Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VIII • EXAMINATION – SUMMER • 2014

Subject Code: X 81102 **Date: 29-05-2014**

Subject Name: Wireless Communication

Time: 10:30 am - 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.**

Q.1 **(a)** Define the following terms: **07**

1) Dwell time 2) Holding time 3) Coherence bandwidth 4) RSSI
5) Cluster 6) GOS 7) Reverse Channel

(b) 'Directional antennas produce more gain than Omni-directional antennas.' How this feature of antennas is exploited in cellular communication? **07**

Q.2 **(a)** Derive the expression for received power for two ray ground reflection model. **07**

(b) What is a cell? Why the cell shape is assumed to be hexagonal? **07**

OR

(b) Compare the following: **07**

1) Hard Handoff and Soft Handoff
2) Microcell Zoning and Cell Splitting

Q.3 **(a)** A cellular service provider decides to use a digital TDMA scheme which can tolerate a SNI (Signal to Interference Ratio) of 15 dB in the worst case. Find the optimal value of N for **07**

1) Omnidirectional Antenna 2) 120° sectoring
3) 60° sectoring

Should the sectoring be used? If so, which sectoring (120 or 60) will be better? Assume a path loss exponent n=4.

(b) Give comparison between CDMA, FDMA and TDMA. **07**

OR

Q.3 **(a)** If a total of 25 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 KHz simplex channels to provide full duplex voice and control channels, compute the number of channel available per cell if a system uses a) 4-cell reuse, b) 7-cell reuse, and c) 12-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each for each of the three systems. **07**

(b) Explain the operation of OFDM with block diagram. **07**

Q.4 **(a)** Explain the process of Handoff in cellular system. **07**

(b) Enlist the techniques for Small-Scale Multipath measurement. Explain any one technique. **07**

OR

Q.4 **(a)** What is Small-Scale fading? Explain the factors influencing Small-Scale fading. **07**

(b) Classify Small-Scale fading based on multipath time delay spread and based on Doppler spread. **07**

Q.5	**(a)**	What is Doppler shift? In the US digital cellular system, if f_c=900 MHz and the mobile velocity is 70 km/hr., calculate the received carrier frequency if the mobile is moving a) directly toward the transmitter, b) directly away from the transmitter , and c) in a direction perpendicular to the direction of the arrival of the transmitted signal.	**07**
	(b)	Explain the process of signal processing in GSM	**07**
		OR	
Q.5	**(a)**	What is diversity? Enlist types of diversity. Explain any two.	**07**
	(b)	Write a short note on Wi-Max.	**07**

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