

S. 16

Code No: 9A04606/R09

III B.Tech. II Semester Regular and Supplementary Examinations

April/May - 2013

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

Set-3

Time: 3 Hours

Max. Marks: 70

Answer any **FIVE** Questions

All Questions carry **equal** marks

1. (a) Show that a waveguide works like a high pass filter.
(b) A waveguide having dimensions $a = 5$ cm, $b = 2$ cm. The signal applied to waveguide is 10 GHz. Determine the modes that are propagating in the waveguide.

2. (a) Why TEM modes are not possible in a hollow rectangular waveguide? Prove it.
(b) Explain in brief about strip line transmission lines.

3. Distinguish between E-plane and H-plane tees and hence discuss the construction and working of a magic Tee.

4. (a) What is an isolator? Explain the principle of working.
(b) Show that the S-matrix of a lossless isolator is given by, $[S] = \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$.

5. Explain the operation of a two cavity klystron amplifier. Derive expressions for bunched beam current and efficiency.

6. (a) Derive the expressions for propagation constant and output power gain of TWT.
(b) In an O-type traveling wave tube, the acceleration voltage is 4000 V and the magnitude of the axial electric field is 4 V/m. The phase velocity on the slow wave structure is 1.10 times the average electron velocity. The operating frequency is 2 GHz. Determine the magnitude of velocity function.

7. Discuss how a decrease in drift velocity with increasing electric field can lead to the formation of a high field domain for microwave generation and amplification.

8. (a) What is spectrum analyzer? List the types of spectrum analyzer. List some applications of spectrum analyzer.
(b) Describe a microwave bench.