VIT

Vellore Institute of Technology

Continuous Assessment Test – II

Winter Semester: 2019-2020

Programme Name & Branch: B.Tech & ECE

Course Code & Name: ECE 2004 - Transmission Lines and Waveguides

Slot: D1+TD1

Exam Duration: 90 Min. **Maximum Marks: 50**

Answer all the questions

OPEN NOTE BOOK EXAMINATION

S.No	Questions	Marks
1.	A 75Ω low-loss transmission line has an attenuation loss of 1.5 dB/m. The velocity of the voltage wave on the line is 2×10^8 m/sec. A short circuited $\lambda/4$ line is used to make a parallel resonant circuit at 1 GHz. Find the resistance, inductance, capacitance, quality factor, and 3dB bandwidth of the resonant circuit.	(8)
2.	Match a load impedance Z_L = 100+j80 Ω to a line with characteristic impedance $Z_0 = 75$ Ω using a shunt single-stub tuner. Find one solution using an open-circuited stub and another using a short–circuited stub.	(10)
3.	A 150 Ω double stub tuner is used to match a load $Z_L = (50 + j50)$ Ω to a 150 Ω lossless transmission line. The first stub is located at the load and the separation between the stubs is $3\lambda/8$. Find both the solutions for the shorted-stub lengths under matched condition.	(12)
4.	Design two lumped element L-section matching networks at 1 GHz which transform Z_L=10−j10 Ω to a 50 Ω transmission line. Use smith chart.	(10)
5.	A microstrip line is made of a copper conductor 0.254 mm wide on a G-10 Fiberglass-epoxy board 0.20 mm in height. The relative dielectric constant of the board material is 4.8, measured at 25 GHz. The microstrip line 0.035 mm thick to be used for 10 GHz. Determine the (a) Characteristic impedance Z_0 of the microstrip line (b) Surface resistivity R_s, of the copper conductor (c) Conductor attenuation constant α_c (d) Dielectric attenuation constant α_d (e) Quality factors Q_c and Q_d	(10)