**2023**

**Wireless and Mobile Communication**

*Full Marks: 100*

Time: Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer **any five** questions.*

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| 1 | a) | What do you mean by channel capacity in a cellular system? Describe how do cell splitting and cell sectoring increase the channel capacity. | 10 |
| | b) | What is handoff? Cite some practical handoff problems. What is an "umbrella cell" approach? | 2+5+3=10 |
| 2 | a) | Explain how does a microcell zone approach help in reducing the no. of handoffs required when sectoring is employed? | 5 |
| | b) | Describe the GSM system architecture and the various interfaces used in GSM. What are the variousGSM control channels. | 8 |
| | c) | Describe the bluetooth protocol stack. | 7 |
| 3 | a) | Write down the salient features of Bluetooth technology. What are the various Bluetooth connection modes? Explain. | 2+6=8 |
| | b) | The coverage area of a cellular system is 2000 sq. km with cell having a radius of 5 sq. km, and there are a total of 1000 radio channels available for handling the traffic. Calculate the system capacity for 7-cell reuse. If N=4, how many times the cluster has to be replicated to approximately cover the entire area. Calculate the system capacity for the given case. | 6 |
| | c) | Does decreasing the cluster size increase the system capacity? Explain. | 2 |
| | d) | Write down the important features of FDMA. | 4 |
| 4 | a) | Explain the designing of an omnidirectional antenna system in the worst case scenario of a cellular system. | 9 |
| | b) | Explain how does frequency reuse distance, D influences co-channel interference? Draw a 4-cell reuse pattern. | 5 |
| | c) | Explain the bluetooth frame format. | 6 |

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|---|---|---|---|
| 5 | a) | State the channel characteristics of CDPD, ARDIS and RMD. | 10 |
| | b) | Describe some important steps in the channel coding stage of OFDM. | 6 |
| | c) | For a 7-cell reuse system and $120^0$ sectoring, the no, of interferers in the first tier is reduced from 6 to 2. Find the improved SIR. Take path loss exponent as 4. | 4 |
| 6 | a) | Discuss the basic principle behind OFDM? What important advantages are provided by OFDM over conventional FDM. | 5 |
| | b) | Explain the important stages of OFDM system with proper diagram. | 8 |
| | c) | Explain Nyquist criterion for zero ISI and raised cosine spectrum. | 7 |
| 7 | | Write short notes on- i) WiMAX, ii) forward and reverse channels of IS-95, iii) functions of L2CAP, iv) Inter symbol interference in wireless communication and its causes. | 5 x 4=20 |

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