VIT
Vellore Institute of Technology

School of Electronics Engineering
B.Tech. (ECE) -Transmission Lines and Waveguides (ECE2004)
Winter Semester (2017-18) – CAT-I Examination

culty Name : Prof.Srinivasarao/ Prof.Poonkuzhali/ Prof.Rajesh/ Prof.Malathi/ Prof.Gopiram/ Prof.Yogesh

Slot   : F1

me : 90 Min.

Marks : 50

Answer ALL the questions.

An air filled transmission line has a characteristic impedance of 70 Ω and a phase constant of 3 rad/m at 100 MHz. Calculate the inductance per meter and capacitance per meter of the line. — 5

A 10% voltage drop occurs in 2 km of a uniformly loaded transmission line terminated by its characteristic impedance and there is a phase change of 20° over the same distance at a frequency of 796 Hz. Find the value of line attenuation in dB/km and velocity of propagation. — 6

3   Calculate the load impedance of a 50 Ω lossless air transmission line of length 2 m, operating at 450 MHz and is connected to an unknown load. The input impedance of the transmission line is 40+j80 Ω. — 5

4   If the input impedance of a short and open circuited lossless air transmission line of length 1.5m are Z_{sc}= j63Ω, and Z_{oc}= -j75 Ω respectively, determine the characteristic impedance Z_0 and propagation constant of the line. — 4

5   A 75 Ω lossless transmission line of electrical length l = 0.3λ is terminated with a complex load impedance Z_L= 30 – j25Ω. 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. — 10

6   Prove that a λ/2 open circuit transmission line will act like a parallel resonator and determine R, L, C and Quality factor of the resonator. — 10

7   Consider the transmission line circuit shown below. Compute the incident power, reflected power, and the power transmitted into the infinite 100 Ω line. — 10