Code: 9A04406 **R09**

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2016

ELECTROMAGNETIC THEORY & TRANSMISSION LINES

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Find the electric field at the surface of a conductor.
(b) For an electric dipole obtain far field expression from the gradient of potential.

2 (a) Define capacitance from the concept of electric field.
(b) Derive an expression for capacitance per unit length between two infinitely long concentric conducting cylinders.

3 (a) Determine the field strength "**H**" at a point on the axis of an infinite solenoid of radius 'R' and '**n**' turns/ meter?
(b) Find the energy stored in the field in establishing a current of 'I' amps in a Solenoid of 'n' turns.

4 (a) What are boundary conditions? How are they useful in solving field problems?
(b) Two homogeneous isotropic di-electric mediums separated at z = 0, $\epsilon_{r1} = 8\ for\ z \leq 0\ and\ \epsilon_{r2} = 4\ for\ z > 0$ if the electric field $E_2 = 8i_x - 6i_y + 8i_z$, find $E_1,\ H_1,\ H_2$.

5 A 100 MHz uniform plane wave traveling in lossy dielectric ($\mu_r \approx 1$) has the following phasor expression for the magnetic field intensity vector:

$H = (1a_y + j2a_z)e^{-0.2x}\, e^{-j2x}$

Write the complete time domain expressions for the electric and magnetic field vectors.

6 Explain reflection of uniform plane wave by a perfect conductor in the case of oblique incidence for parallel polarization.

7 Derive the transmission line equations for lossless line and obtain the expressions for γ, Z_0.

8 Impedance measurement on a 500 Kn length of cable at ω = 10000 rad/sec under open circuited and short circuited conditions gave the following results:

$Z_{oc} = 2000\angle -80^0\,\Omega$, $Z_{sc} = 20\angle 20^0\,\Omega$

Calculate the values of Z_0, γ, β, α, and primary constants.

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