Code No. : 3129

FACULTY OF ENGINEERING
B.E. 4/4 (ECE) I Sem. (Main) Examination, December 2010
MICROWAVE ENGINEERING

Time : 3 Hours] [Max. Marks: 75

Instruction : *Answer **all** questions from Part – A. Answer **any five** questions from Part – B.*

PART – A **(Marks : 25)**

1. Define wave impedance in parallel plane structure. What is the relation between wave impedances for TE and TM modes ? 3

2. Give the physical interpretation for phase and group velocity in relation to speed of light. 3

3. Write scattering matrix of a E-plane Tee Junction. 3

4. What is a Cavity Resonator ? 2

5. What are the applications of Reflex Klystron ? 2

6. Explain, why S-parameters are preferred at microwave frequency. 2

7. Justify the use of helix as slow wave structure in Travelling Wave Tube. 3

8. Justify the use of 2 : 1 aspect ratio for rectangular wave guide. 2

9. Write about Striplines. 2

10. Explain Gunn effect. 3

PART – B (Marks : 50)

11. What is the dominant mode of propagation between two conducting parallel planes ? Find the velocities of propagation between parallel planes. 10

12. a) Distinguish between TE, TM and TEM modes. 3

    b) A hollow rectangular wave guide has dimensions 4 cm × 2 cm. Calculate guide wavelength, phase velocity and wave impedance, if the frequency of the signal is 10 GHz 7

13. Derive the S-matrix of Directional coupler. Explain how perfect directivity is achieved in a multi aperture coupler 10

14. a) Find the scattering matrix of a Magic Tee 5

    b) Write the working of B.W.O. 5

15. a) What are the high frequency limitations of conventional tubes ? Explain. 5

    b) Draw a neat schematic of two-cavity klystron and explain its working with necessary diagrams. 5

16. Explain the function of Gunn Diode and its application as Gunn Oscillator at microwave frequency. How will you measure Gunn Oscillator characteristics in a laboratory ? 10

17. Write short notes on **any two** : 10

    a) Magnetron Oscillator

    b) PIN Diode

    c) Write about "Vane" and "Flap" Attenuators.