Code No: RT32044 **R13** SET - 1

III B. Tech II Semester Supplementary Examinations, November/December - 2016

MICROWAVE ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Derive the expression for cut-off frequency of a rectangular wave guide.	[4M]
	b)	What are the design considerations for a micro strip line?	[3M]
	c)	Explain scattering parameters in microwave components.	[4M]
	d)	Explain the bunching process in reflex klystron.	[4M]
	e)	Explain any two applications of magnetron.	[3M]
	f)	Explain RWH theory.	[4M]

PART -B

2	a)	Derive the wave equation for a TE wave and obtain all the field components in a rectangular waveguides.	[8M]
	b)	A hollow rectangular waveguide has dimensions α=1.5 cm, calculate the amount of attenuation if the frequency of the signal is 6GHz.	[8M]
3	a)	A rectangular-cavity resonator has dimensions of a=5 cm, b=2 cm and d=15cm, compute. i)the resonant frequency of the dominant mode for an air-filled cavity. ii)the resonant frequency of the dominant mode for a dielectric-filled cavity of ε_r=2.56	[10M]
	b)	Define a reentrant cavity and give at least two examples. Where are these used?	[6M]
4	a)	Explain briefly about circulators and isolators.	[8M]
	b)	Find the Hybrid rind S-parameters and explain with neat sketch.	[8M]
5	a)	A two-cavity amplifier klystron has the following parameters beam voltage V_o= 900V, beam current I_o= 30mA, frequency f =8GHz, gap spacing in either cavity d= 1mm, spacing between centers of cavities L=4cm, effective shunt impedance R_{sh}=40KΩ, determine i)The electron velocity ii)The dc electron transit time iii)The input voltage for maximum output voltage iv)The voltage gain in decibels.	[10M]
	b)	Derive the output power of Two-cavity klystron amplifier.	[6M]
6	a)	Explain the modes of resonance and PI mode operation.	[8M]
	b)	Explain 8-cavity cylindrical travelling wave.	[8M]
7	a)	Draw and explain in detail about IMPATT diode.	[8M]
	b)	Draw a neat diagram of a microwave bench setup and explain in detail about all the components.	[8M]

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