GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2714401 Subject Name: Wireless Communication Theory Time: 2:30 pm to 5:00 pm Instructions:

Total Marks: 70

Date:04/01/2017

istructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) List out the selection parameters for modulation in OFDM. Explain each of 07 them in detail.
 - (b) Describe the concept of cell splitting. What will happen if we reduce the size 07 of new cell as half of the old cell? Also mention its limitations.
- Q.2 (a) A cellular service provider provides a scheme which can tolerate SIR 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 case should be used? (Assume n=4).
 - (b) Explain co-channel interference and derive the equation of Signal to 07 Interference Ratio (SIR) for hexagonal geometry with N=7.

OR

(b) Explain briefly: (1) IMSI (2) RSSI (3) LTE (4) WCDMA (5) Dwell time
 (6) LMDS (7) Chip-rate
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Q.3 (a) Suppose that a mobile station is moving along a straight smooth surface 07 between base stations BS1 and BS2. The distance between BS1 and BS2 is 2200 m. Assume that the received power in dBm at Base station is given by $P_r=P_0-10*n*\log (d/d_0)$, where d is the distance between mobile station and base station in meters. P_0 is the power at distance d_0 from the mobile. Assume that $P_0=0dBm$ and $d_0=1m$. Let n denote path loss exponent which is 3.1. Given that the minimum usable level of signal is -88dBm and the mobile is currently connected to BS1, determine the hand-off margin if hand-off time is 4.5 seconds and the mobile speed is 100 km/hr.

(b) Define multiple access technique. Compare TDMA, FDMA and CDMA. 07 OR Q.3 (a) Compare GSM technique with CDMA technique for mobile communication. 07 (b) Explain FHSS transmitter and receiver. Also explain fast and slow FHSS. 07

Q.4 (a) Give the classification of data channel and control channel and explain all the control channels in GSM.
 (b) Explain CDMA 2000 Cellular Technology
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OR

Q.4 (a) Draw frame format for a normal burst in GSM. Explain burst, frame, 07 multiframe, hyperframe, superframe.
(b) What is rake receiver? Can we use rake receiver in GSM? Why? 07

Q.5(a) Explain security aspects in Wireless Networks.07(b) Explain IEEE 802.16 standard.07OR

Q.5(a) Explain GPRS with current trends.07(b) Explain UMTS in detail.07