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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Sixth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; June/July - 2015

Microwave Devices and Integrated Circuits

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer any **FIVE** full questions, selecting at least **TWO** full questions from each **part**.*

PART- A

1 a. Derive an expression for the reflection coefficient of a transmission line at the receiving end in terms of load impedance Z_L and characteristic impedance Z_0 starting from incident voltage and current wave equation. 8

b. A transmission line has the following parameters :

R = 2 Ω/m, G = 0.5 m℧/m, f = 1 GHz

L = 8 nH/m, C = 0.23 pF,

Calculate; i) Characteristic impedance ii) Propagation constant. 6

c. Briefly explain the characteristics of the smith chart. 6

2 a. Derive TE_{mn} field equations in rectangular wave guides. 10

b. With a neat sketch explain the two-hole directional coupler and obtain S-matrix of a directional coupler. 10

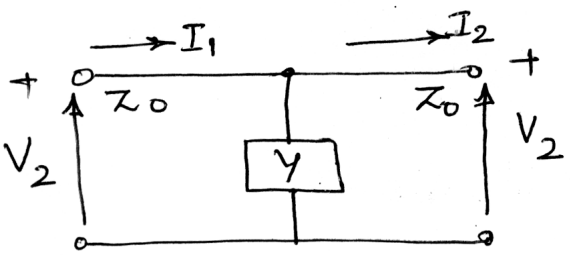
3 a. What is meant by reentrant cavity? Mention the role of reentrant cavities in Klystrons. With neat sketch, explain the different types of reentrant cavities. 10

b. With a neat diagram of helix-TWT, explain the amplification process and mention its applications. 10

4 a. Explain the properties of S-parameters for junction of ports having common characteristic impedance. 10

b. Derive an expression for ABCD parameters in terms of Z-parameters. 6

c. Find ABCD parameters of the shunt admittance y in the transmission line shown in the figure. 4



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PART - B

5.a.	With a neat sketch, explain the internal structure organization of different coaxial cables.	10
b.	With relevant diagram, explain the waveguide Tees and its S-matrix.	10
6 a.	Explain the modes of operation for Gunn diodes.	4
b.	Explain the principles of operation of BARITT diodes.	6
c.	Describe the structure and equivalent circuit of varactor diodes and how it is used for frequency multiplication.	10
7 a.	Calculate the characteristic impedance Z_0 of microstrip line for the following specification. $\in_r = 5.23$, h = 7 mils, t = 2.8 mils, ω = 10 mils	4
b.	Explain the attenuation losses of a parallel strip line.	6
c.	Explain the structure of coplanar strip line and shielded strip line. Write equation for its characteristic impedance.	10
8 a.	Explain the steps involved in the manufacture of thick film and thin film MIC.	8
b.	Explain the working environment and equipment for the precise and repeatable circuit production	6
c.	With a neat diagram, explain the interdigital capacitor and sandwich capacitor.	6

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