Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2724408 **Date: 19/11/ 2016**

Subject Name: Recent Trends in Modern Wireless Communication Engineering

Time: 2:30 pm to 5:00 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)**	Explain all the variants of OFDM briefly.	**07**
	(b)	Why the name Rake Receiver is given? Explain its concept in detail.	**07**
Q.2	**(a)**	Which are the selection parameters for modulation in OFDM? Explain them in detail.	**07**
	(b)	What are the criteria to select code/sequence? Explain the general block diagrams of DSSS transmitter and receiver.	**07**
		OR	
	(b)	How OFDM is different than other existing techniques? Explain OFDM with neat block diagram.	**07**
Q.3	**(a)**	Explain FHSS transmitter and receiver. Also explain fast and slow FHSS.	**07**
	(b)	A recorded conversation is to be transmitted by a pseudo noise spread spectrum system. Assume that the spectrum of the speech waveform is band-limited to 3 kHz and use 128 quantization levels. (a) Find out the chip rate required to obtain a processing gain of 30 dB. (b) Given that the sequence length is to be greater than 5 hours, find out the number of shift register stages required.	**07**
		OR	
Q.3	**(a)**	Differentiate Single User MIMO, Multi User MIMO and Multi-cell MIMO briefly.	**07**
	(b)	A direct sequence spread spectrum has a PN code rate of 192 Mcps and a binary message bit rate at 750 bps. (a) If quadriphase modulation is used, find out PG. (b) Assuming received power is 40 femto (f) watts and the one sided noise spectral density level is 16 zepto (z) W/Hz. Find the signal to noise power ratio in the input bandwidth of the receiver.	**07**
Q.4	**(a)**	Explain MIMO applications in 3G wireless systems.	**07**
	(b)	Explain frequency diversity and the systems based on frequency diversity.	**07**
		OR	
Q.4	**(a)**	What is WCDMA? Compare WCDMA with 3GPP conceptually.	**07**
	(b)	Compare microscopic and macroscopic diversity and explain space diversity.	**07**
Q.5	**(a)**	Explain 3G SDR system architecture.	**07**
	(b)	Explain GPRS with current trends.	**07**
		OR	
Q.5	**(a)**	Define cognitive radio and explain present trends and future of SDR.	**07**
	(b)	Explain features of 4G and list all the possible applications of 4G.	**07**

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