

Code: 13A04603

B.Tech III Year II Semester (R13) Regular & Supplementary Examinations May/June 2017

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- (a) What is a dominant mode?
- (b) For a cavity of dimensions 3 cm x 2 cm x 7 cm filled with air and made of copper, find the resonant frequency.
- (c) Why H-plane T junction called as current junction?
- (d) What is the coupling factor of a directional coupler?
- (e) What is bunching process?
- (f) What is a slow wave structure? Write two examples.
- (g) What is a cross field tube?
- (h) What is population inversion in Gunn diode?
- (i) What are different methods used for power calculation.
- (j) What is a double minimum method?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

- 2 (a) Enumerate the basic advantages of microwaves.
- (b) Draw the EM spectrum and list all the frequency ranges involved in microwave bands.
- (c) Briefly explain the applications of microwaves.

OR

- 3 Deduce the electromagnetic field relations for the dominant mode in a rectangular waveguide from the Maxwell's equations.

UNIT – II

- 4 What is a magic Tee junction. Derive the S matrix of a magic Tee.

OR

- 5 (a) Explain the operation of circulator with a neat diagram.
- (b) A signal power 32mW is fed into one of the collinear ports of loss less H-Plane Tee. Determine the powers in the remaining ports when other ports are terminated by means of matched load.

UNIT – III

- 6 Explain the construction, operation, operating characteristics of reflex klystron oscillator with a neat diagram.

OR

- 7 With a neat sketch, explain the structure and principle of operation of TWT Amplifier.

UNIT – IV

- 8 What are the bulk properties of GUNN diode that give rise to negative resistance?

OR

- 9 Why pi-mode operation is preferred in cylindrical type magnetron? Give its working principle with neat sketches.

UNIT – V

- 10 Give the measurement procedure for Q factor of a resonant cavity and attenuation constant at microwave frequencies.

OR

- 11 (a) Draw a neat sketch of a MW test bench for impedance measurements using reflectometer.
- (b) Two identical directional are used in a waveguide to sample the incident and reflected powers. The output of the two coupler is found to be 2.5mW and 0.15mW. Find the values of VSWR in the wave guide.