

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VII EXAMINATION – SUMMER 2026

Subject Code:3171608

Date:01-06-2026

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) Explain the concept of Wireless Local Area Network (WLAN).	03
	(b) What is the primary function of Bluetooth technology in personal area networks (PANs)?	04
	(c) Discuss the major trends in cellular radio and personal communication systems, highlighting advancements from the second generation (2G) to the fourth generation (4G).	07
Q.2	(a) What is the concept of frequency reuse in a cellular system?	03
	(b) Discuss the role of the Distance-to-Frequency Reuse Ratio in cellular systems and its impact on interference.	04
	(c) In a cellular system with a hexagonal cell layout, the distance between the centers of two cells using the same frequency is 6 km. If the cell radius is 2 km, calculate: a) The frequency reuse factor (N). b) The total number of cells that can be accommodated in a 100 km x 100 km area.	07
	OR	
	(c) A cell is divided into 6 sectors. If each sector requires 25 channels and the total number of channels available in the system is 300, calculate: a) The number of cells that can be fully equipped with the given channels. b) The number of channels allocated to each cell, assuming each cell is fully sectorized.	07
Q.3	(a) Briefly explain the concept of Rayleigh fading.	03
	(b) What is meant by 'multipath fading'? Discuss its impact on communication systems.	04
	(c) Explain the GSM Architecture	07
	OR	
Q.3	(a) What is the main difference between Line-of-Sight (LOS) and Non-Line-of-Sight (NLOS) path loss models?	03
	(b) Explain the concept of 'shadowing' and 'scattering' in radio propagation and its impact on signal strength.	04
	(c) Explain the GPRS Architecture	07
Q.4	(a) What is the primary difference between FDMA and CDMA in terms of how they manage channel access?	03
	(b) Describe the security mechanisms used in GSM to	04

- protect user data and ensure network security. Include authentication and encryption processes.
- (c) Describe the architecture of the IS-95 CDMA system. Include the major components and their functions, and explain how they interact to provide mobile communication services **07**
- OR**
- Q.4** (a) Define TDMA and provide an example of its application in wireless communication. **03**
- (b) Explain the concept of OFDM and its advantage over traditional multiple access techniques. **04**
- (c) Describe the GSM handover process and its significance for maintaining seamless communication. Include the types of handovers and the key steps involved in the handover process. **07**
- Q.5** (a) What is the function of the CDMA reverse channel in a CDMA system? **03**
- (b) Briefly describe the key characteristics of Wi-Fi and WiMAX technologies. **04**
- (c) Explain the concept and benefits of Soft Handoff in CDMA networks. Discuss how it improves call quality and network reliability. **07**
- OR**
- Q.5** (a) What is the primary advantage of using CDMA2000 over IS-95 **03**
- (b) Explain the key differences between Wi-Fi and ZigBee in terms of their application areas and technology. **04**
- (c) Compare and contrast WiMAX and UWB (Ultra-Wideband) technologies in terms of their applications, bandwidth capabilities, and communication range. **07**
