COURSE CODE (CREDITS): 18B11EC513(4)   MAX. MARKS: 15

COURSE NAME: Electromagnetic Waves

COURSE INSTRUCTOR: Dr. Salman Raju Talluri

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1. Derive an expression for the voltage on a transmission line using the distributed equivalent circuit of the transmission line.   [4 marks]   [CO-4]

2. A generator is connected to a transmission line as shown in the accompanying figure. Find the reflection coefficient at the load, VSWR at the input, input impedance looking towards the load at $z = -l$. (Solve this problem without using the Smith chart).   [3 marks]   [CO-3]
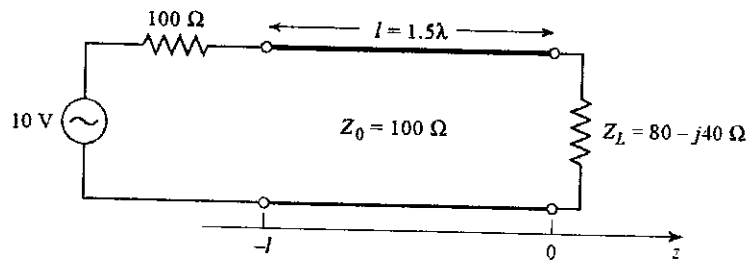
3. Using the Smith Chart, design two lossless L-section matching circuits to match a load of $Z_L = 150 - j200\ \Omega$ to a transmission line of $100\ \Omega$ characteristic impedance at 3 GHz.

[4marks]   [CO-4]

4. Derive the expression for VSWR in terms of the reflection coefficient. For the given circuit below, determine the distance from the load to the first voltage maximum.   [2marks]   [CO-3]
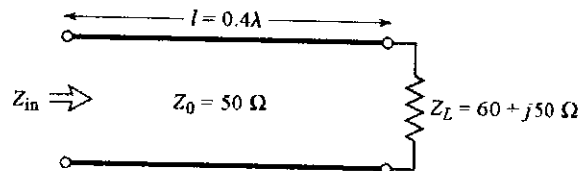
5. Define/Explain the following.   [2 marks]   [CO-1 and CO-2]

    a. Quarter wave transformer

    b. Electrical length and physical length

    c. Gauss law in point form and integral form

    d. Insertion loss and Return loss

Smith Chart

RADIALLY SCALED PARAMETERS