Code: R7320405

R07

B.Tech III Year II Semester (R07) Supplementary Examinations December/January 2015/2016

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) Draw the field patterns of the dominant mode in a rectangular waveguide.
(b) Derive the expression for the cutoff frequency of the same mode.

2 Derive the field expressions of a circular waveguide for the dominant mode

3 (a) What are the different types of waveguide discontinuities available? Explain them with suitable sketches.
(b) How do you achieve inductive and capacitive effects using tuning screw microwave component?

4 What are the properties of scattering matrix? Explain them with suitable expressions.

5 (a) State term *"Reflex Klystron saturation factor"* and discuss about the electronic admittance of the reflex Klystron tube.
(b) A reflex Klystron operates at the peak of n = 2 mode with beam voltage V_0 = 300 V, beam current I_0 = 20 mA, and signal voltage V_1 = 40 V. Determine the input power, output power and efficiency.

6 (a) How amplification is achieved in helix TWT amplifier? Describe the process with sketches.
(b) A traveling wave tube is operated under the following parameters: Beam voltage V_0 = 3 kV, beam current I_0 = 30 mA, characteristic impedance of the helix Z_0 = 10 ohms, Circuit length N = 50, frequency f = 10 GHz. Determine the output power gain in dBs and all possible propagation constants.

7 Explain the Gunn Effect. Mention various modes of GUNN diode and explain them in detail.

8 Write short notes on:
(a) Impedance measurement.
(b) VSWR measurement.
(c) Frequency measurement using wave-meter.

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