

01.06.24

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

B.Tech III Year II Semester Supplementary Examinations May/June-2024

MICROWAVE ENGINEERING

(Electronics & Communication Engineering)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

- 1 a Why TEM modes are not possible in hollow rectangular waveguide? Prove it. CO1 L1 6M
 b When dominant mode propagated in air filled circular waveguide diameter is 4cms. Find cut-off wavelength, cut-off frequency and guide wavelength. CO1 L4 6M

OR

- 2 Explain following terms CO1 L2 12M
 (a) Guide wavelength (b) Phase Velocity (c) Group Velocity.

UNIT-II

- 3 a Derive the S-matrix for E-plane junction. CO2 L4 6M
 b Explain the principle of Ferrite phase shifter. CO2 L1 6M

OR

- 4 Explain following terms CO2 L2 12M
 (a)E-plane Tee (b) H-plane Tee (c) Magic Tee

UNIT-III

- 5 What are slow wave structures? Explain how a helical TWT achieve amplification. CO3 L1 12M

OR

- 6 a Explain the possibility of oscillations in a TWT amplifier. CO3 L1 6M
 b Discuss about the differences between a TWT and a Klystron. CO3 L6 6M

UNIT-IV

- 7 Discuss in detail about cylindrical magnetron. CO4 L1 12M

OR

- 8 a Give the classification of solid state microwave devices along with examples? CO4 L1 6M
 b An n-type GaAs Gunn diode has following parameters: CO4 L4 6M
 Electron drift velocity: $v_d = 2.5 \times 10^5$ m/s.
 Negative electron mobility: $\mu_n = 0.015$ m²/ v. s.
 Relative dielectric constant: $\epsilon_r = 13.1$.
 Determine the criterion for classifying the modes of operation.

UNIT-V

- 9 a Write a short note on power ratio method. CO5 L1 6M
 b Write short notes on RF substitution method. CO5 L1 6M

OR

- 10 a Discuss in detail about measurement of attenuation. CO5 L6 6M
 b Write short notes on "Reflection co-efficient and Insertion loss measurement at microwave frequencies" CO5 L1 6M

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