Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 714401N **Date: 08-01-2013**

Subject Name: Wireless Communication Theory

Time: 02.30 pm – 05.00 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 multiple access technique. Compare TDMA, FDMA and CDMA.	**07**
	(b)	(i) Prove that for hexagonal geometry, the co channel reuse ratio is given by $Q = D/R = \sqrt{3N}$, where $N = i^2 + j^2 + ij$.	**04**
		(ii) Explain channel assignment strategies in brief.	**03**
Q.2	**(a)**	List the mechanisms available to increase the system capacity and describe any one in your words.	**07**
	(b)	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) omnidirectional antennas (b) 120º sectoring and (c) 60º sectoring. Should sectoring be used? If so, which case should be used? (Assume n=4).	**07**
		OR	
	(b)	Consider the communication system in which there are total of 1000 radio channels available for handling traffic. Suppose the area of cell is 5 km^2 and the area of entire system is 2000 km^2 (i) Calculate the system capacity if N=7. (ii) If N=4, How many times would the cluster have to be replicated in order to approximately cover the entire area? Calculate the system capacity for given case. (iii) Does the decreasing cluster size increasing the system capacity? Explain.	**07**
Q.3	**(a)**	Explain all the control channels used in GSM.	**07**
	(b)	Define hard and soft handoff. With neat sketch describe simple handoff mechanism in mobile communication.	**07**
		OR	
Q.3	**(a)**	Explain GSM architecture in detail.	**07**
	(b)	With neat sketch explain TDMA frame format for GSM.	**07**
Q.4	**(a)**	Define orbit. Give advantages and disadvantages of using satellites in LEOs, MEOs and GEOs.	**07**
	(b)	What is OFDM? Explain its significance and applications.	**07**
		OR	
Q.4	**(a)**	Describe transponders with its types and derive the equation for figure of merit.	**07**
	(b)	Explain UMTS in detail.	**07**
Q.5	**(a)**	What is WLAN? Explain its architecture in detail.	**07**
	(b)	Explain co-channel interference and prove that $S/I = (\sqrt{3N})^n/i_0$	**07**
		OR	
Q.5	**(a)**	What is WIMAX? Explain the features of WIMAX.	**07**
	(b)	Explain 4G services and applications.	**07**

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