C **Reg No :** | | | | | | | | | | |

Question Paper Code: 56402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Sixth Semester

Electronics and Communication Engineering

15UEC602–ANTENNA AND WAVE PROPAGATION

(Regulation 2015)

Duration: 3 Hours Maximum: 100 Marks

Answer ALL questions

PART A - (5 x 1 = 5 Marks)

1. Intrinsic impedance of free space is CO1 -R

   (a) 77 ohm (b) 377ohm (c) 370 ohm (d) 100ohm

2. In an electrically small loops, the overall length of the loop is _____ one-tenth of a wavelength. CO2 -R

   (a) Less than (b) Equal to (c) Greater than (d) None

3. A rectangular horn antenna operating at 4GHz has the wavelength of 0.075m and gain of about 13dBi. Then its required capture area is? CO3 -R

   (a) 0.0149 m^2 (b) 0.0475 m^2 (c) 0.5521 m^2 (d) 0.9732 m^2

4. Which mode of radiation occurs in an helical antenna due to smaller dimensions of helix as compared to a wavelength? CO4 -R

   (a) Normal (b) Axial

   (c) Both a and b (d) None of the above

5. Which ionization layer exists during day time & usually vanishes at night due to highest recombination rate? CO5- R

   (a) D-region (b) Normal E-region

   (c) Sporadic E-region (d)Appleton region

PART – B (5 x 3= 15Marks)

6.	Define gain of an antenna. Mention the relationship between gain and aperture of an antenna.	CO1- R	
7.	Calculate approximately the Radiation resistance for a 10 m square loop antenna at frequency of 3 MHz..	CO2 -R	
8.	State the advantages of cassegrain feed system.	CO3- R	
9.	What is frequency independent antenna?	CO4 -R	
10.	The critical frequency for ionized layer is 5MHz. Determine the electron density of the layer.	CO5- R	

PART – C (5 x 16= 80Marks)

11.	(a)	Examine the Radiation and polarization characteristics of an antenna.	CO1- App	(16)
		Or		
	(b)	Demonstrate the Reciprocity principle	CO1- App	(16)
12.	(a)	Derive the fields radiated from a half wave dipole antenna. Find the Radiation resistance of that antenna.	CO2 -App	(16)
		Or		
	(b)	Derive the expression for the array factor of a linear array of four isotropic element spaced $\lambda/2$ apart fed with signals of equal amplitude and phase. Obtain the direction of maxima and minima.	CO2- Ana	(16)
13.	(a)	Explain the special features of Reflector antenna and discuss on different types of feed used with neat diagram	CO3 -Ana	(16)
		Or		
	(b)	Explain:	CO3 -Ana	(8)
		(i) Slot antenna.		
		(ii) Microstrip antenna.	CO3 -Ana	(8)
14.	(a)	With a neat block diagram, explain the radiation pattern and gain of an antenna can be measured.	CO4- U	(16)
		Or		
	(b)	Explain the operation of a log periodic antenna and Design a 50 to 200MHz log periodic dipole antenna for gain corresponds to scale factor 0.8 and space factor 0.15. Assume the gap spacing at the smallest dipole is 3.6mm.	CO4- Ana	(16)

15. (a) Describe the structure of the atmosphere and the characteristics of the radio wave propagation in each layer. CO5 -U (16)

Or

(b) Discuss about the following

(i) Ground wave propagation CO5- U (8)

(ii) Tropospheric Propagation CO5- U (8)