Code :R5320405

R5

III B.Tech II Semester(R05) Supplementary Examinations, April/May 2011
MICRO WAVE ENGINEERING
(Electronics & Communication Engineering)

Time: 3 hours
Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1. (a) What are TE, TM and TEM modes of propagation? Explain.
   (b) A TEM modes can not propagate in rectangular wave guide. Justify this statement.

2. (a) Explain how a rectangular cross section of a micro strip line can be transformed in to equivalent circular conductance.
   (b) In the above transformation, what is the significance of t/w ratio.

3. Write short notes on the following:

   (a) Tuning screw in wave guide
   (b) Capacitive window in the wave guide.

4. (a) Explain Faraday rotation with a neat diagram? Explain the working of ferrite isolator.
   (b) Give the scattering matrix of 3 port circulator. The scattering variables measured at a port are
   a = 5 + j2 and   b = 2 + j2
   The normalizing impedance Z_0 = 50 ohms. Calculate the voltage and current.

5. (a) Give the analysis of reflex klystron & derive the expression for repeller voltage V_r interms of l,n & V_a.
   (b) Explain clearly the classification of microwave sources.

6. (a) Derive the Hartree anode Voltage equation for linear magnetron.
   (b) A linear magnetron has following operating pars:
   V_o=15KV, I_o=1.2A,f=8GHZ, B_o= 0.015 wb/m^2, d= 5CM,h=2.77CM. Calculate
      i. Electron velocity at hub surface
      ii. phase velocity for synchronism
      iii. Hartree anode Voltage.

7. (a) Derive the equation for power output & efficiency of IMPATT diode.
   (b) Determine the conductivity of n-type Ga As Gunn diode if
   Electron density n = 10^{18} cm^{-3}
   Electron density at lower valley n_l = 10^{10} cm^{-3}
   Electron density at upper valley n_u = 10^8 cm^{-3}
   Temperature T = 300^oK.

8. (a) Two idential directional couples are placed in a waveguide to sample the incident and the reflected power. The meter readings show that the power level of the reverse coupler is 10dB down from the level of the forword coupler. What is the value of the SWR on the waveguide?
   (b) How are microwave mesurements different from low frequency measurements.

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