Roll No .....

EC-402

B.E. IV Semester

Examination, December 2016

Electro-Magnetic Theory

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions. All questions carry equal marks.

1. a) Transform the vector field $\overline{F} = 10\overline{a}_x - 8\overline{a}_y + 6\overline{a}_z$ to cylindrical co-ordinate system, at point P (10, –8, 6). 7
   b) State and prove the divergence's theorem. 7

2. a) State the Coulomb's law and explain it. 7
   b) Derive Laplace's and Poisson's equations. 7

3. a) Explain image theory. 7
   b) Derive Ampere's circuit law in integral and differential vector form. 7

4. a) State and prove uniqueness theorem. 7
   b) Explain Boundary conditions on magnetic field. 7

5. a) Derive the Maxwell's equation in : 7
      i) Point form and
      ii) Integral form
   b) Derive the wave equations for source free region. 7

6. a) Derive continuity equation. 7
   b) Explain circular and elliptic polarization. 7

7. a) Explain the plain wave in lossy dielectric media. 7
   b) Explain following terms : 7
      i) Loss tangent
      ii) Skin depth

8. a) Derive the expression for transmission coefficient and reflection coefficient of uniform plane waves with normal incidence at plane dielectric boundary. 7
   b) What do you mean by total internal reflection? Explain. 7

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