Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **14EC2020** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ANTENNA THEORY AND WAVE PROPAGATION** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | Derive the expression for the electric field components  to obtain radiation pattern of a center-fed  dipole antenna. Sketch the radiation pattern. | CO2 | 12 |
| b. | Distinguish between isotrophic and directional radiatiors. Sketch its radiation pattern. Given an application for each radiators. | CO1 | 4 |
| c. | The radiation resistance of an antenna is 72Ω and loss-resistance is 8Ω. What is its directvity, if the power gain is 16. | CO1 | 4 |
| (OR) | | | | |
| 2. | a. | Prove the reciprocity theorem as applied to antennas and hence show the equality of directional patterns for transmission and reception by same antenna. | CO1 | 15 |
| b. | Calculate the radiation resistance of a short dipole antenna whose length is (). | CO1 | 5 |
| 3. | a. | Derive an expression for the radiation pattern of an endfire, uniform linear array of 4 equally spaced (element spacing =) isotrophic antennas. Calculate the width of its major lobe between first nulls | CO2 | 14 |
|  | b. | Explain pattern multiplication with one example. | CO2 | 6 |
| (OR) | | | | |
| 4. | a. | Illustrate the radiation pattern of N elements binomial arrays with necessary polynomial equations. Obtain Pascal’s traiangle. Mention the advantages and disadvantages. | CO2 | 10 |
|  | b. | Obtain the array factor of N-element uniform linear array. | CO1 | 10 |
| 5. | a. | Describe the construction and basic principles of operation of a helical antenna under   1. Normal mode of operation 2. Axial mode of operation. Mention three applications. | CO3 | 20 |
| (OR) | | | | |
| 6. | a. | Draw neat sketch of Yagi antenna and explain how the radiation pattern of yagi antenna can be found. | CO3 | 10 |
|  | b. | Obtain the voltage and current relationship for two element yagi-uda antenna. | CO1 | 10 |
| 7. |  | Obtain the radiated fields of Huygens source. | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | Discuss the principle of operations which have to be gone in to the deisgn and construction of parabolic reflector antenna. | CO3 | 10 |
|  | b. | Describe the methods of feeding of a paraboloid reflector in which the primary antenna is located at the focal point. | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | With neat sketch, illustrate the layers in ionosphere. Describe how the ionospheric layers D, E, F1, F2 are fomed and how they affect the propagation of adio waves. | CO3 | 12 |
|  | b. | Explain Ground Wave Propagation with neat sketch. | CO3 | 8 |

ALL THE BEST