

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 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 beam solid angle and directivity of an antenna | 9 |
| b) Draw the equivalent circuit of a receiver antenna | 6 |
| 2 a) Derive expression for far field pattern of a half wave dipole antenna and find position of Nulls and BWFN. | 10 |
| b) Explain any one method of gain measurement of an antenna | 5 |
| 3 a) A transmitter antenna transmits 10watt power at 100Mhz with efficiency 80%. The gain of the transmitter antenna is 3. The receiver antenna is at a distance 5km from transmitter which is identical to transmitter. The effective length of receiver antenna is 0.3λ . Calculate | 8 |
| a) The power density at the receiver antenna | |
| b) Electric field intensity at the receiver antenna. | |
| c) The power received by the receiver antenna. | |
| d) The voltage induced at the input terminal of the antenna | |
| b) Explain the concept of retarded potential | 7 |
| 4 Plot the radiation pattern of a 4 element linear broadside array with isotropic point sources with spacing $d = \frac{\lambda}{4}$. Find BWFN of the array, | 15 |
| 5 a) With necessary equations explain the principle of beam steering | 10 |
| b) Explain binomial array | 5 |
| 6 a) Explain the working of a rhombic antenna | 10 |
| b) Explain the principle of pattern multiplication | 5 |

- 7 Explain rectangular micro strip patch antenna and explain its design steps. 20
- 8 Derive expression for effective refractive index, critical frequency, maximum usable frequency and skip distance (assuming flat earth's surface) for sky wave propagation 20
- 9 a) Explain normal mode and axial mode helical antenna (10)
- b) Derive expression for line of sight distance for space wave propagation assuming effective radius of earth, (10)
