Code: 9A04406

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2017

ELECTROMAGNETIC THEORY & TRANSMISSION LINES

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) State and Prove Gauss law and explain its applications through example

(b) Three co-axial cylindrical sheets of charge are present in space, of charge densities $5\,\mu C/\,cm^2$ at $r = 3\,m; -2\,\mu C/m^2\ at\ r = 4\,m$ and $4\,\mu C/m^2\ at\ r = 6\,m,$ find the displacement density at $r = 2\,m$ and $r = 6\,m$?

2 What is electric dipole? Derive the relation between polarization vector and Electric field in dielectrics.

3 State and prove all the Ampere's laws applied to magnetic field.

4 (a) State continuity equation and explain its physical interpretation?

(b) If the electric field $E = E_0 z^3 \cos\omega t\ i_x$ in free space and there exist a magnetic field such that both Faraday's law and Ampere's circuit law are satisfied simultaneously find the magnetic field

5 Show that $\frac{E}{H} = \sqrt{\frac{\mu}{\varepsilon}}$ for a uniform plane wave.

6 State and prove poyntig's the theorem.

7 A transmission line 5 km long is terminated in a pure resistive load of 600 Ω, its characteristic impedance is $690 \angle -40^0$ and its propagation constant is $0.3 \angle -50^0$ at $\frac{5000}{2\pi}$ Hz. If a source of this frequency having a voltage of 1 volt is applied to the sending end. What will be the sending end current?

8 (a) What is smith chart? Give the applications of smith chart.

(b) A loss less line has a characteristic impedance of 100 Ω and is loaded by unknown impedance. The standing wave ratio along the line is 2. The first two voltage minima are located at z = -10 and -35 cm from the load where z = 0. Determine the load impedance.

*****