is self Inductance.
  - i) What is Lorentz force equation.
  - j) Write Faradays law in Integral form & differential form.
  - k) Write the wave equation for sinusoidally time varying fields.
  - l) What is dielectrics?
  - m) What is skin effect?
  - n) Write the equation for Maxwell in differential form.
  - o) Write the names of good conductors.

### UNIT - I

- 2) a) Explain about line charge, surface charge and volume charge.  
b) Write application of Gauss law to compute  $\vec{E}$ .

OR

- 3) a) Explain about Electric field and electric potential.  
b) Discuss about conduction current and current density  $\vec{J}$ .

### UNIT – II

- 4) a) Define magnetic flux ( $\phi$ ), magnetic flux density ( $\vec{B}$ ) and magnetic field Intensity ( $\vec{H}$ ).  
b) Explain about scalar magnetic potential & vector magnetic potential.

OR

- 5) a) What is mutual Inductance and extract the Neumann's formula for mutual Inductance.  
b) Compute mutual Inductance for simple configurations.

### UNIT – III

- 6) a) Write the Lorentz Force equation and explain physical meaning of electromagnetic field.  
b) Write Faraday's law in integral form and differential form and explain about them.

OR

- 7) a) Write Maxwell's equation in integral form and differential form for sinusoidally time varying fields.  
b) Write magnetic boundary conditions.

### UNIT – IV

- 8) a) Write Poynting theorem and explain.  
b) Write power flow and power density in EM field.

OR

- 9) a) Explain about uniform plane wave in free space and dielectrics.  
b) Explain about plane wave in lossy dielectrics and good conductors.

