Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016**

**Subject Code: 2720503** **Date: 27/05/2016**

**Subject Name: Antenna Engineering Design**

**Time:10:30 am to 01:00 pm** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Define the Following:<br>(1) Radiation Impedance (2) HPBW (3) Antenna Aperture<br>(4) Gain (5) Polarization (6) Directivity (7) Beam Solid Angle | **07** |
| | **(b)** | Explain Special types of Antenna with their major applications in brief. | **07** |
| **Q.2** | **(a)** | Explain Reciprocity theorem of an Antenna. also explain near and far field concept in antenna. | **07** |
| | **(b)** | For uniform linear array of 'n' isotropic sources of equal amplitude and spacing, obtain the expression for relative electric field and AF at a far point. Also discuss the nulls, maxima and HPBW for general case also compare it with non uniform linear array. | **07** |
| | | **OR** | |
| | **(b)** | Draw equivalent circuit of an Antenna. Explain radiation mechanism in simple Dipole and Loop Antenna. | **07** |
| **Q.3** | **(a)** | Explain the Difference between Linear and circular array with suitable example. | **07** |
| | **(b)** | Explain the Smart Antenna system along with its features and benefits. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is Significance of D-T algorithm? Explain it with proper justification. | **07** |
| | **(b)** | What is the use of Phase Shifters in Phase Array Antenna design explain it in brief. | **07** |
| **Q.4** | **(a)** | What are different types of Horn Antenna? Explain any one of them with its design considerations. | **07** |
| | **(b)** | Explain application of Method of Moment (MoM) on dipole and loop antenna. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain the Geometry of Parabolic Reflector Antenna with its different types of feed. | **07** |
| | **(b)** | Discuss the factors affecting the aperture efficiency of the parabolic reflector Antenna. How does the Cassegrain reflector improve the performance of a parabolic reflector antenna? | **07** |
| **Q.5** | **(a)** | What is Surface Wave Propagation? Explain its effect on designing Micro Strip Patch Antenna with proper justification. | **07** |
| | **(b)** | Write note on Finite Difference Time Domain (FDTD) Method. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Discuss any one Antenna Optimization Techniques in brief. | **07** |
| | **(b)** | Explain Recent advances in Fractal Antenna and Patch Array. | **07** |

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