

Code: EC6T3

**III B.Tech - II Semester – Regular/Supplementary Examinations
AUGUST 2021**

**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) List out microwave bands and their frequency ranges.
- b) What are slow wave structures?
- c) Explain any one application of magic tee.
- d) List out the properties of Scattering matrix.
- e) What is a phase shifter?
- f) Define cavity resonator and its principle behind resonance.
- g) Mention the applications of IMPATT diode.
- h) Mention the different applications of Gunn diode.
- i) List out the applications of a directional coupler.
- j) Define VSWR. Find reflection coefficient when VSWR is given as 2.
- k) Explain why an isolator is used in a microwave bench.

PART – B

Answer any *THREE* questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) With the help of applegate diagram explain the operation of a reflex klystron. Also calculate the theoretical efficiency of the reflex klystron. 8 M
- b) Briefly explain the operation of a backward wave oscillator. Mention its performance characteristics and applications. 8 M
3. a) Briefly explain the microwave attenuators and their types with neat constructional diagrams. 8 M
- b) Derive the scattering matrix of E-plane Tee junction and justify why it is called as a 3-dB splitter. 8 M
4. a) Brief the concept of Faraday rotation in ferrites. Explain the working of any one microwave device which makes use of Faraday rotation. 8 M
- b) Derive the equations for resonant frequencies for a rectangular and circular cavity resonator. What do you understand by quality factor of a cavity resonator? 8 M

5. a) Explain how Manley-Rowe relations are useful in predicting the possibility of power gain in a parametric amplifier. 8 M
- b) What are transferred electron devices? Explain Gunn effect on the basis of Ridley-Watkins-Hilsum (RWH) theory. 8 M
6. a) Explain each block of the microwave bench setup using suitable block diagram. 8 M
- b) Explain briefly the procedure involved in measuring the Q of a Cavity resonator. 8 M