

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

Subject Code:2171004

Date:23-05-2025

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.
- Simple and non-programmable scientific calculators are allowed.

- Q.1**
- (a) Enlist the various functions of Mobile Switching Centre (MSC). **03**
- (b) Define the following terms regarding wireless communication: **04**
- (1) ISM bands
 - (2) Diffraction
 - (3) Set up channels
 - (4) Multipath fading
- (c) Explain the different generations of wireless communication. **07**

- Q.2**
- (a) Why hexagonal cell shape is preferred over square or triangular cell shape to represent the cellular architecture. **03**
- (b) Explain the Adjacent and Co channel interference with the help of example. **04**
- (c) Define cell splitting. Explain how it is helpful to improve coverage and capacity in cellular systems. **07**

OR

- (c) Explain ground reflection (Two-ray) Model with figure and derive the equation for Electric Field E TOTAL, Path Difference(Δ), Phase Difference (θ_{Δ}) and Time Delay(τ_d) **07**

- Q.3**
- (a) Compare Wi-Fi with Wi-MAX technology. **03**
- (b) Derive the expression for Feher's upper bound. **04**
- (c) By assuming cosine law and the hexagonal cell geometry, Prove that for a hexagonal geometry, the co-channel reuse ratio is given by $Q = (3N)^{1/2}$, where $N = i^2 + j^2 + ij$ **07**

OR

- Q.3**
- (a) Explain the process by which CDMA system resolves near far problem. **03**
- (b) Define the following terms. **04**
- (1) GOS
 - (2) RSSI
 - (3) Forward channel
 - (4) Umbrella cell
- (c) Discuss Hand off strategy and its types. Discuss the proper and improper handoff situations. **07**

- Q.4 (a)** What is the significance of Frequency Reuse concept? **03**
- (b)** Explain channel assignment strategies in brief. **04**
- (c)** Draw Global System for Mobile Communication (GSM) architecture with the help of block diagram. Discuss each block in brief. **07**
- OR**
- Q.4 (a)** Discuss the concept of spread spectrum. **03**
- (b)** Enlist and explain the factors influencing small scale fading. **04**
- (c)** Explain CDMA forward channel operation in detail. **07**
- Q.5 (a)** Enlist the security issues of wireless networks. **03**
- (b)** State the important steps to establish the call in GSM. **04**
- (c)** Enlist various multiple access schemes used in wireless communications and explain FDMA in detail. **07**
- OR**
- Q.5 (a)** Compare flat fading and frequency selective fading. **03**
- (b)** Discuss about software defined radio. **04**
- (c)** Describe various GSM logical and physical channels. **07**
