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**Question Paper Code : 40957**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018  
Fourth Semester  
Electronics and Communication Engineering  
EC 6403 – ELECTROMAGNETIC FIELDS  
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. State divergence theorem.
2. Write the different coordinate systems.
3. Two capacitances  $C_1$  and  $C_2$  are connected in series. Find the equivalent total capacitance.
4. What is current density ?
5. What is vector magnetic potential ?
6. State Ampere circuital law.
7. Define – dielectric strength.
8. What is ferromagnetic material ?
9. What is electromotive force ?
10. Define Poynting's theorem.

PART – B

(5×13=65 Marks)

11. a) i) State and prove Stokes theorem. (6)  
ii) Derive Electric field intensity due to line charge. (7)  
(OR)  
b) i) Derive the equation for potential difference to move a point charge in electric field. (7)  
ii) Derive the Electric field due to electric dipole. (6)

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12. a) Derive an expression for energy stored in the electrostatic field of a section of a coaxial cable. (13)

(OR)

- b) Derive the electric field boundary condition, when a wave travels between two different dielectrics medium. (13)

13. a) State Biot-Savart's law and derive the expressions for magnetic field intensity, of a straight current carrying conductor.

(OR)

- b) Derive the magnetic field intensity of a circular current carrying conductor.

14. a) Derive the inductance of toroid and solenoid.

(OR)

- b) i) Derive the equation which relates magnetization and permeability. (8)

- ii) Explain the different types of magnetic materials. (5)

15. a) Derive the Poynting theorem equation from Maxwell's curl equation.

(OR)

- b) Derive the Maxwell's equations in Differential form and integral form.

PART - C

(1×15=15 Marks)

16. a) Apply Lorentz force equation, to derive the force on a differential current element.

(OR)

- b) Illustrate with an example, to apply Poisson's and Laplace equation.