Code No: R22042 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations, April/May - 2017
ELECTRO MAGNETIC WAVES AND TRANSMISSION LINES
(Com. to ECE, EIE)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Obtain the Maxwell's two equations for electrostatic fields and also Compare convection and conduction currents.
   b) The finite sheet $0\leq x\leq 1$, $0\leq y\leq 1$ on the z=0 plane has a charge density $\rho_s= xy(x^2+y^2+25)^{3/2}$ nC/m^2.Find the total charge on the sheet .

2. a) Explain about scalar magnetic potential and vector magnetic potential .
   b) Derive the expression for relation between magnetic flux density and magnetic field Intensity? A solenoid with length 10 cm and radius 1 cm has 450 turns . Calculate its Inductance.

3. a) Describe about the displacement current density for time varying fields?
   b) Write the Maxwell's Equations for time varying fields in point form and integral forms? And also explain.

4. a) Obtain the wave equations for conducting and perfect dielectric media.
   b) Define polarization? And also explain.

5. a) Explain the concept of Surface impedance? Derive the expression for surface impedance of a good conductor?
   b) What is total reflection in case of oblique incidence at a plane dielectric boundary? Derive the expression for critical angle (θ_c)?

6. a) Obtain the expression for the field components of an electromagnetic wave propagating between a pair of perfectly conducting planes.
   b) Explain the properties of TEM waves.

7. a) Explain the transmission line parameters and also obtain the transmission line equations.
   b) A telephone line has R=30Ω/km, L=100mH/km, G=0 and C=20F/km. At f=1kHz, obtain (i) The characteristic impedance of the line (ii) the propagation constant (iii) the phase velocity.

8. a) Distinguish between the Single and Double Stub Matching.
   b) A stub of length 0.12 λ is used to match a 60Ω lossless line to a load. If the stub is located at 0.3 λ from the load, Calculate (i)The load impedance Z_L (ii)The standing wave ratio between the stub and the load.
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