



Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

01/11
AN

Question Paper Code : 52457

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Sixth Semester

Electronics and Communication Engineering

EC2353 – ANTENNAS AND WAVE PROPAGATION

(Regulations 2008)

[Common to PTEC2353 – Antennas and Wave Propagation for B.E. (Part – Time)
Fifth Semester – ECE – Regulations 2009]

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Define radiation intensity.
2. Calculate the radiation resistance of $\lambda/10$ wire dipole in free space.
3. List any two applications of loop antenna.
4. What is meant by antenna array ?
5. State Huygen's principle.
6. Calculate the beam width between first nulls of a 2 m paraboloid reflector operating at 6000 MHz.
7. What are the different methods of feeding Microstrip antenna ?
8. Define pitch angle of a helical antenna.
9. What are the factors that affect the propagation of radio waves ?
10. A pulse of a given frequency transmitted vertically upward is received back after a period of 2 ms. Find the virtual height of the reflection layer.

PART – B

(5×16=80 Marks)

11. a) Derive the expression for radiated field from an Oscillating dipole and hence deduce the expression for radiation resistance. (16)

(OR)



b) i) Explain the term beam solid angle with respect to antenna. (3)

ii) Calculate the directivity of an antenna the power pattern is given by,

$$U(\theta, \phi) = \begin{cases} \sin\theta \sin\phi & 0 \leq \theta \leq \pi; 0 \leq \phi \leq \pi \\ 0 & 0 \leq \theta \leq \pi; \pi \leq \phi \leq 2\pi \end{cases} \quad (8)$$

iii) Derive FRIIS transmission formula. (5)

12. a) Obtain the expressions for power radiated and the radiated resistance of a Half wave dipole. (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 directions of maxima and minima. (16)

13. a) Explain the principles of operation of horn antenna and discuss the various forms of Horn antenna. Obtain the design equations of Horn antenna. (16)

(OR)

b) Write short notes on :

i) Slot antenna. (8)

ii) Lens antenna. (8)

14. a) With a neat diagram. Explain the principle and operation of Log periodic antenna. (16)

(OR)

b) Describe construction and basic principles of operation of a helical antenna under normal mode and axial mode. (16)

15. a) Draw the structure of atmosphere and ionosphere and explain in detail the various regions of ionosphere. (16)

(OR)

b) i) Describe the significant features of ground wave propagation. (8)

ii) A plane wave at 20 MHz is transmitted to ionosphere and reflected from a height of 500 km from the flat earth. If the refractive index corresponding to maximum electron density is 0.5; determine the horizontal range for which the signal frequency is MUF. (8)