



P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; May / June - 2018
Microwave Devices and Integrated Circuit's

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. What are standing waves? Sketch the standing wave pattern for lossy and lossless line. Write the equation for V_{max} and V_{min} of standing wave. 6
- b. Write the schematic circuit of transmission line and derive the transmission line equation in terms of propagation constant. 8
- c. A microwave transmission line is terminated with load impedance $Z_l = -40.1 + j 75.3 \Omega$. The reflection coefficient observed is $0.64 \angle 100^\circ$. Compute; 6
- i) Transmission coefficient ii) Characteristic impedance iii) SWR
- 2 a. List the applications of Smith chart. 5
- b. Derive the equation for line impedance in terms of exponential and hyperbolic functions at any point from sending end. 8
- c. A transmission line with characteristic impedance of 400Ω is connected to a load of $200 + j 300 \Omega$ operating at 800 MHz. Find the location and length of single stub nearest to the load to produce impedance match. 7

UNIT - II

- 3 a. Discuss the propagation of TE waves in rectangular wave guide with related equations and also explain its dominant mode of propagation. 12
- b. With a neat sketch, describe the construction and working of Faraday rotation isolator. 8
- 4 a. List the differences between travelling wave tube and klystron. 4
- b. Explain the amplification process of helix travelling wave tube along with neat diagram. 10
- c. Describe the operation of two cavity klystron amplifier with neat diagram. 6

UNIT - III

- 5 a. Explain the properties of S-parameters for junction of ports having common characteristic impedance. 10
- b. Explain the structure of three types of co-axial cable along with diagram. 6
- c. List the advantages of [S] over [Z] or [Y]. 4

- 6 a. Describe the working of precision type variable attenuator along with diagram and attenuation equation. 8
- b. Discuss the phase shifting of microwave using non-reciprocal phase shifter. 6
- c. Explain the application of Magic-T as balanced mixer with neat diagram. 6

UNIT - IV

- 7 a. Explain the construction and operation of Gunn diode. 6
- b. Discuss the operation of IMPATT diode and derive equation for power output and efficiency. 8
- c. Describe the fundamental concepts of RWH theory. 6
- 8 a. Explain the physical structure and principle of operation of TRAPATT diodes. 8
- b. Discuss the construction and operating principle of varactor diodes and how it can be used as multiplier circuit? 6
- c. List the differences between tunnel diode and normal $p-n$ junction diode. 6

UNIT - V

- 9 a. Explain the dielectric losses and radiation losses in micro strip lines along with equations. 10
- b. Write note on :
- i) Coplanar strip line 10
- ii) Shielded strip line
- 10a. Discuss the fabrication steps for thick-film deposition method of MIC. 8
- b. Write note on sandwich capacitor. 6
- c. Explain the Etch back technique of circuit accomplishment in MIC. 6

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