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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17EC3006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED RADIATION SYSTEMS** | **Max. Marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Briefly discuss the following antenna parameters:   1. Bandwidth 2. Gain 3. Efficiency 4. Input impedance. | CO1 | 10 |
| b. | Describe the concept of radiation in terms of isotropic, directional and omni directional pattern with relevant diagrams. | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Elaborate reciprocity theorem for antenna radiation patterns. | CO1 | 10 |
| b. | Explain the radiation pattern in far field with respect to radiated power. | CO1 | 10 |
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| 3. | a. | Discuss about N- element linear array with uniform amplitude and spacing. | CO2 | 10 |
| b. | Explain the difference and sum patterns for circular array pattern synthesis. | CO2 | 10 |
| **(OR)** | | | | |
| 4. |  | Describe the principle on analog and digital beam forming. | CO3 | 20 |
|  |  |  |  |  |
| 5. | a. | Explain about E & H plane sectrol horns. | CO3 | 8 |
| b. | Elaborate the functions of the following horns:   1. Pyramidal 2. Conical 3. Corrugated 4. Multimode. | CO3 | 12 |
| **(OR)** | | | | |
| 6. | a. | Elaborate the functions and features of parabolic reflector. | CO4 | 10 |
| b. | A 10m diameter reflector, with an F/D ratio of 0.5 is operating at f=3GHz. The reflector is fed with an antenna, whose primary pattern is symmetrical and which can be approximated by  Gf(θ’) = 6COS 2 θ’  Find the   1. Aperture efficiency 2. Overall directivity 3. Spillover and tapper efficiency 4. Directivity when the maximum aperture phase deviation   is π/8 rad. | CO4 | 10 |
|  |  |  |  |  |
| 7. | a. | Discuss about different feeding methods. | CO4 | 10 |
| b. | Explain in detail the rectangular patch transmission line model. | CO4 | 10 |
| **(OR)** | | | | |
| 8. | a. | Deduce the following design parameters, for rectangular patch antenna having substrate with dielectric constant of 2.2,  h= 0.1588cm, should resonate at 10GHz.   1. Width (W) 2. Effective permittivity 3. Incremental length 4. Length 5. Effective length | CO5 | 10 |
| b. | Describe about circular patch and ring antennas in detail. | CO5 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Elaborate in detail about the following polarizations:   1. Linear 2. Circular 3. Elliptical. | CO6 | 12 |
| b. | Outline the block diagram of radiation measurement instruments and discuss its working principle. | CO6 | 8 |