

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2022****Subject Code:2171004****Date:06/06/2022****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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Discuss in a detail about the major tradeoff between channel capacity and Co-channel interference in cellular system.	<b>03</b>
	(b) Explain Handoff mechanism in mobile communication with their types and important parameters.	<b>04</b>
	(c) Derive the formula to find the signal to interference ratio for hexagonal cell shape in cellular environment. A cellular service provider decides to use digital TDMA system which can tolerate a signal to interference ratio is 15 dB in worst case. Find the optimal value of cluster size (N) for omni directional antenna, Assume path loss component $n=4$ .	<b>07</b>
<b>Q.2</b>	(a) Discuss channel assignment strategies in mobile in communication? State the difference between voice channel and control channel.	<b>03</b>
	(b) What is near-far problem in mobile communication? Suggest the steps to reduce near-far effect.	<b>04</b>
	(c) Explain cell splitting concepts in a brief and shed the light on importance of cell splitting in communication.	<b>07</b>
<b>OR</b>		
	(c) What is Micro-cell zone concept? Explain the concept in a brief and enlist the merits of Micro-cell zone concept over conventional cellular structure.	<b>07</b>
<b>Q.3</b>	(a) State the difference between large and small-scale propagation loss?	<b>03</b>
	(b) What are the Fresnel zones? How the signals are differed if they came out from two different Fresnel zone at receiver?	<b>04</b>
	(c) Derive the equation for Frill's formula and solve the following problem.  In a communication system, transmission power is of 50 W, gain of transmitter and receiver are unity and the distance between transmitter and receiver is 2 K.M. Find the received power in decibel. Assume operating frequency is 900 MHz and consider line of sight Communication between transmitter and receiver.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) State the difference between coherence bandwidth and coherence time and explain how rms delay spread and doppler effect plays important role in deciding these two parameters.	<b>03</b>
	(b) Explain following terms in a detail: 1. Frequency selective Fading    2. Flat fading	<b>04</b>

- (c) Derive the equation for doppler frequency. Find the doppler frequency in following three cases, if the transmitter is moving with 60 miles/hour, assume operating frequency is 1850 MHz **07**
- (a) Transmitter is moving directly towards receiver
  - (b) Transmitter is moving away from receiver
  - (c) Transmitter is moving perpendicular towards receiver.
- Q.4** (a) Explain Time Division Multiplexing (TDMA) and state the merits of TDMA over Frequency Division Multiplexing (FDMA). **03**
- (b) Explain Frequency Hopping concept in CDMA with example. **04**
- (c) Draw transmitter and receiver structure of CDMA system and give the proper insight about their working for the case of Direct Spread Spectrum (DSSS). **07**
- OR**
- Q.4** (a) State the important steps to establish the call in GSM. **03**
- (b) What is OFDM scheme? How it is differed than FDM? **04**
- (c) Explain and draw GSM architecture with all the important components and elaborate their functions in a detail. **07**
- Q.5** (a) Explain functionality of following GSM channels. **03**
- 1. Paging Channel
  - 2. Random Access Channel
  - 3. Access Grant channel
- (b) What is a rake receiver, state their importance in communication? **04**
- (c) Draw the frame structure of GSM with all the important fields and explain GSM frame hierarchy. **07**
- OR**
- Q.5** (a) Explain Bluetooth technology with the important parameters. **03**
- (b) State the difference between Wi-Fi and WiMAX technology. **04**
- (c) What is ZigBee, Explain the Zigbee technology with proper insight. **07**