Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth semester B.Tech degree examinations (S), September 2020

Course Code: EC306

Course Name:Antenna & Wave Propagation

Max. Marks: 100   Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks   Marks

1 a) With a neat diagram of the experimental setup, explain how radiation pattern measurement of anantenna is carried out.   (10)

   b) Explain antenna field zones   (5)

2 a) Derive expressions for the Far Field components and Radiation Resistance of a short dipole antenna.   (12)

   b) Calculate the effective aperture of a short dipole antenna operating at 100 MHz.   (3)

3 a) State and Prove Reciprocity Theorem.   (7)

   b) The radiation intensity of the major lobe of an antenna is represented by   (8)

   $U = A_0 Cos\theta, \quad 0 < \theta < \frac{\pi}{2}, \quad 0 < \Phi < 2\pi$

   Find the maximum directivity?

PART B

Answer any two full questions, each carries 15 marks

4 a) Explain the working of a rhombic antenna and its applications.   (8)

   b) Explain the working of V antenna.   (7)

5 a) Design a Dolph –Tschebyscheff array of 10 elements with spacing of d = λ/2 between the elements and major to minor lobe ratio is 26 dB.   (15)

6 a) Derive expression for directions of pattern maxima, pattern minima and HPBW for a endfire array of 'n' elements.   (10)

   b) With neat diagrams explain the principle of operation of a Horn antenna.   (5)

PART C

Answer any two full questions, each carries 20 marks

7 a) With detailed diagrams explain the structure and modes of operation of helical antenna.   (12)

   b) Explain duct propagation.   (8)

8 a) Define Critical frequency and Maximum usable frequency.   (5)

b) With the help of neat diagrams explain the principle of operation of Log (10) PeriodicAntenna.

c) Explain Tropospheric scatter propagation. (5)

9 a) Design a rectangular microstrip antenna using a dielectric substrate with (15) dielectric constant of 2.2, h = 0.1588 cm so as to resonate at 10 GHz.

b) What is fading. Explain the diversity techniques adopted in wave propagation. (5)

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