

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year II Semester Supplementary Examinations February-2022

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Derive the expressions of field components in a rectangular waveguide **6M**
b A waveguide having dimensions $a = 5$ cm, $b = 2$ cm. The signal applied to waveguide is 10GHz. Determine the modes that are propagating in the waveguide. **6M**

OR

- 2 a Prove that TM_{01} and TM_{10} modes does not exist in a rectangular waveguide. **7M**
b When dominant mode propagated in air filled circular waveguide diameter is 4cms. Find cut-off wavelength, cut-off frequency and guide wavelength. **5M**

UNIT-II

- 3 Explain following terms (i) E-plane Tee (ii) H-plane Tee (iii) Magic Tee **12M**

OR

- 4 a Derive the S-matrix for directional coupler. **6M**
b Explain the principle of Ferrite phase shifter. **6M**

UNIT-III

- 5 a Explain the possibility of oscillations in a TWT amplifier. **8M**
b Write short notes on wave modes. **4M**

OR

- 6 What are slow wave structures? Explain how a helical TWT achieve amplification. **12M**

UNIT-IV

- 7 a Discuss in detail about Gunn diode modes of operation **7M**
b What are bulk properties of a GUNN diode that give rise to negative resistance like characteristics? **5M**

OR

- 8 a Give the classification of solid-state microwave devices along with examples? **8M**
b Explain Two Valley Model Theory **4M**

UNIT-V

- 9 a What is spectrum analyzer? List the types of spectrum analyzer. List some application of Spectrum analyzer. **8M**
b Describe a microwave bench **4M**

OR

- 10 a Draw the experimental setup necessary for the measurement of impedance using slotted line. Explain in detail. **9M**
b What are the characteristics of detectors used in microwave measurement? **3M**

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