

Code No: R15A0421**MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****IV B.Tech I Semester Supplementary Examinations, April 2023****Microwave Engineering****(ECE)**

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Time: 3 hours**Max. Marks:****75****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

*********PART-A (25 Marks)**

- 1). a What are the Applications of Microwaves? [2M]
- b Write the equation of Phase and Group velocities [3M]
- c Write the Properties of Scattering Matrix [2M]
- d Draw and write S matrix of isolator. [3M]
- e What are the losses of conventional tubes at microwave frequencies? [2M]
- f Write the Gain considerations in TWT. [3M]
- g Define Cross field effects [2M]
- h Classification of Microwave semiconductor devices and its applications [3M]
- i Write the applications of Spectrum Analyzer [2M]
- j Define VSWR and its equations [3M]

PART-B (50 MARKS)**SECTION-I**

- 2 Briefly explain and Derive the TE mode analysis in Rectangular Waveguide. [10M]
OR
- 3 A wave of frequency 6GHz is propagated in a parallel plane waveguide separated by 3cm. Calculate i) the cut-off wavelength for the dominant mode. ii) Wavelength in the waveguide. iii) the group and phase velocities. iv) Characteristic wave impedance [10M]

SECTION-II

- 4 Draw the neat block diagrams and explain the Ferrite components, Gyrator and Circulator. [10M]
OR
- 5 Explain the working of a two-hole directional coupler with a neat diagram and derive the expression for the coupling factor and directivity. [10M]

SECTION-III

- 6 Explain in detail about bunching process and obtain expression for bunching parameter in a two-cavity klystron. [10M]

OR

- 7 Explain how velocity modulation is converted into current modulation with Applegate diagram and also derive the equation for output power efficiency. [10M]

SECTION-IV

- 8 Derive the Hartree anode Voltage equation for linear magnetron. [10M]

OR

- 9 Briefly explain the different avalanche transit time devices using diagrams. [10M]

SECTION-V

- 10 Find S matrix for a matched isolator having an insertion loss of 0.5dB and isolation of 25dB and explain the S-matrix representation of a multiport microwave network and its significance. [10M]

OR

- 11 Draw the neat block diagram and explain the Waveguide Phase Shifters [10M]
