**18EC604**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **August, 2021** | **Electronics & Communication Engineering** | | |
| **Sixth Semester** | **ANTENNAS AND WAVE PROPAGATION** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| *Answer Question No.1 compulsorily.* | | | (1X10 = 10 Marks) |
| *Answer ONE question from each unit.* | | | (4X10=40 Marks) |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Answer all questions | | (1X10=10 Marks) |
|  | a) | Define the term “Antenna”. | 1M(CO1) |
|  | b) | What is the significance of radiation resistance of an antenna? | 1M(CO1) |
|  | c) | Define Antenna Gain. | 1M(CO2) |
|  | d) | Define radiation intensity | 1M(CO2) |
|  | e) | Define Beam width. | 1M(CO2) |
|  | f) | Define array factor. | 1M(CO2) |
|  | g) | Define pitch angle in helical antenna. | 1M(CO4) |
|  | h) | What are the advantages of microstrip antenna? | 1M(CO3) |
|  | i) | Define Duct Propagation. | 1M(CO5) |
|  | j) | Define virtual height. | 1M(CO5) |
| **UNIT I** | | | |
| 2. | a) | In detail explain the mechanism of radiation with examples. | 5M(CO1) |
|  | b) | Derive the expression for power radiated by a half wave/Quarter wave monopole antenna. | 5M(CO1) |
| **(OR)** | | | |
| 3. | a) | Discuss about potential function using Heuristic approach. | 5M(CO1) |
|  | b) | Derive the expressions for electric and magnetic field components of an alternating current element. | 5M(CO1) |
| **UNIT II** | | | |
| 4. | a) | Briefly explain the following terms:  i) Radiation Intensity ii) Half Power Beam Width iii) Directivity. | 5M(CO2) |
|  | b) | Discuss about two element array and its array factor. | 5M(CO2) |
| **(OR)** | | | |
| 5. | a) | Derive the Friis Transmission equation. | 5M(CO2) |
|  | b) | Briefly explain about Binomial array. | 5M(CO2) |
| **UNIT III** | | | |
| 6. | a) | Explain in detail about pyramidal horn antenna. | 5M(CO3) |
|  | b) | Explain parabolic reflector antenna in detail and derive its power gain equation. | 5M(CO4) |
|  |  | **(OR)** |  |
| 7. | a) | Describe the construction and operation of helical antenna under axial mode. | 5M(CO3) |
|  | b) | Describe the constructional details of cassegrain antennas and sketch its radiation characteristics. | 5M(CO4) |
| **P.T.O.**  **18EC604** | | | |
| **UNIT IV** | | | |
| 8. | a) | Briefly explain the following terms:  i) Skip Distance ii) Maximum Usable Frequency iii) Refraction of sky waves | 5M(CO5) |
|  | b) | Explain the significance of flat earth and curved considerations for tropospheric wave propagation. | 5M(CO5) |
| **(OR)** | | | |
| 9. | a) | Describe the structure of ionosphere and mechanism of radio wave propagation. | 5M(CO5) |
|  | b) | Derive the expression for field strength at a receiving point for free space propagation. | 5M(CO5) |