JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

B.Tech-V Semester (ECE)

COURSE CODE(CREDITS):18B11EC311(4) MAX. MARKS: 15

COURSE NAME: Electromagnetic Waves

COURSE INSTRUCTORS: Salman Talluri MAX. TIME: 1 Hour

Note: ***(a)****All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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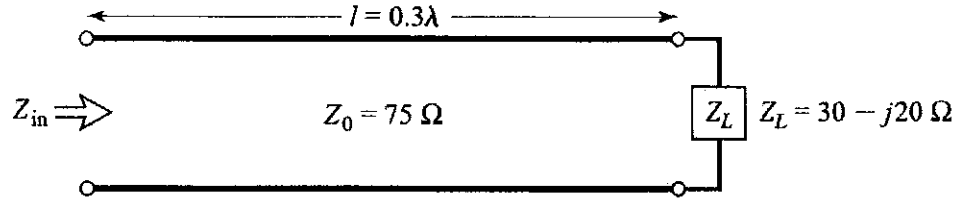
1. Write the expression for finding the electric filed intensity at the point $P(\rho = 2, \phi = 45^o, z = 3)$ for the charge density existing within $0 < \rho < 1, 0 < \phi < 180^o$ *and* $-1 < z < 1$ with a variation of $\rho_v = \frac{1}{\rho}\ C/m^3$ and a line charge density of $\rho_L = 10\ nC/m$ existing along the x-axis from –infinity to +infinity. [3m CO-1]
2. Derive the Telegrapher's equation with a lumped equivalent model for the transmission line model. [3m CO-3]
3. A lossless transmission line of electrical length $l = 0.3\lambda$ is terminated with a complex load impedance as shown in the accompanying figure. Find the reflection coefficient at the load, the SWR on the line, the reflection coefficient at the input of the line, and the input impedance to the line using Smith Chart [4m CO-3]



4. Give the expression for calculating the input impedance of a transmission line (Z_0) terminated with a load impedance of Z_L . Derive the input impedance of a short-circuited transmission line and plot the variation of voltage and currents on short-circuited transmission line. [3m CO-4]
5. Write about the following in short [2m CO-4]
   a. Method of Images application
   b. Perfect Electrical Conductor
   c. Distance between maxima and minima on transmission line
   d. Reflection Coefficient