

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

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

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|---|----|---|-----|
| 1 | a) | Define Radiation resistance, HPBW, and effective length of an antenna | (7) |
| | b) | Derive the expressions for far field pattern Electric and Magnetic fields of a short dipole excited with constant current. Derive expression for directivity of the short dipole antenna. | (8) |
| 2 | a) | Explain antenna temperature. | (8) |
| | b) | Derive reciprocity theorem for antennas. | (7) |
| 3 | a) | Explain the procedure involved in the radiation gain measurement of antenna | (8) |
| | b) | Explain how the input impedance of an antenna is measured. | (7) |

PART B

Answer any two full questions, each carries 15 marks

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|---|---|------|
| 4 | Derive expression for array factor of N isotropic sources for end-fire array. Derive expression for major lobe, minor lobes and Nulls of the array. | 15 |
| 5 | a) Design a 5 element Dolph-Chebyshev array with peak side lobe level 19.5dB | (10) |
| | b) Explain the working of V antenna | (5) |
| 6 | a) Explain the working of a parabolic dish antenna. Write down the expression for gain, HPBW and BWFN | (7) |
| | b) Explain the working of a rhombic antenna and its uses. | (8) |

PART C

Answer any two full questions, each carries 20 marks

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| 7 | (a) | Explain the working of a log periodic dipole array and explain its design steps. | (15) |
| | b) | Explain ground wave propagation | (5) |
| 8 | a) | Explain axial mode helical antenna. Write down the expression for gain, HPBW, BWFN and radiation resistance of axial mode helical antenna. | (12) |
| | b) | Neglecting the effect of earth's magnetic field derive expression for refractive index of ionosphere. | (8) |
| 9 | | Derive expression for line of sight distance and received field strength for space wave propagation | (20) |