

Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (ECE) (2018 Batch) (Sem.-1)
RF AND MICROWAVE CIRCUIT DESIGN
Subject Code : MTEC-PE2Y-18-2
Paper ID : [75178]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. Attempt any FIVE questions out of EIGHT questions.**
2. Each question carries TWELVE marks.

- Q1 a. Explain the steps required for double stub matching using Smith chart. (6)
- b. Derive the wave equations for a transmission line. Also derive the equations for characteristics impedance and characteristics admittance of transmission line. (6)
- Q2 a. Design the scattering matrix of magic Tee. (6)
- b. What are the various applications of microwave? Discuss the limitations of conventional tubes at microwave frequency. (6)
- Q3 a. Explain the following terms : (6)
- i. Reflection coefficient
- ii. VSWR
- iii. Normalized impedance
- iv. Characteristics impedance
- v. Line Admittance
- b. A transmission line has a characteristic impedance of $50 + j0.01 \Omega$ and is terminated in a load impedance of $73 - j42.5 \Omega$. Calculate the reflection coefficient and VSWR. (6)

- Q4 a. Derive the resonant frequency of : (6)
- i. Rectangular waveguide.
 - ii. Circular Waveguide
- b. Write note on following : (6)
- i. Ferrite
 - ii. Isolator
 - iii. Matched Termination
- Q5 a. Draw and explain the working principle of microwave transistor. (4)
- b. Discuss the concept of negative resistance used in microwave devices. (4)
- c. Discuss the different applications of Varactor diode. (4)
- Q6 a. Draw a suitable circuit using a transmission line which can be used to extract power from a TRAPATT diode and explain its operation. (6)
- b. Draw and explain the working of a Tunnel diode. Also draw its energy band diagrams. (6)
- Q7 a. Explain the following terms used in amplifier design : (6)
- i. Stability
 - ii. Noise Figure
 - iii. Impedance Matching
- b. What is need of directional coupler? Explain its function with neat diagram. (6)
- Q8 Explain the operating principle and working of : (12)
- a. Inter symbol interference
 - b. Random Process
 - c. MESFET