Code: 9A10503

R09

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013
ELECTROMAGNETIC THEORY
(Electronics & 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 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 intent the coil sides are at y = 0.5 m
         and 0.6 m, if R = 2.5 Ω.
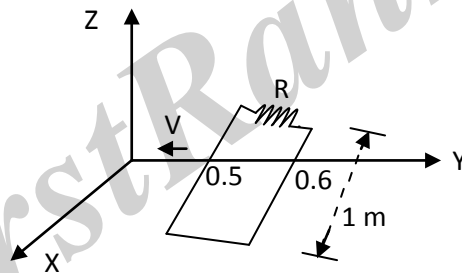
4   (a) Derive an expression for wave propagation in good conductor.
    (b) A uniform plane wave in a medium having $\sigma = 10^{-3}\, s/m$, $\Sigma = 80\, \Sigma_0$ and $\mu = \mu_0$ is having a
         frequency of $10\, KHz$. Calculate the different parameters of the wave.

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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