2008–ANNA UNIVERSITY
B.E/B.TECH DEGREE EXAMINATION
MICROWAVE ENGINEERING
(ELECTRONICS AND COMMUNICATION ENGINEERING)

DECE-2008

TIME-3 HOUR
MARKS-100

ANSWER ALL QUESTIONS.

PART A - (10 * 2 = 20 MARKS)

1. What are the basic parameters to measure the performance of a directional coupler?

2. What do you mean by Faraday rotation isolator?

3. State the transferred electron effect?

4. What are the major disadvantages of IMPATT diodes?

5. Define beam loading.

6. What is meant by Hull cut-off voltage?

7. How can you eliminate the radiation loss of micro strip lines?

8. List out the advantages of Monolithic Microwave Integrated Circuits.

9. Write the main demerits of single bridge power meter.

10. What does the accuracy of phase measurement depend on while measuring the impedance using reflectometer method?

PART B - (5 * 16 = 80 MARKS)

11. a) (i) Prove that it is impossible to construct a perfectly matched ,lossless, reciprocal three port junction.

(ii) Derive the S-matrix of a directional coupler.

or

b) (i) List out the characteristics of the Magic-T when all the ports are terminated with matched load

(ii) How can you synthesize a rat-race hybrid coupler from magic –tee?

12. a) (i) Draw the geometrical diagrams of GaAs FET and explain.

(ii) What are the modes of operation that result in microwave oscillations in a Gunn diode? Explain.

or

b) (i) Describe the principal of operation, the cases of input resistance at signal frequency and the circuit performance of parametric amplifier.

(ii) Explain the construction and DC operating principle of IMPATT diode

13. a) (i) A reflex klystron is operated at 8 GHz with dc beam voltage of 600v for 1.75 mode, repeller space length of 1mm,and dc beam current of 9mA. The beam coupling coefficient is assumed to be 1. Calculate the repeller voltage, electronic efficiency and output power.

(ii) With the applegate diagram, describe the mechanism of operation of two cavity klystron amplifier. Write the assumptions on which the analysis for RF amplification by this amplifier is based.

or

b) (i) How can you analyze a TWTA circuit that uses a helix slow wave non resonant microwave guiding structure?

(ii) Explain the oscillation mechanism and the electron trajectory concept of magnetron oscillator.

14. a) (i) Explain how the characteristic impedance is varying in a completely shielded strip line , with graphical representations.

(ii) A microstrip line is composed of zero thichness copper conductors on a substrate having relative dielectric constant of 8.4, dielectric loss tangent of .0005 and thickness of 2.4 mm.If the line width is 1mm and operated at 10Ghz,calculate the characteristic impedance and the attenuation due to conductor loss.

               or

b) What are the processes involved in the fabrication of monolithic microwave integrated circuits? Describe in detail.

15.a) (i) Draw the block diagram for the slotted line method of VSWR measurement and explain.

(ii) Explain a method for high power measurement

               or

b) (i)Draw the experimental setup for the measurement of impedance of discontinuity and explain.

(ii Draw the experimental setup for S-parameter measurement of Magic tee and explain .