Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2021**

**Subject Code:2171004 Date:05/08/2021**

**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.**

| | | | MARKS |
|---|---|---|---|
| **Q.1** | **(a)** | Define the following terms regarding wireless communication: Half duplex channel, Base station, Mobile Switching Center | **03** |
| | **(b)** | Explain coherence bandwidth. | **04** |
| | **(c)** | Compare Wi-Fi and Wi-MAX system parameters | **07** |
| **Q.2** | **(a)** | Define large scale propagation model. | **03** |
| | **(b)** | Assume a receiver located 10 km from a 50 W transmitter .The carrier frequency is 900MHz. Free space propagation is assumed. Gt=1 and Gr=2. Find the power at the receiver. | **04** |
| | **(c)** | Derive an expression for a ground reflection model assuming distance between transmitter and receiver antenna is very large compare to heights of the antennas. | **07** |
| | | **OR** | |
| | **(c)** | Discuss the Okumura's prediction method with necessary equations. | **07** |
| **Q.3** | **(a)** | Explain TDMA/FDD and FDMA/FDD. | **03** |
| | **(b)** | Explain the following terms with respect to wireless networks: (i) Frequency Reuse (ii) Co-channel interference (iii) handoff (iv) Umbrella cell approach | **04** |
| | **(c)** | Calculate the worst case carrier to interference ratio for a mobile receiver located at the boundary of its serving cell if it is under the influence of interfering signals from two nearest co-channels cells in a cellular system. Assume 3-sectors per cell and a reuse pattern of 4. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Why is hexagonal cell shape preferred over square or triangular cell shape to represent the cellular architecture. | **03** |
| | **(b)** | Explain the concept of Cell splitting in detail with figure. | **04** |
| | **(c)** | Discuss the fixed channel allocation, Channel borrowing and dynamic channel allocation techniques in cellular systems. | **07** |
| **Q.4** | **(a)** | Define mean excess delay, rms delay spread and excess delay spread. | **03** |
| | **(b)** | Describe the factors influencing small scale fading. | **04** |
| | **(c)** | Explain the following diversity techniques briefly: 1. Space diversity techniques 2. Frequency diversity techniques | **07** |

**OR**

| | | | |
|---|---|---|---|
| **Q.4** | **(a)** | What is diversity? | **03** |
| | **(b)** | Describe the concept of Doppler effect with relevant mathematical expressions. | **04** |
| | **(c)** | Describe the types of small scale fading based on multipath time delay spread only. | **07** |
| **Q.5** | **(a)** | Discuss the concept of spread spectrum. | **03** |
| | **(b)** | What is a non linear effect in FDMA? | **04** |
| | **(c)** | Explain in brief: (i) Wi - Fi (ii) Wi Max | **07** |

**OR**

| | | | |
|---|---|---|---|
| **Q.5** | **(a)** | List the security issues of wireless networks | **03** |
| | **(b)** | Write a short note on Bluetooth. | **04** |
| | **(c)** | Describe RAKE receiver in CDMA. | **07** |

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