Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3171004 Date:14-12-2023

Subject Name: Wireless Communication

Time: 10:30 AM TO 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Justify frequency reuse in cellular system improves capacity**.**	**03**
	(b)	Define the following terms with reference to wireless communication: 1. 3GPP 2. LTE 3. Hand-Over 4. Full-Duplex system	**04**
	(c)	Prove that $D = \sqrt{(3(i^2+ij+j^2))}R$. Draw necessary diagram.	**07**
Q.2	**(a)**	Describe evolution of 1G, 2G and 3G mobile phone systems.	**03**
	(b)	Discuss practical hand off issues and their solutions.	**04**
	(c)	For a regular cellular structure with equal size hexagonal cells, show that $D/R = (21)^{1/2}$, Where D is the minimum distance between the centres of adjacent cells and R is the radius of each cell. Assume 7-cell reuse pattern.	**07**
		OR	
	(c)	Explain with necessary diagram effect of co-channel cell. Derive the expression for signal to interference considering only first tire of co channel cells. What will be the case if worst situation occur?	**07**
Q.3	**(a)**	What is diffraction? Explain	**03**
	(b)	Give complete classification of types of small-scale fading.	**04**
	(c)	Derive an expression for the received power for a two-ray reflection point to point mobile communication propagation model. Assume path loss exponent n=4.	**07**
		OR	
Q.3	**(a)**	What is power delay profile of received signal? Explain with the figure.	**03**
	(b)	Draw GSM frame structure and RACH burst structure.	**04**
	(c)	Discuss speech processing in GSM	**07**
Q.4	**(a)**	Draw the forward channels in IS-95 System with labeling of each block.	**03**
	(b)	Discuss the benefits and features of CDMA over FDMA and TDMA.	**04**
	(c)	Describe: Time Division Multiple Access (TDMA) in detail. Write the equation for efficiency of TDMA and The number of channels in	**07**

TDMA system

OR

Q.4	**(a)**	Explain the spread spectrum technology along with its advantages.	**03**
	(b)	Discuss Inter-MSC hand off procedure in GSM with neat signalling diagram.	**04**
	(c)	A unit gain antenna with a maximum dimension of 1 m produces 50 W power at 900 MHz. Find (i) the transmit power in dBm and dBW, (ii) the received power in dBm at a free space distance of 100 m.	**07**
Q.5	**(a)**	What is ZigBee? Explain in details ZigBee networks	**03**
	(b)	Explain Micro Cell Zone Concept.	**04**
	(c)	Draw and Explain GSM system architecture	**07**

OR

Q.5	**(a)**	What is Huygen's principle?	**03**
	(b)	Explain wireless Ad-Hoc network	**04**
	(c)	Explain the working of UWB radio. Discuss the features, advantages and disadvantages of UWB technology	**07**