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Question Paper Code: 47403

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Seventh Semester

Electronics and Communication Engineering

14UEC703 - MICROWAVE ENGINEERING

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The range of microwave frequency is
 - 3-30 GHz
 - 3-30 Hz
 - 3-30 KHz
 - 3-30 MHz
- The waveguide tuning component, which is not easily adjustable is,
 - Screw
 - Iris
 - Stub
 - Plunger
- TRAPATT diode is preferred over IMPATT diode because of
 - High η
 - Less sensitivity to harmonics
 - Lower noise
 - Ability to operate at higher frequencies
- Two entities that are combined to form a Magic Tee are
 - One Hand two E plane tees
 - One H and one E plane tee
 - Two Hand two plane tees
 - Two H and one E plane tee
- Operating frequency of the reflex klystron is as high as
 - 70,000 MHz
 - 50,000 MHz
 - 20,000 MHz
 - 10,000 MHz

6. The microwave tube amplifier that uses an axial magnetic field and radial electric field is
 (a) Reflex klystron (b) CFA
 (c) Coaxial magnetron (d) Travelling wave magnetron
7. The fabrication of microstrip line is done by
 (a) Photo etching (b) Printed circuit technique
 (c) Oxidation (d) Cladding
8. Processing in MMICs is done by
 (a) Ion implantation (b) Net list generation
 (c) Floor planning (d) None of the above
9. A loss less line of characteristics impedance Z_0 is terminated in pure reactance of $-jZ_0$ value. VSWR is
 (a) 10 (b) 2 (c) 1 (d) Infinity
10. The reflection coefficient on a line is $0.2 \angle 45^\circ$. The SWR is
 (a) 0.8 (b) 1.1 (c) 1.2 (d) 1.5

PART - B (5 x 2 = 10 Marks)

11. What are hybrid couplers?
12. List the applications of Gunn diode.
13. Compare O-type tube and M-type tube.
14. What is double stub matching?
15. What are the errors in impedance measurement?

PART - C (5 x 16 = 80 Marks)

16. (a) The S-parameters of a two-port network are given by
 $S_{11} = 0.2 \angle 90^\circ$ $S_{22} = 0.2 \angle 90^\circ$
 $S_{12} = 0.5 \angle 90^\circ$ $S_{21} = 0.5 \angle 0^\circ$
 (i) Determine whether the network is lossy or not.
 (ii) Is the network symmetrical and reciprocal? Find the insertion loss of network. (16)

Or

- (b) (i) Explain the working of circulator and explain its applications. (8)
- (ii) Draw and explain the operation of Magic Tee. Explain its application in the construction of a 4- port circulator. (8)
17. (a) (i) Explain the construction and principle of CdTe Diode. (6)
- (ii) Explain the operating principle of a Gunn diode. Describe its domain formation and various modes of operations. (10)
- Or
- (b) (i) Draw the construction and explain the working of IMPATT diode. (8)
- (ii) Explain the working of TRAPATT Diode. (8)
18. (a) Explain the π mode of Oscillations in a Magnetron and derive the Hull cut-off equations of a Magnetron. (16)
- Or
- (b) (i) Explain the working principle and operation of multi-cavity Klystron amplifier and derive the expressions for its output power. (8)
- (ii) Explain the Working Principle of reflex klystron oscillator and derive the expression for power and efficiency. (8)
19. (a) Explain the various stages involved in Monolithic Microwave Integrated Circuits technology. (16)
- Or
- (b) (i) Explain in detail about working of Parallel Strip line. (8)
- (ii) How matching can be carried out by Microstrip line. (8)
20. (a) (i) Explain the impedance measurement technique using slotted line and reflectometer. (8)
- (ii) Explain the measurement of high VSWR with the help of block diagram. (8)
- Or
- (b) Draw a block diagram for impedance measurement using reflectometer and explain

in detail

(16)