Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3171004 Date:03/06/2022

Subject Name:Wireless Communication

Time:02:30 PM TO 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define : a) Forward Channel b) Roamer c) Control Channel	**03**
	(b)	Draw and explain various upgrade paths for 2G technologies.	**04**
	(c)	Explain cell splitting. Derive the relationship between transmit power of smaller cell and larger cell for n=3. State advantage and disadvantage of cell splitting.	**07**
Q.2	**(a)**	Compare the handoff procedure for first generation and second generation of wireless communication.	**03**
	(b)	Define adjacent channel interference. State the causes of its generation. Discuss solution for it.	**04**
	(c)	A city has an area of 1000 square kms. It is covered by seven cell reuse pattern. Each cell has radius 4 kms. The bandwidth allocated is 25 MHz. Full duplex channel bandwidth is 50 KHz. GOS of 2% is specified for Erlang B system. User traffic is 0.03 Erlangs. Find a) No. of cells in service area. b) Traffic intensity per cell c) Total number of users that can be served d) No. of mobile per channel e) theoretical maximum number of users that can be served at one time. A= 60 Erlangs for 71 channels A= 70 Erlangs for 80 channels	**07**
		OR	
	(c)	A cellular service provider has decided to use a digital TDMA scheme which can tolerate a signal-to-interference ratio of 18 dB. Find the optimal value of N for a) omni directional antenna b) 120 sectoring and c) 60 sectoring. What is the best choice among three? (n=4)	**07**
Q.3	**(a)**	Compare flat fading and frequency selective fading.	**03**
	(b)	Explain factors affecting small scale fading.	**04**
	(c)	If 40 W power is applied to a unity gain antenna with maximum dimension 1 m and operating frequency of 900 MHz. Find the received power in dBm at a free space distance of a) 100 m, b) 10 Km and c) 5 m using free space propagation model.	**07**
		OR	
Q.3	**(a)**	Compare fast fading and slow fading.	**03**
	(b)	List methods used for small scale multipath measurement. Explain any one in detail.	**04**
	(c)	List and explain basic propagation mechanisms	**07**
Q.4	**(a)**	Draw the Block diagram of GSM system architecture.	**03**
	(b)	List and explain all Dedicated Control Channels.	**04**

	(c)	Explain working of Rake receiver with help of block diagram.	**07**
		OR	
Q.4	**(a)**	Explain the process by which CDMA system resolves near far problem.	**03**
	(b)	List various CDMA forward Channels. Explain functioning of each channel.	**04**
	(c)	Explain signal processing in GSM using neat diagrams.	**07**
Q.5	**(a)**	A normal GSM time slot consists of six trailing bits, 8.25 guard bits, 26 training bits and two traffic bursts of 58 bits of data, find the frame efficiency.	**03**
	(b)	Explain CSMA protocols in detail.	**04**
	(c)	Explain working and features of MANET.	**07**
		OR	
Q.5	**(a)**	List and explain working of various devices used in 802.11 networks.	**03**
	(b)	Compare Zigbee and Bluetooth. (Any four points)	**04**
	(c)	Define FDMA. Discuss any four features of FDMA. Explain nonlinear effects in FDMA.	**07**

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