Q. Code:721027

Reg. No. | | | | | | | | | | | | | |

M.E./M.TECH DEGREE EXAMINATIONS, MAY 2024

First Semester

CU22101 – ADVANCED RADIATION SYSTEMS

(Electronics and Communication Engineering)

(Regulation 2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Students can able to understand the design parameters of an antenna and derive the radiation characteristics of fundamental antennas.	**3**
CO 2	Students can able to enhance the knowledge in the area of various antenna arrays and make them to derive the radiation parameters.	**3**
CO 3	Students can able to compute the parameters of aperture and slot antennas.	**3**
CO 4	Students can able to impart the design and analysis of modern antennas.	**4**
CO 5	Students can able to design antennas for various application.	**3**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Illustrate far fields of an antenna.	**1**	**3**
2.	List the types of polarization.	**1**	**2**
3.	Define isotropic radiator.	**1**	**2**
4.	Mention the advantages of matching techniques.	**1**	**2**
5.	A linear end-fire, uniform array of 16 elements has a separation of $\lambda/2$ between elements, find the directivity.	**2**	**3**
6.	Enumerate the features of phased array antenna?	**2**	**2**
7.	Compare analog and digital beamforming.	**2**	**2**
8.	Specify the applications of frequency scanned arrays.	**2**	**3**
9.	What do you understand term aperture?	**3**	**2**
10.	State field equivalence principle.	**3**	**2**
11.	Discuss the feeding techniques of parabolic reflector.	**3**	**3**
12.	Point out dipole and slot antenna are complementary to each other.	**3**	**3**
13.	Draw the equivalent circuit of rectangular patch antenna.	**4**	**3**
14.	Distinguish between transmission line and cavity model.	**4**	**2**
15.	Illustrate aperture coupled feeding technique of rectangular microstrip patch antenna.	**4**	**3**
16.	What are the limitations of microstrip patch antenna?	**4**	**2**

17.	Enumerate the features of PIFA antenna.	**5**	**2**
18.	Mention the advantages and disadvantages of Vivaldi antenna.	**5**	**2**
19.	Draw the structure of wearable antenna.	**5**	**2**
20.	Discuss about metamaterial antenna.	**5**	**3**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Derive the expressions for the radiated field and radiation resistance of a half wave dipole.	**(10)**	**1**	**3**
	(OR)			
(b)	Derive the expressions for radiation intensity, gain, Directivity and input impedance of an antenna.	**(10)**	**1**	**3**
22. (a)	Evaluate the performance of digital beamforming in the construction of phased array with neat diagram.	**(10)**	**2**	**3**
	(OR)			
(b)	Evaluate the performance of phased array antenna using MEMs technology.	**(10)**	**2**	**3**
23. (a)	Derive the radiation components of field from a rectangular aperture with an illustration of Field Equivalence Principle.	**(10)**	**3**	**3**
	(OR)			
(b)	Derive the input impedance of slot antenna and also mention its applications.	**(10)**	**3**	**3**
24. (a)	Examine the radiation mechanism from rectangular microstrip patch antenna with neat diagram and also discuss about any two types of feeding techniques.	**(10)**	**4**	**4**
	(OR)			
(b)	Construct the rectangular microstrip patch antenna using cavity model and obtain the mode field patterns.	**(10)**	**4**	**4**
25. (a)	Explain the working principle and applications of medical antenna with a neat diagram.	**(10)**	**5**	**3**
	(OR)			
(b)	Explain the working principle of microstrip reflect array antenna with a neat diagram.	**(10)**	**5**	**3**

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PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	The aperture dimension of a pyramidal horn is 15 x 7.5 cm^2. It is operating at 9 GHz. Find beamwidth , power gain and directivity.	**(10)**	**3**	**3**

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