

(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.

1. (a) Derive Poisson's and Laplace equation. (5)  
(b) What is polarization? Explain all types of polarization. (5)  
(c) Explain the radiation resistance, directivity, Beam-width and directive gain of the antenna. (5)  
(d) Explain boundary conditions of E and H fields for two media. (5)
2. (a) Derive an expression of Electric Field Intensity due to infinite line charge at any point P on z-axis. (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)
3. (a) Write short notes on- 1) Horn antenna 2) Micro strip antenna (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)
4. (a) Drive the expression for radiation resistance in far field region of an Infinitesimal dipole antenna. (10)  
(b) Write a note on Smith chart and explain the steps to calculate SWR from the chart. (10)
5. (a) Explain in detail the sources and characteristics of EMI, and EMI control techniques. (10)  
(b) Derive an expression for transmission line equation. (10)
6. (a) Write the generalized Maxwell's Equations in time harmonic field form. (10)  
(b) Explain the factors affecting the field strength of space wave signal. (10)

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