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Question Paper Code: 1066149

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Sixth Semester
Electronics and Communication Engineering
EC8651 - TRANSMISSION LINES AND RF SYSTEMS
(Regulation 2017)
(Smith Chart permitted)

Time: Three Hours   Maximum: 100 Marks

Answer ALL questions

PART – A   (10 x 2 = 20 Marks)

1.   What are the primary and secondary constants of a transmission Line?

2.   What is characteristics impedance?

3.   Define standing wave ratio.

4.   A radio frequency with Z_0=70ohm is terminated Z_L=115-j80ohm at λ=2.5m.Calculate the VSWR, maximum line impedance.

5.   List the applications of the smith chart.

6.   Mention the disadvantage of single stub matching.

7.   Distinguish between TE and TM waves.

8.   What is a TEM wave or Principal wave?

9.   Define transducer power gain.

10. Differentiate Oscillators and Mixers.

PART – B   (5 x 13 = 65 Marks)

11. (a)   Derive an expression for the voltage and current at any point on a infinite transmission line.   (13)

<div align="center">(OR)</div>

(b) An open wire telephone line has R=10ohm/km, L=0.004H/km, C=0.008 x 10^{-6} F/km, G=0.4X10^{-6}mho/km, Vs=1.0V Calculate i) Characteristic Impedance ii) Attenuation Constant iii) Phase constant, iv) Velocity propagation v) Wavelength. (13)

12. (a) Derive an expression for voltage and current equation of dissipation less line. (13)

<div align="center">OR)</div>

(b) Derive an expression for open and short circuit of dissipation less line and draw the waveforms. (13)

13. (a) Explain in detail about impedance matching and length of stub using Single Stub matching with relevant equations. (13)

<div align="center">(OR)</div>

(b) A transmission of 100m long is terminated in load of 100-200jΩ. Determine the line impedance at 25m from the load end at a frequency of 10MHz, Assume line impedance Z0=100Ω. Determine the Input Impedance and Admittance using Smith chart. (13)

14. (a) Derive an expression for the transmission of TE waves between parallel perfectly conducting planes for the field components. (13)

<div align="center">(OR)</div>

(b) Derive relevant equations TM waves in Circular waveguide. (13)

15. (a) Explain in detail basic concepts of RF mixers with relevant expressions. (13)

<div align="center">(OR)</div>

(b) Discuss in detail Bipolar Junction Transistors used in RF System. (13)

16. (a) A rectangular air-filled copper waveguide with dimension 0.9-inch x 0.4-inch cross section 12inch length is operated at 9.2GHz with a dominant mode. Calculate cut-off frequency, guide wavelength, Phase velocity, characteristics impedance and the loss.   (15)

(OR)

(b) Design a RF Power amplifier with schematics of a single stage amplifier.   (15)

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