Student Exam No: _____

GANPAT UNIVERSITY

B.TECH SEM. VII ELECTRONICS & COMMUNICATION ENGINEERING EXAMINATION, NOV /DEC -2011

EC 704 MICROWAVE ENGINEERING

TIME: 3 Hrs.] **[TOTAL MARKS: 70**

INSTRUCTIONS:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

Que-1	**A**	Define Transit time in Reflex klystron.Expalin Reflex klystron as amplifier in detail.	**6**
	B	Explain working of Backward Wave Oscillator in detail.	**6**
		OR	
Que-1	**A**	What is frequency pulling and frequency pushing concepts in magnetrons? Discuss operation of Magnetron.	**6**
	B	What is the need to have a multi cavity klystron amplifier? Discuss about two cavity klystron amplifier device.	**6**
Que-2	**A**	What is Doppler Effect? Discuss CW Doppler radar operation.	**5**
	B	Discuss about PIN diode in detail.	**6**
		OR	
Que-2	**A**	Draw block diagram of simple RADAR system. Derive maximum range equations of radar system.	**5**
	B	Explain Varactor diode in detail.	**6**
Que-3	**A**	What do you mean by O-type tubes and M-type tubes? Name some O-type tubes.	**4**
	B	What is Bolometer? Mention the limitations of single bridge circuit for power measurement purpose?	**4**
	C	What is negative resistance in GUNN diode? What are the elements that exhibit Gunn effect?	**4**

SECTION-II

Que 4	A	Derive the equation for wave impedance for TM Mode in rectangular waveguide. Also Derive the equation for Electric field component for rectangular Waveguide.	6
	B	What is dominant mode? Derive the equation for E_x and H_y component for TE Mode in rectangular Waveguide.	6
		OR	
Que 4	A	Derive the equations for length of the stub and distance of the stub from the load.	6
	B	For given constant of an open wire transmission line $R=10^{-2}\Omega/M$,$G=10^{-6}$ Mho /M ,$L=10^{-6}$ H/M ,$C=10^{-9}$ F/M , F=1K Hz. Find Z0 , α , β and V_p	6
Que 5	A	What is principle of Magic Tee? Determine S-matrix for Magic Tee.	4
	B	Derive the equation for the Phase Velocity for waveguide. Also draw the pattern for TE_{30} and TM_{33}.	4
	C	Explain the working principle of circulator with necessary diagram. Also give its applications.	4
		OR	
Que 5	A	List properties of S matrix. Also explain working principle of gyrator.	4
	B	What is VSWR? Derive the equation for input impedance on a transmission line.	4
	C	A rectangular waveguide has dimensions 3.5x 7 cms. Determine the guide wavelength, phase constant β and phase velocity V_p at a wavelength of 4.9 cms for the dominant mode.	4
Que 6	A	A load impedance of 92-j66 Ω is required to be matched to 50 Ω co-axial lines at 650 MHz. determine distance of stub from load and length of stub using smith chart. Also determine the VSWR for it.	4
	B	What is cavity Resonator? Derive the equation for E_y and H_x component for TM Mode in rectangular cavity Resonator.	7

END OF PAPER

The Complete Smith Chart

Black Magic Design