Code: 9A04606

R09

B.Tech III Year II Semester (R09) Supplementary Examinations May/June 2017

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 An air filled rectangular waveguide has dimensions of a = 6 cm and b = 4 cm. The signal frequency is 3 GHZ. Compute the following for the TE_{10}, TE_{01} and TE_{11} modes.
(i) Cut off frequency.
(ii) Wavelength in the waveguide.
(iii) Phase constant and phase velocity in the waveguide.
(iv) Group velocity and wave impedance in the waveguide.

2 Derive the expressions for the field components due to TM wave in circular waveguide.

3 (a) What is the need of phase shifter? Name different types of phase shifter.
(b) Draw the diagram of dielectric phase shifter and explain the operation.

4 (a) Explain the operation of circulator.
(b) What is Faraday rotation?

5 (a) Explain the following with a neat diagram:
(i) Transit-angle effect.
(ii) Gain-Bandwidth product limitation.
(b) Discuss about reentrant cavities.

6 (a) What is Hull-voltage in a magnetron? Explain its significance.
(b) Explain about the magnetron oscillator with neat diagrams.

7 (a) What is Gunn effect? Explain this phenomenon using two-valley theory.
(b) What is time parameter for TED'S?
(c) List some of the power detecting elements.

8 (a) Write short notes on the measurement of noise factor.
(b) Calculate the SWR of a transmission system operating at 10 GHz. Assume TE_{10} wave transmission inside a waveguide of dimensions a = 4 cm, b = 2.5 cm. The distance measured between twice minimum power points=1 on a slotted line.

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