Reg. No. : | | | | | | | | | | |

Question Paper Code: 37403

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Seventh Semester

Electronics and Communication Engineering

01UEC703 - MICROWAVE ENGINEERING

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State the differences between isolator and circulator.
2. Mention the reason for using S-matrix for microwave analysis.
3. What are the factors reducing efficiency of IMPATT diode?
4. Define negative resistance.
5. Why magnetron is called as cross filed device?
6. Compare TWTA and klystron amplifier.
8. Write down the losses present in strip line.
9. List the different types of impedance measurement methods.
10. A wave guide termination with a VSWR of 1.5 is used to dissipate 150 watts of power. Determine the reflected power.

PART - B (5 x 16 = 80 Marks)

11. (a) Derive the S- parameter of Magic Tee. (16)

Or

(b) Describe the scattering matrix of a directional coupler. (16)

12. (a) (i) Compare the characteristics of IMPATT, BARITT and TRAPATT diode. (6)

(ii) Derive the Manley Rowe power relations for the parametric amplifier. (10)

Or

(b) Derive the manley-rowe relationship for a parametric amplifier and state the use of this relationship. (16)

13. (a) Explain the velocity modulation process and derive the condition at which maximum bunching occurs in two cavity klystron. (16)

Or

(b) A reflex klystron operates under the following condition. V_0 = 600V, L = 1mm, R_{sh} =15Ω, f_r = 9GHz, n = 2 mode. Assuming negligible transit time. Find V_r, direct current needed to give a microwave gap voltage of 200V and the electronic efficiency under the same condition. (16)

14. (a) Explain in detail with suitable diagrams, the fabrication techniques of a monolithic microwave integrated circuit. (16)

Or

(b) (i) Specify the properties of materials that are required for the monolithic microwave integrated circuits fabrication. (8)

(ii) Write short notes on coplanar strip lines and shielded strip lines. (8)

15. (a) Explain in detail various power measurement techniques. (16)

Or

(b) Explain in detail about slotted line VSWR measurement. (16)