

R09

Code: 9A10503

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

**ELECTROMAGNETIC THEORY**

(Electronics &amp; Instrumentation Engineering)

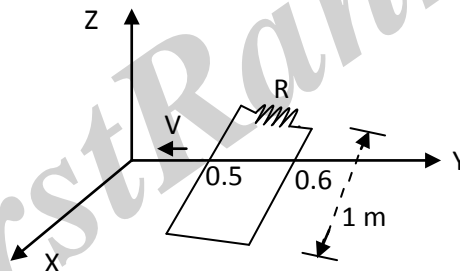
Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 A parallel plate capacitor has a plate area of  $1.5 \text{ m}^2$  and plate separation of 5 mm. There are two dielectrics in between the plates. The first dielectric has a thickness of 3 mm with a relative permittivity of 6 and the second has a thickness of 2 mm with relative permittivity 4. Find capacitance.
- 2 (a) Explain scalar magnetic potential and give its limitations.  
(b) Explain importance of vector magnetic potential.
- 3 (a) Define statically induced emf and dynamically induced emf.  
(b) A rectangular loop shown in figure below, moves forwards the origin at a velocity  $V = -250 \bar{a}_y$  m/s in a field  $\bar{B} = 0.8 e^{-0.5y} \bar{a}_z$  Tesla. Find the current at the instant the coil sides are at  $y = 0.5 \text{ m}$  and  $0.6 \text{ m}$ , if  $R = 2.5 \Omega$ .



- 4 (a) Derive an expression for wave propagation in good conductor.  
(b) A uniform plane wave in a medium having  $\sigma = 10^{-3} \text{ S/m}$ ,  $\Sigma = 80 \Sigma_0$  and  $\mu = \mu_0$  is having a frequency of 10 KHz. Calculate the different parameters of the wave.
- 5 Derive an expression for reflection of plane wave by a perfect dielectric-oblique incidence.
- 6 Explain attenuation of waves due to finite conductivity of guide walls.
- 7 (a) Explain switching transients in EMI.  
(b) Explain pulse and high power electromagnetics.
- 8 (a) Explain different earthing principles and precautions.  
(b) Explain conductive coatings and cable shielding.

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