

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
MICROWAVE ENGINEERING  
(Electronics & Communication Engineering)**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) Draw the applegate diagram of a Reflex Klystron and explain velocity modulation and bunching.  
(b) Describe the construction of a multicavity Klystron and the coupling techniques to be adopted for more interaction between RF electron beams. [8+8]
2. (a) How is bunching achieved in a cavity magnetron. Explain the phase focusing effect.  
(b) Discuss types of magnetrons and list the important applications. [8+8]
3. (a) Give the classification of solid state MW devices along with examples?  
(b) Why conventional tubes and solid state devices can not be used at microwave frequencies? [8+8]
4. (a) Explain the physical structure and I–V characteristics of a Tunnel diode. Hence establish its microwave applications.  
(b) Draw the equivalent circuit of a crystal diode and explain its features. [10+6]
5. (a) Derive a general expression for the resonant frequencies of a rectangular waveguide cavity.  
(b) List out the microwave applications cavity resonators. [10+6]
6. Describe with a neat sketch, the working of a 4-port directional coupler, and obtain S-matrix when the coupling factor is 3dB. List out the different types of directional couplers. [16]
7. (a) Explain the operation, the use and the limitations of a bolometer type of power measurement bridge.  
(b) Distinguish between the different types of Q factors for a cavity, and establish a relation between them. [10+6]
8. (a) Compare and contrast Microwave integrated circuit with Monolithic Microwave integrated circuit.  
(b) What are the requirements to be considered for designing of a Microwave integrated circuit?  
(c) Explain the applications of Microwave integrated circuits. [6+5+6]

\*\*\*\*\*