R15

Code No: 127FE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech IV Year I Semester Examinations, May/June - 2019
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)	What modes are the dominant modes in TE and TM waveguides.	[2]
b)	Define effective permittivity of Microstip line.	[3]
c)	Define Q factor of Circular waveguides.	[2]
d)	Compare probe and loop connections.	[3]
e)	What are the reentrant cavities?	[2]
f)	How Microwave tubes are classified?	[3]
g)	What is strapping in Magnetron?	[2]
h)	How cross-field concept is used to produce oscillations in Magnetron?	[3]
i)	What type of slot is used in Microwave bench?	[2]
j)	What are the properties of S-matrix?	[3]

PART-B

(50 Marks)

2.a) What are the applications of Microwave frequencies?
b) Derive the equation for impedance of Microstrip line.
c) Prove the cutoff frequency of Rectangular waveguide in TM and TE modes is same. [10]

OR

3.a) Determine the equations of Fields of Rectangular waveguide in TM mode starting from Maxwell's equations.
b) Explain the power loss in waveguides with suitable equations. [5+5]

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

OR

5.a) Explain how Ferrites are used for isolators? Explain any one of such circuit.
b) What are the waveguide windows? How these are used in Microwave circuits? [5+5]

6. Explain the bunching process of two cavity klystron amplifier with Applegate diagram and also derive the equations for power efficiency. [10]

OR

7.a) What are the different oscillating modes in TWT and explain them.
b) Compare the performance of TWT with Klystron amplifier. [6+4]

8. Explain the electron bunching process in Cylindrical Magnetron with neat diagrams and derive the Hartee condition. [10]

OR

9.a) Draw the characteristics of Gunn diode and explain how negative resistance region is obtained?

b) What are the applications of Gunn diode? [6+4]

10. What are the characteristics of two hole direction coupler and derive the S-matrix of it. [10]

OR

11. Explain how to measure the VSWR of a given load at microwave frequencies with neat block diagram. [10]

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