

Code: EC6T3

**III B.Tech-II Semester–Regular/Supplementary Examinations–March 2019**

**MICROWAVE ENGINEERING  
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) State the limitations of Conventional tubes at microwave frequencies.
- b) What is meant by hull cut-off condition in magnetrons?
- c) What are microwave junctions? Give some examples.
- d) What are the advantages of S parameters compared with Y or Z parameters?
- e) Define phase shifter. Mention the applications of phase shifters.
- f) Define faraday rotation law. List two microwave devices using faraday rotation principles.
- g) The incident and reflected powers can be sampled using a directional coupler in a waveguide. The output of the two couplers is found to be 2 mW and 0.1 mW. Calculate the value of VSWR in the waveguide.
- h) List out the applications of microwave solid state devices.
- i) Define the concept of Gunn effect.

- j) What is the purpose of using Isolator in microwave bench set-up?
- k) List the different types of impedance measurement methods.

### PART – B

Answer any *THREE* questions. All questions carry equal marks.  
3 x 16 = 48 M

2. a) Compare “Drift space bunching” and “Reflector bunching” with the help of Applegate diagrams. 8 M
- b) Explain the operation of Cylindrical Magnetron with neat sketch. 8 M
3. a) Explain in detail coupling probes and coupling loops. 6 M
- b) Derive the Scattering matrix of Magic-Tee junction with neat sketch and explain the applications of magic tee. 10 M
4. a) Draw a neat diagram of a four port directional coupler indicate through port, coupled port for any given input port. Explain its principle of operation. 8 M

b) Derive the field expressions for a rectangular cavity resonator. Plot the field patterns of the dominant mode of propagation in such a resonator for TE and TM modes.

8 M

5. a) Explain in detail about IMPATT diode and write the differences between IMPATT diode and TRAPATT diode.

8 M

b) Describe the characteristics and specialties of parametric amplifiers and explain the amplification mechanism with neat illuminations.

8 M

6. a) Describe the functioning of each component in a microwave bench setup.

8 M

b) Explain the principle of power measurement using Bolometric method.

8 M