

Course Code	2	2	E	C	6	2
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MICROWAVES AND ANTENNAS

Max. Marks: 100

<i>Q. No</i>	<i><u>Question</u></i>	<i><u>Marks</u></i>	<i>(RBTL:CO:PI)</i>
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1.	a.	With a neat sketch explain Gunn diode characteristics.	10	(2 : 1 : 1.3.1)
	b.	Derive the expressions for reflection and transmission coefficients in terms of load and characteristics impedance.	10	(2 : 1 : 1.3.1)

2.	a.	Explain different modes in reflex klystron oscillator.	10	(2 :1 : 1.3.1)
	b.	With neat sketch explain Smith chart, and show how load impedance and VSWR circle is located.	10	(2 :1 : 1.3.1)

3.	a.	Define the following losses and derive the necessary expressions in S-parameters.	10	(2 : 2 : 1.3.1)
		(i) Insertion loss		
		(ii) Transmission loss		
		(iii) Reflection loss		
		(iv) Return loss.		
	b.	Obtain S-matrix representation of multiport network.	10	(2 : 2 : 1.3.1)

4.	a.	Explain the operation of precision type phase shifter with a neat sketch.	10	(2 : 2 : 1.3.1)
	b.	Explain the characteristics of magic tee, obtain S-matrix representation.	10	(2 : 2 : 1.3.1)

5.	a.	With neat sketch of power pattern, explain (i) HPBW (ii) FNBW and obtain (iii) HPBW (iv) FNBW. Given $E(\theta) = \cos(\theta)$	08	(2 : 3 : 1.3.1)
	b.	Derive an expression for beam area of radiation pattern of antenna.	06	(2 : 3 : 1.3.1)
	c.	Briefly discuss radiation intensity and beam efficiency.	06	(2 : 3 : 1.3.1)

6. a. Find the beam area of a radiation pattern given by: 10 (2 :3 : 1.3.1)
 $E(\theta) = \sin^2(\theta)$, $0 \leq \theta \leq 90^\circ$.

b. With neat sketch explain short electric dipole. 10 (2 :3 : 1.3.1)

Module-4

7. a. State the power theorem and derive the expression for pointing vector. 10 (2 :4 : 1.3.1)
b. In arrays of point sources derive the resultant field of two point sources of same magnitude and same phase and plot the radiation pattern. 10 (2 :4 : 1.3.1)

(OR)

8. a. Explain with neat sketch, different types of smart antennas. 12 (2 :4 : 1.3.1)
b. Discuss applications of smart antenna technology. 08 (2 :4 : 1.3.1)

Module-5

9. a. Explain the basic characteristics of microstrip antennas, with neat sketch of their different shapes. 10 (2 :5 : 1.3.1)
b. Discuss with neat sketch the feeding methods of microstrip antennas. 10 (2 :5 : 1.3.1)

(OR)

10. a. With neat sketch explain different modes in helical antennas. 10 (2 :5 : 1.3.1)
b. Briefly discuss antenna for (i) cell phones (ii) satellite and defence communications. 10 (2 :5 : 1.3.1)

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