GUJARAT TECHNOLOGICAL UNIVERSITY PDDC - SEMESTER-VIII • EXAMINATION – WINTER • 2014

	Su Su	bject Code: X 81102 Date: 01-12-2014 biect Name: Wireless Communication	
	Ti Ins	me: 02:30 pm - 05:00 pm Total Marks: 70 tructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks.	
Q.1	(a)	 Describe the following terms: (I) Cell (II) Cluster (III) Channel Capacity (IV) RSSI (V) MAHO (VI) Dwell Time (VII) Cell Dragging 	07
	(b)	Compare 2.5G TDMA standards: HSCSD,GPRS, and EDGE	07
Q.2	(a) (b)	Explain the classification of GSM channels. With the help of block diagram, explain the IS 95 CDMA forward channel in detail	07 07
	(b)	Explain GSM signal processing in detail with the aid of block diagram.	07
Q.3	(a) (b)	Prove that for hexagonal symmetry, the co-channel reuse ratio is given by $Q=\sqrt{(3N)}$ A cellular service provider decides to use a digital TDMA scheme which can tolerate a signal-to-interference ratio of 15 dB in the worst case. Find the optimal value of N for (a) Omni-directional antennas, (b) 120° sectoring, and (c) 60° sectoring. Should sectoring be used? If so, which sectoring $(120^{\circ} \text{ or } 60^{\circ})$ will be better? Assume a path loss exponent $n=4$.	07 07
Q.3	(a)	The coverage area of a cellular system is 2000 sq km with each cell having radii of 5 sq km, and there are total of 1000 radio channels available for handling the traffic. a) Calculate the system capacity for 7 cell-reuse	07
		b) If N=4, How many times the cluster has to be replicated in order to approximately cover the entire cellular area? Also calculate the system capacity.	
		Does decreasing the cluster size increase the system capacity? Explain.	
	(b)	Discuss Okurmura's outdoor propagation model with necessary equations.	07
Q.4	(a)	Derive the expression for received power for two ray ground wave reflection model. Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz. For a	07 07
	(D)	(a) directly toward the transmitter, (b) directly away from the transmitter, and (c) in a direction which is perpendicular to the direction of arrival of the transmitted signal.	

- Q.4 (a) Classify the small-scale fading & explain the frequency selective fading. 07
- Q.4 (b) Given the following geometry, determine the loss due to knife-edge diffraction. Assume 07 f=900 MHz (Hint use $G_d(dB)=20\log(0.225/v)$



Q.5	(a)	Write a short note on Ad-Hoc network.	07
	(b)	Compare TDMA, FDMA, and CDMA technologies for cellular systems	07
		OR	
Q.5	(a)	Write a short note on Wi-Max.	07
	(b)	Write a brief note on OFDM	07
