

Code: 9A10503

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2012

**ELECTRO MAGNETIC THEORY**

(Electronics and Instrumentation Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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- 1 (a) State and explain Coulomb's law.  
(b) In what manner does permittivity vary to satisfy Laplace's equations in a non-homogeneous, charge free space?
- 2 (a) An infinitely long current element on x-axis carries a current of 1.0 mA in  $a_x$  direction. Determine H at the point p(5, 2, 1).  
(b) Explain Ampere's force law.
- 3 (a) Explain Maxwell's equations for time varying fields.  
(b) In free space, the magnetic field of an EM wave is given by  $H = 0.4 \omega \epsilon_0 \cos(\omega t - 50x) a_z$  A/m. Find electric field and displacement current density.
- 4 (a) Explain the wave propagation in conducting media.  
(b) What is the velocity of propagation of a uniform plane wave in a medium whose  $E_r = 10$  and  $\mu_r = 3$ . Derive the equation you use.
- 5 (a) Explain Brewster angle and critical angle.  
(b) Discuss the power loss in a plane conductor.
- 6 (a) When a wave of 6 GHz is to be propagated between two parallel conducting plates separated by 60 mm. Find the modes that will propagate through the guide.  
(b) Obtain attenuation factor for TEM case.
- 7 (a) Discuss man-made EMI sources.  
(b) For a copper shield, find the reflection loss in dB 1 KHz.
- 8 (a) Give the principles and practice of earthing.  
(b) Explain electrical bonding.

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