Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021

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) Define directivity and radiation efficiency of an antenna.   6

   b) Define losses due to mismatch, ohmic and dielectric losses for a transmitting antenna. What is polarization loss?   9

2 a) Define radiation resistance of an antenna. Express it in terms of the total power radiated.   8

   b) The radiation resistance of a short dipole of length 0.1 times the wavelength is 8 ohms. Calculate the radiation resistance when the length of dipole is reduced by a factor of ½. Justify your answer.   7

3 a) Explain how the input impedance and directivity of the antenna is measured.   7

   b) Write the expression for magnetic vector potential in terms of the current source distribution, for the static case. Deduce this expression for the time varying (dynamic) case. What is retarded vector potential?   8

PART B
Answer any two full questions, each carries 15 marks

4 a) What is the principle of pattern multiplication? How is it used in the construction of binomial array?   9

   b) In a uniform linear array with progressive phase shift, find the expression for the direction of maximum radiation. From the expression, explain how the main beam direction can be varied for the array.   6

5 a) Explain Chebyshev array and write down the expression for array factor.   10

   b) Explain Binomial array   5

6 a) Explain the two major feed methods in the Parabolic reflector antenna with proper diagrams.   7

   b) Explain any two different types of travelling wave antenna structures and their radiation patterns.   8

PART C
Answer any two full questions, each carries 20 marks

7 a) Give two examples for a frequency independent radiating structures. What is the effect of truncation on them? Explain the log periodic antenna with example. (8)

    b) Distinguish between the normal and axial modes of radiation from a helical antenna. (7)

    c) Explain the concept of smart antennas. (5)

8 a) List major advantages and drawbacks of the patch antennas. (8)

    b) Explain two different feed methods in patch antennas with diagrams. (6)

    c) Define critical frequency and Maximum usable frequency. Derive relations between them. (6)

9 a) Explain with suitable diagrams, the ground wave, tropospheric and ionospheric modes of wave propagations. (8)

    b) Explain the important sources and types of atmospheric absorption and noises. (7)

    c) Explain the multi path propagation effects. (5)

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