Q. Code:926784

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

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

Sixth Semester

EC18602– ANTENNA THEORY AND DESIGN

(Electronics and Communication Engineering)

(Regulation 2018 / 2018A)

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

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Illustrate the insights of antennas and arrays.	**3**
CO 2	Determine the radiation characteristics of different types of aperture and slot antenna.	**3**
CO 3	Design microstrip antennas and its analysis.	**3**
CO 4	Show the recent special antennas and its analysis.	**2**
CO 5	Identify the different types of propagation mechanisms at different frequencies.	**2**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define isotropic radiator.	**1**	**1**
2.	What is the need for antenna arrays?	**1**	**1**
3.	State Huygens' principle.	**2**	**2**
4.	What are the limitations of the reflector antenna?	**2**	**2**
5.	Compare the contact and non-contact methods of excitation techniques of microstrip patch antennas.	**3**	**2**
6.	List the limitations of microstrip patch antenna.	**3**	**2**
7.	Point out the applications of spiral antenna.	**4**	**2**
8.	Mention the applications of EBG structure in antennas.	**4**	**2**
9.	Find the maximum distance that can be covered by a space wave, when the antenna heights are 60 m and 120 m respectively.	**5**	**2**
10.	Define critical frequency.	**5**	**1**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Apply the vector potential at a distant point due to small current element, calculate the field quantities and radiation resistance of the half wave dipole antenna.	**(14)**	**1**	**3**
	(OR)			
(b)	Derive the expressions for field pattern of end-fire array of n sources of equal amplitude and spacing.	**(14)**	**1**	**3**

12. (a)	Obtain the design equations and discuss the principle of operation of horn antenna.	**(14)**	**2**	**3**
	(OR)			
(b)	With neat diagram explain the working principle of parabolic reflector antenna and also explain the various types of feed relative to their merits and demerits.	**(14)**	**2**	**3**
13. (a)	With necessary illustrations explain the radiation characteristics of microstrip antenna with different types of feeding structures and mention its application.	**(14)**	**3**	**3**
	(OR)			
(b)	Analyze the rectangular microstrip patch antenna using a model that represents the patch as a dielectric-loaded cavity.	**(14)**	**3**	**3**
14. (a)	With neat diagram explain the working principle of normal mode and axial mode helical antenna.	**(14)**	**4**	**4**
	(OR)			
(b)	With neat diagram explain the working principle of reflect array antenna.	**(14)**	**4**	**4**
15. (a)	With necessary diagram explain in detail about antenna gain and radiation pattern measurements.	**(14)**	**5**	**3**
	(OR)			
(b)	Divide the atmosphere in different layers and specify factors affecting the radio wave propagation.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Design a rectangular microstrip antenna using a substrate (FR4) with dielectric constant of 4.4, h = 1.2 mm so as to resonate at 9 GHz.	**(10)**	**2**	**5**

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