Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VIII • EXAMINATION – SUMMER • 2015

Subject Code: X81102 **Date:11/05/2015**

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 followings: **07**

1) Cell
2) Cluster
3) Channel Capacity
4) RSSI
5) MAHO
6) Dwell Time
7) Cell Dragging

(b) What is frequency reuse ratio? How it is related to S/I? **07**

Q.2 **(a)** Prove that for hexagonal symmetry, the co-channel reuse ratio is given by Q = (3N)^0.5 **07**

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

OR

(b) Explain GSM signal processing in detail with the aid of block diagram **07**

Q.3 **(a)** Compare TDMA and CDMA for mobile communication. **07**

(b) A hexagonal cell within a four cell system has a radius of 1.387 km. A total of 60 channels are used within the entire system. If the load per user is 0.029 Erlangs, and λ = 1 call/hour, compute the following for an Erlang C system that has a 5% probability of a delayed call (Consider Erlang C Chart, for 5% probability of delay with C = 15, traffic intensity= 9 Erlangs) **07**

a) How many users per square kilometer will this system support?
b) What is the probability that a delayed call will have to wait for more than 10 s?
c) What is the probability that a call will be delayed for more than 10 seconds?

OR

Q.3 **(a)** Describe architecture of GSM subsystems MSC and BSC. **07**

(b) Solve the followings **07**

1) Find the Fraunhofer distance for an antenna with maximum dimension of 1 m and operating frequency of 900 MHz. If antenna has unity gain, calculate the path loss.
2) If a transmitter produces 50 W of power, express the transmit power in units of a) dBm b) dBW. If 50 W is applied to a unity gain antenna with a 900 MHz carrier frequency, find the received power in dBm at a free space distance of 100 m from the antenna. What is P_r (10 km)? Assume unity gain for the receiver antenna.

Q.4	**(a)**	Enlist the functions of GPRS and explain the GPRS architecture.	**07**
	(b)	Compare hard handoff and soft handoff.	**07**
		OR	
Q.4	**(a)**	Which are different multipath channel measurement techniques? Discuss any one of these techniques.	**07**
	(b)	Classify the small-scale fading & explain the frequency selective fading.	**07**
Q.5	**(a)**	Which are different multipath channel measurement techniques? Discuss any One of these techniques.	**07**
	(b)	Write a short note on the followings a) Cell sectorization. b) Micro cell zone concept.	**07**
		OR	
Q.5	**(a)**	Compare Wi-Fi and Wi-Max standards with reference to important system Parameters.	**07**
	(b)	Write a short note on Ad-Hoc network.	**07**

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