R13

Code No: 117FE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech IV Year I Semester Examinations, March - 2017
MICROWAVE ENGINEERING
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

1.a)	Define dominant and degenerative modes of waveguide.	[2]
b)	Write the equation of Q factor of Microstrip line.	[3]
c)	Which is the dominant mode in circular waveguide?	[2]
d)	What is post and what is the application of it?	[3]
e)	Compare 'O' type and 'M' type tubes.	[2]
f)	What are the limitations of conventional tubes?	[3]
g)	How pi-mode is separated in Magnetron?	[2]
h)	How LSA mode of Gunn diode is used to produce oscillations?	[3]
i)	Why S-parameters are needed in Microwave frequencies?	[2]
j)	Why an Isolator is needed in Microwave bench?	[3]

Part-B (50 Marks)

2.a) Derive the field equations for Rectangular Waveguide in TE mode starting from Maxwell's equations.
b) Why TEM wave is not possible in Rectangular waveguide? [5+5]

OR

3.a) Draw the field line for the following modes of Rectangular waveguide
i) TE10 ii) TM11 iii) TM12 iv) TM22
b) Determine the impedance of Rectangular waveguide in TE and TM mode. [5+5]

4.a) What are the different types of Attenuators? Explain them with neat diagrams.
b) Draw the structure diagram of E-plane Tee and explain its characteristics. [5+5]

OR

5.a) Why Matched loads are needed in Microwave circuits? Explain its working with neat diagrams.
b) Explain the principle of Faraday rotation. [5+5]

6. Explain how velocity modulation is converted into current modulation with Applegate diagram and also derive the equation for output power efficiency. [10]

OR

7. Explain how TWT is increased gain by increasing the bunching of electrons and derive the equation of gain. [10]

8.a) Explain how 8-cavity cylindrical Magnetron is used to produce oscillations.
b) What are the applications of Magnetron oscillator? [5+5]

OR

9.a) Explain how Gunn diode is used in waveguide oscillator.
b) What are the different avalanche transit time devices? [5+5]

10. Draw the structure of Magic tee and write its characteristics and also derive its S-matrix. [10]

OR

11. Explain how a slot section is used to measure the frequency of a given microwave signal. [10]

---ooOoo---