(20) SEAT No._____

SARDAR PATEL UNIVERSITY

No. of Printed Pages : 2

B.Sc. Semester VI [Electronics & Communication]
Day & Date: Wednesday; 03/04/2019
Time: 10:00 am TO 1:00 pm
US06CELC05: Microwave Devices and Circuits

Total Marks: 70

Note: Figures to the right indicate maximum marks.

Q1 **Choose the correct answer.** **[10]**

1 For any mode of propagation in a rectangular waveguide, propagation occurs _____.

a) Above the cut off frequency
b) Below the cut off frequency
c) Only at the cut-off frequency
d) Depends on the dimension of the waveguide

2. 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

3 The modes of propagation supported by a rectangular wave guide is _____.

a) TM, TEM, TE b) TM, TEM c) TM, TE d) TE, TEM

4 Microwave is an electromagnetic radiation of _____wavelength.

a) long b) medium c) short d) none

5 The propagation constant is generally written as _____.

a) $\alpha + j\beta$ b) $\alpha - j\beta$ c) $\beta + j\alpha$ d) $\beta - j\alpha$

6 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)0 ° b) 90° c) 180° d) 360°

7. _____ is a device that produces a phase shift of a required amount of the input wave.

a) Attenuator b) Phase shifter c) Resonator 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) PIN b) varactor c) Gunn diode d) tunnel

9 The electrodes of a Gunn diode are made of _____.

a) Molybdenum b) copper c) gold d) GaAs

10 Varactor diode is a semiconductor diode in which the _____ can be varied as a function of reverse voltage of the diode.

a) junction resistance b) junction capacitance c) junction impedance d) none

P.T.O.

Q2		**Answer in short [ANY TEN]**	**[20]**
	1	Give the classification of transmission lines.	
	2	What is the use of smith chart?	
	3	Define voltage standing wave ratio.	
	4	Define impedance matching in smith chart.	
	5	State only the advantages and applications of microwaves.	
	6	What are ferrite devices in microwave?	
	7	Give the difference between TE and TEM modes of propagation.	
	8	Give the advantages and disadvantages of microwave attenuator.	
	9	Mention the type of Microwave attenuators.	
	10	Mention the applications of PIN diode.	
	11	Mention the applications of Gunn diode.	
	12	Give the applications of Avalanche Transit Time devices.	
Q-3		Derive the transmission line equations in terms of voltage and current.	**[10]**
		OR	
Q-3	A	Explain standing wave and standing wave ratio.	**[05]**
	B	Explain Transmission Line Analysis in terms of Admittance in smith chart.	**[05]**
Q-4		Write a short note on Propagation of TM waves in rectangular waveguide.	**[10]**
		OR	
Q-4		Write a short note on Propagation of TE waves in rectangular waveguide.	**[10]**
Q-5	A	Derive the expression of Hull's cut off voltage.	**[05]**
	B	Write a short note on: Phase shifter in microwave communication.	**[05]**
		OR	
Q-5	C	Explain the construction and working of Magnetron klystron with necessary diagrams.	**[05]**
	D	Explain the construction and working of reflex klystron with necessary diagrams.	**[05]**
Q-6		Write a note on Gunn diode.	**[10]**
		OR	
Q-6		Write a note on tunnel diode.	**[10]**

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