Seat No.:

Enrolment No._____

Total Marks: 70

7

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GUJARAT TECHNOLOGICAL UNIVERSITY ME Semester –III Examination Dec. - 2011

701 Date: 08/12/2011

Subject code: 732701DatSubject Name: Smart Antenna for Wireless CommunicationTime: 10.30 am - 01.00 pmTotInstructions:

1. Attempt all questions.

- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- **Q-1 (a)** Explain in brief special types of Antenna.
 - (b) The radial component of the radiated power density of an infinitesimal linear dipole of length $l \ll \lambda$ is given by

$W_{av} = \widehat{a_r} A_0 \sin^2\theta / r^2 \quad (W/m^2)$

Where A_0 is the peak value of the power density, θ is the usual spherical coordinate and $\overline{\alpha_r}$ is radial unit vector. Determine the maximum directivity of the antenna.

| Q-2 (a) (b) | Compare Fixed Beam forming and Switched beam forming networks Explain Small Scale fading, and Large Scale Path Loss. OR | 7 7 |
|----------------|--|--------|
| Q-2 (a) (b) | Explain : (i) Antenna Efficiency (ii) Beam Efficiency. Write short note on Wideband Smart antenna System. | 7 7 |
| Q-3 (a) | (i) The Vector Channel Impulse Response and the Spatial Signature.(ii) Key benefits of Smart Antenna | 4 3 |
| (b) | Draw and Explain Liner Equally Spaced (LES) Antenna Array system. | 7 |
| Q-3 (b) | Explain Spatial Diversity Combining and Sectoring for Smart Antennas. | 7 |
| Q-4 (a) (b) | Explain downloading beamforming techniques for CDMA. A vector based Approach for Range and Capacity Analysis Using Smart Antennas. OR | 7 7 |
| Q-4 (a) | Draw architecture of coherent combining array Receiver for CDMA system and Explain it. | 7 |
| (b) | Reverse Channel Performance of Multi-cell Systems with Spatial Filtering at the Base Station. | 7 |
| Q-5 (a) (b) | Explain General Model for TDOA Estimation. Explain: (i) True ranging PL Systems, (ii) Elliptical PL Systems, OR | 7 7 |
| Q-5 (a) (b) | Explain Cross correlation method for TDOA Estimation. Explain: (i) Hyperbolic PL Systems, (ii) Direction finding PL System. | 7 7 |
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