Reg. No. : | | | | | | | | | | |

Question Paper Code: 47403

B.E. / B.Tech. DEGREE EXAMINATION, NOV 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)

1. To couple two waveguides a choke flange may be used
   (a) As it is simpler than any other method of joining
   (b) To help the alignment of the waveguides
   (c) To compensate for discontinuities at the joint
   (d) T increase the bandwidth of the system

2. The waveguide tuning component, which is not easily adjustable is,

   (a) Screw (b) Iris (c) Stub (d) Plunger

3. TRAPATT diode is preferred over IMPATT diode because of

   (a) High η (b) Less sensitivity to harmonics

   (c) Lower noise (d) Ability to operate at higher frequencies

4. The resonant frequency of the cavity is expressed as

   (a) $f = V_d + 2L$ (b) $f = V_d * 2L$

   (c) $f = V_d - 2L$ (d) $f = V_d / 2L$

5. Operating frequency of the reflex klystron is as high as

(a) 70,000 MHz (b) 50,000 MHz (c) 20,000 MHz (d) 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. In VSWR measurement, the condition for producing standing wave measurement is

(a) $Z_L + Z_0$ (b) $Z_L = Z_0$ (c) $Z_L \neq Z_0$ (d) $Z_L - Z_0$

PART - B (5 x 2 = 10 Marks)

11. Define Insertion loss.

12. List the applications of Gunn diode.

13. Compare O-type tube and M-type tube.

14. List the advantages of MMIC's

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

$S_{11} = 0.2\angle 90°$ $S_{22} = 0.2 \angle 90°$

$S_{12} = 0.5 \angle 90°$ $S_{21} = 0.5 \angle 0°$

(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) Discuss with supporting equations about scattering matrix of a directional coupler (16)

17. (a) (ii) Explain the operating principle of a Gunn diode. Describe its domain formation and various modes of operations. (16)

Or

(b) (i) Draw the construction and explain the working of IMPATT diode. (16)

18. (a) Explain the concept and derive the expression for Bunching process. (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) Draw a flow chart for MMIC fabrication process and discuss in detail. (16)

20. (a) Explain the impedance measurement technique using slotted line and reflectometer. (16)

Or

(b) Draw a block diagram for impedance measurement using reflectometer and explain in detail (16)