

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – VII • EXAMINATION – WINTER 2012****Subject code: 171004****Date: 27/12/2012****Subject Name: Wireless Communication****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

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

- Q.1** Answer The following. **14**
- (a) Explain channel assignment strategies for GSM Systems. **05**
- (b) Define following terms: **05**
 i) Cluster ii) RSSI iii) MAHO iv) Channel Capacity v) Dwell Time.
- (c) Explain the concept of frequency reuse for cellular communication systems. **04**
- Q.2** (a) Discuss the Okumura's prediction method with necessary equations. **07**
- (b) A cellular service provider decides to use a digital TDMA scheme which can tolerate a signal-to-interference ratio of 15 dB in the worst case. Find the optimal value of N for (a) omni directional antennas, (b) 120° sectoring, and (c) 60° sectoring. Should sectoring be used? If so, which sectoring (120° or 60°) will be better? Assume a path loss exponent $n=4$. **07**
- OR**
- (b) Compute the absolute mean path loss at $d_0=3\text{m}$ and at $d=22\text{ m}$ for a mobile radio system operated in the 2.4-to 2.48 GHz authorized band. Assume the path loss exponent is $n=3.5$. Assume the first two meters are LOS, afterwards NLOS propagation should be assumed. **07**
- Q.3** (a) What is the delay spread bound $\tau_{\max}$ of a 220-MHz public land-mobile radio (PLMR) system if $P_T=1\text{ watt (+30 dBm)}$ and $P_{R\min} = -90\text{ dBm}$? How much is $\tau_{\max}$ if the sensitivity of the receiver is improved to $P_{R\min} = -100\text{ dBm}$? **05**
- (b) Derive the expression for S/I ratio for adjacent channel interference for cellular systems. **05**
- (c) Compare cell splitting and sectoring techniques. **04**
- OR**
- Q.3** (a) Assuming six co-channel interfering cells, find the S/I ratio for path loss co-efficients of $n=3$ and $n=4$. Consider cluster size $N=7$. In which case 15 dB requirement is met? what needs to be changed to meet the same condition in second case? **05**
- (b) Explain the concept of Umbrella cell. **05**
- (c) Compare Wi-Fi and WiMAX in brief. **04**
- Q.4** (a) Briefly Describe the functions of the following for GSM Systems. i. MSC ii. VLR iii. HLR iv. AUC v. EIR. **05**
- (b) Briefly Describe Hand-off strategies in cellular system. Compare soft and hard Hand-off. **05**
- (c) Explain GSM Speech Processing in Brief. **04**
- OR**
- Q.4** (a) Derive the expression for Feher's upper bound. **05**
- (b) Compare HSCSD and GPRS. Explain briefly GPRS. **05**
- (c) What is Doppler frequency for 1850 MHz transmitter frequency and mobile is moving at 60 km/h? **04**
- Q.5** (a) Explain IS-95 CDMA System. **07**
- (b) Compare TDMA, FDMA and CDMA Technology for cellular systems. **07**
- OR**
- Q.5** (a) Explain IMT-2000 System. **07**
- (b) Write short note on CDPD.(Cellular Digital Packet Data). **07**
