

Roll No.

Total No. of Pages : 02

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B.Tech. (ECE) (PIT) (Sem.-6)
MICROWAVE AND ANTENNA ENGINEERING

Subject Code : UC-BTEC-604-18

M.Code : 80053

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define the terms : Microwaves, Directivity, MASER, VSWR.
- b) What are the types of Microwave tubes? Give their applications.
- c) What is the significance of Bunching in Microwave tubes?
- d) What do you mean by Velocity Modulation in microwave tubes?
- e) List some important parameters for designing and analyzing an Antenna.
- f) What are the Transferred Electron Devices? Give examples.
- g) What is the difference between a Broad-side antenna array and an End-fire antenna array?
- h) A typical GaAs MESFET has parameters: $C_{gs} = 0.66\text{pF}$, $g_m = 50\text{m}\Omega$. Calculate the cut-off frequency of this microwave solid-state device?
- i) Define : Antenna array, Array factor.
- j) State Babinet's Principle in antennas. Give example.

SECTION-B

2. Explain how are Waveguides different from normal transmission lines? Discuss their similarities and dissimilarities.
3. Briefly explain the construction and working of a Half-wave dipole antenna using suitable diagram.
4. Discuss the concept of Gunn effect using the two valley theory. Explain its working using suitable diagram.
5. A reflex Klystron operates at the peak mode i.e. $n = 2$ with a beam voltage = 300V, beam current = 30mA, signal voltage 40V. Calculate the following :
 - a) Input & Output Power
 - b) Efficiency.
6. Describe the basic antenna field regions, explain giving diagrams of their field patterns.

SECTION-C

7. Discuss the working operation, properties and typical characteristics of Klystron Amplifier using suitable neat diagram. Also, explain its electron beam bunching process using mathematical analysis.
8. Describe the structure, working operation and applications of a Horn antenna using suitable diagram. Also give its applications.
9. Write a note on :
E-H Plane (Hybrid) or Magic Tee junction along with its scattering matrix analysis.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.