Reg. No. ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 51463

B.E./ B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Electronics and Communication Engineering

EC 2353/EC 63/10144 EC 604– ANTENNAS AND WAVE PROPAGATION

(Regulations 2008/2010)

(Common to PTEC 2353- Antennas and Wave Propagation for B.E (Part-Time) Fifth Semester –Electronics and Communication Engineering–Regulations 2009)

Time : Three Hours　　　　　　　　　　　　　　　　　　**Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Write the importance of radiation resistance of an antenna.

2. What is the significance of aperture of the antenna ?

3. A uniform linear array contains 50 isotropic radiation with an inter element spacing of $\lambda/2$. Find the directivity of broadside forms of arrays.

4. What is pattern multiplication and draw the pattern of 2 point sources separated by $\lambda/2$.

5. State Huygen's principle.

6. What are the merits and applications of offset feed reflector antenna ?

7. Calculate the radio horizon of a TV antenna placed at a height of 166 m. If the receiver is at a distance of 66 km, what should be the height of the receiving antenna ?

8. Write any four salient features of micro strip antenna.

9. Find the maximum distance that can be covered by a space wave, when the antenna heights are 60 m and 120 m.

10. What is Fading and how it is compensated ?

PART – B (5 × 16 = 80 Marks)

11. (a) Derive the Electric and magnetic field components of a Hertzian dipole. (16)

OR

(b) (i) Two spacecrafts are separated by 3 km. Each has an antenna with directivity D= 200 operating at 2 GHz. If craft A's receives 20 db power, what is the transmitted power by craft B ? (7)

(ii) Explain the following terms with respect to antenna :
(1) Polarization
(2) Effective aperture
(3) Directivity (9)

12. (a) (i) What is binomial array ? (2)

(ii) Draw the pattern of 10 element binomial array with spacing between the elements of $3\lambda/4$ and $\lambda/2$. (14)

OR

(b) Derive the expressions for field pattern of broad side array of n point sources. (16)

13. (a) Discuss the construction of the rectangular Horn antenna and draw the measured E – and H- plane field patterns of rectangular horns as a function of flare angle and horn length. (16)

OR

(b) A square-corner reflector has a driven $\lambda/2$ element $\lambda/2$ from the corner. (4 × 4 = 16)

(i) Calculate and plot the far-field pattern in both principal planes.

(ii) What are the HBPWs in the two principal planes ?

(iii) What is the terminal impedance of the driven element ?

(iv) Calculate the directivity from impedance of driven and image dipoles. Assume perfectly conducting sheet reflectors of infinite extent.

14. (a) (i) Differentiate V antenna from Rhombic antenna. Explain their construction and principles in detail. (8)

(ii) Explain the design details of log periodic dipole antenna. (8)

OR

(b) (i) Draw a neat block diagram for antenna radiation pattern measurement. Explain the procedure in detail. (10)

(ii) Give an account on " Helical Antenna". (6)

15. (a) (i) Describe the Troposcatter propagation. (8)

(ii) Explain the effect of Earth's magnetic field on ground wave propagation. (8)

OR

(b) Describe the theory of propagation of Electromagnetic wave through the ionosphere in the presence of external magnetic field and show that the medium acts as doubly refracting crystal. (16)

———————

51463