(41) SEAT No._____ No. of Printed Pages : 2

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SARDAR PATEL UNIVERSITY

B.Sc.[Electronics & Communication] (Semester-VI) EXAMINATION

US06CELC05: Microwave Devices and Circuits

4th April, Wednesday 2018,

Time:- 10:00 AM to 1:00 PM

Note: Figures to the right indicate maximum marks.

Assume data wherever necessary. **Total Marks: 70**

Q1		**Choose the correct answer.**				[10]
	1	The _____ is the ratio of the complex amplitude of the reflected wave to that of the incident wave				
		a) reflection coefficient	b) transmission co-efficient	c) sound transmission co-efficient	d) none	
	2	Microwave is an electromagnetic radiation of _____wavelength.				
		a) long	b) short	c) medium	d) none	
	3	The Helmholtz's equation is given by _____.				
		a) $\nabla \times \Psi = \gamma \Psi$	b) $\nabla \cdot \Psi = \gamma \Psi$	c) $\nabla^2 \Psi = -\gamma^2 \Psi$	d) None	
	4.	The propagation constant is generally written as _____.				
		a) $\alpha + j\beta$	b) $\alpha - j\beta$	c) $\beta + j\alpha$	d) $\beta - j\alpha$	
	5	In E – plane tee junction, for input in port 3 the outputs in port 1 and port 2 are _____ out of phase with each other.				
		a) 90°	b) 180°	c) 270°	d) 360°	
	6	A _____of electromagnetic radiation is a particular electromagnetic field pattern of radiation measured in a plane perpendicular to the propagation direction of the beam.				
		a) transverse mode	b) Transverse electromagnetic	c) Transverse magnetic	d) none	
	7.	_____depend upon the interaction of electrons with a rotating electromagnetic field of constant angular velocity.				
		a) Negative resistance Magnetrons	b) cavity magnetron	c) Cyclotron frequency Magnetrons	d) none	
	8	A_____, also known as a transferred electron device (TED), is a form of diode, a two-terminal passive semiconductor electronic component, with negative resistance, used in high-frequency electronics.				
		a) Gunn diode	b) varactor	c) tunnel	d) PIN	
	9	A _____ diode is a diode with a wide, undoped intrinsic semiconductor region between a p-type semiconductor and an n-type semiconductor region.				
		a) PIN	b) varactor	c) tunnel	d) gunn	
	10	Varactor diode is operated in a _____ state.				
		a) reverse bias	b) forward bais	c) zero bias	d) none	

P.T.O.

2		**Answer in short [ANY TEN]**	**[20]**
	1	Give the classification of transmission lines.	
	2	What are the advantages of microwaves?	
	3	Define voltage standing wave ratio.	
	4	Draw a neat and labeled diagram of cavity magnetron.	
	5	What is the use of smith chart?	
	6	Define normalized impedance.	
	7	State only the advantages and applications of microwaves.	
	8	Give the difference between TE and TM modes of propagation.	
	9	Explain phase shifters in microwave.	
	10	Give the advantages and disadvantages of Avalanche Transit Time devices.	
	11	Draw the frequency spectrum for electromagnetic waves.	
	12	State the applications of PIN diode with necessary diagrams.	
Q3		Derive the transmission line equations in terms of voltage and current.	**[10]**
		OR	
Q3	**A**	Derive the expression for reflection coefficient.	**[05]**
	B	Write a brief note on transmission coefficient.	**[05]**
Q4		Derive the TM modes in rectangular waveguides.	**[10]**
		OR	
Q4		Write a short note on TE waves in rectangular waveguide.	**[10]**
Q5		Derive the expression of Hull's cut off voltage.	**[10]**
		OR	
Q5		Explain the construction and working of reflex klystron with necessary diagrams.	**[10]**
Q6	**A**	Write a note on varactor diode.	**[05]**
	B	Draw a neat labeled diagram of Gunn diode. State its applications.	**[05]**
		OR	
Q6	**A**	Write a note on tunnel diode.	**[05]**
	B	Write a short note on PIN diode.	**[05]**