(3 Hours) **[Total Marks: 80]**

N.B.: (1) Question No. 1 is Compulsory.

(2) Attempt any three questions out of the remaining five.

(3) Each question carries 20 marks and sub-question carry equal marks.

(4) Assume suitable data if required.

Q1. (a) Derive Poisson's and Laplace equation. (5)

(b) Explain boundary conditions of E and H fields for two media. (5)

(c) Explain the radiation resistance, directivity, Beam-width and directive gain of the antenna. (5)

(d) What is polarization? Explain all types of polarization. (5)

Q2. (a) Derive Maxwell's equations in integral and point form for static field. (10)

(b) State and Explain Poynting vector using modified Ampere's law, derive the pointing theorem and describe the significance of each of its terms. (10)

Q3. (a) Derive an expression for reflection and transmission coefficient for normal incidence in case of reflection from perfect dielectric. (10)

(b) Classify and Explain different types of wave Propagation and define the terms Critical frequency, Virtual height, Maximum unstable frequency and Skip distance. (10)

Q4. (a) Drive the expression for radiation resistance in far field region of an Infinitesimal dipole antenna. (10)

(b) Derive an expression for transmission line equation. (10)

Q5 (a) State Poynting Theorem and derive the expression for Poynting Vector. (10)

(b) Write a note on Smith chart and explain the steps to calculate SWR from the chart. (10)

Q6. (a) Write the generalized Maxwell's Equations in point form and integral form. (10)

(b) Explain the factors affecting the field strength of space wave signal. (10)

****