Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 714401N **Date: 23-12-2013**

Subject Name: Wireless Communication Theory

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 following with respect to Wireless Communication System **07**

1. Base Station and Mobile Station
2. Control Channel
3. Full Duplex and Half Duplex System
4. Page and Roamer
5. Hard and Soft Handoff
6. Forward and Reverse Channel
7. Subscriber

(b) If S/I ratio of 15dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is (a) n=4, (b) n= 3? Assume there are six co-channel cells in the first tier and all of them are at the same distance from the mobile. Use suitable approximations. **07**

Q.2 **(a)** Give the Comparisons of Common wireless communication system. **07**

(b) For regular hexagonal cellular system of 32 cells with a radius of 1.6km, a total spectrum allocation that supports 336 traffic channels and a reuse pattern of 7. Calculate the total service area covered with this configuration, the number of channel per cell and a total system capacity. Let the cell size be reduced to the extent that the same area as covered with 128 cells. Find the radius of the new cell and new system capacity. **07**

OR

(b) A cellular communication service area is covered with 12 clusters having 7 cells in each cluster and 16 channels assigned in each cell. Show that **07**

(a) The no. of channel per cluster are 112

(b) The system capacity is 1344

Q.3 **(a)** Define orbit. Give advantages and disadvantages of using satellites in LEOs, MEOs and GEOs. **07**

(b) Explain GSM architecture in detail. **07**

OR

Q.3 **(a)** Describe transponders with its types and derive the equation for figure of merit. **07**

(b) Explain the concept of spread spectrum and discuss any one spread spectrum system in detail. **07**

Q.4 **(a)** Define multiple access technique. Compare TDMA, FDMA and CDMA. **07**

(b) Define spectral efficiency and calculate spectral efficiency of the POCSAG paging system in terms of bps per hertz of RF bandwidth of its three specified data rates (512bps, 1200bps and 2400bps). **07**

OR

Q.4 **(a)** Explain QPSK and compare with MSK and GMSK. **07**

(b) What is OFDM? Explain its significance and applications. **07**

Q.5	**(a)**	What is WIMAX? Explain the features of WIMAX.	**07**
	(b)	Write a short note on 3G technologies.	**07**
		OR	
Q.5	**(a)**	What is WLAN? Explain its architecture in detail.	**07**
	(b)	What is WLL? Describe in detail.	**07**

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