Code No: R193204A **R19** **SET - 1**

III B. Tech II Semester Regular Examinations, June-2022

CELLULAR & MOBILE COMMUNICATION

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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UNIT-I

1. a) Explain the different components of a cellular system. [8M]

   b) Explain the need for cell splitting. Also explain two kinds of cell splitting techniques. [7M]

(OR)

2. a) Explain the significance of delay spread and coherence bandwidth in mobile radio environment due to multipath reflection phenomenon. [8M]

   b) If an average calling time is 1.76 min and maximum calls per hour in one cell be 3000, find the offered load in erlangs. [7M]

UNIT-II

3. a) Define co-channel Interference. Explain about co-channel interference reduction factor. [8M]

   b) Discuss the design of an omni directional antenna system in k = 7 cell pattern when the mobile unit is at the cell boundary. [7M]

(OR)

4. a) Diversity scheme applied at the receiving end of the antenna is an effective technique for reducing interference. Justify. [8M]

   b) What are different types of non-co-channel interference in a cellular system? [7M]

UNIT-III

5. a) Explain about paging channels. [8M]

   b) Discuss the effects of human made structures on cell coverage. [7M]

(OR)

6. a) Explain the methods of channel assignment to the mobile units in detail. [8M]

   b) In a mobile radio environment, the average cell-site antenna height is about 50 m, the mobile antenna height is about 3 m, and the communication path length is 5 km. Find [7M]

      (i) Incident angle

      (ii) Elevation angle at the antenna of the mobile unit

UNIT-IV

7. a) Explain in detail the need for hand off and determine the probability of requirement of hand off. [8M]
   b) Write short notes on [7M]
      (i) Mobile assisted handoff
      (ii) Intersystem handoff

(OR)

8. a) Explain soft and hard handoffs. [8M]
   b) What is meant by a dropped call? Explain the factors that influence the dropped call rate. [7M]

UNIT-V

9. a) With suitable block diagram explain the GSM system. [8M]
   b) Discuss the salient features of FDMA and TDMA techniques. [7M]

(OR)

10. a) What is TDMA? Explain TDMA architecture with neat diagram. [8M]
    b) Explain the capabilities and applications of 5G communications. [7M]

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CELLULAR & MOBILE COMMUNICATION

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Time: 3 hours Max. Marks: 75

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All Questions Carry Equal Marks
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UNIT-I

1. a) Why the shape of a cell is represented with hexagon? Explain with an example. [8M]
   b) Explain the significance of frequency reuse in cellular systems. [7M]

(OR)

2. a) Illustrate the modeling of transmission medium in mobile radio environment. [8M]
   b) During a busy hour, the number of calls per hour for each of 10 cells is 2000,1500, 3000, 500,1000, 1200, 1800, 2500, 2800, 900. Assume that 60 percent of the car phones will be used during this period and that one call is made per car phone, Calculate the total allowed subscriber traffic in the system. [7M]

UNIT-II

3. a) Describe how to find the cochannel interference area from a mobile receiver. [8M]
   b) Explain the occurrence of near end far end interference in the following cases: [7M]
   (i) One cell (ii) Cells of two systems

(OR)

4. a) Discuss the method of finding C/I ratio in a directional antenna system for 3-sector case in 7-cell reuse pattern. [8M]
   b) Derive C/I from a normal case in a omnidirectional antenna system. [7M]

UNIT-III

5. a) Explain the process of selecting a voice channel for: [8M]
   (i) Mobile originating calls (ii) Paging calls
   b) Explain the concept of overlaid cells with neat diagrams. [7M]

(OR)

6. a) Explain the process of numbering and grouping the channels. [8M]
   b) Explain the concept of point-to-point model and its merits. [7M]

UNIT-IV

7. a) How can handoff be initiated at the boundary of two cells, based upon threshold point considering signal at two base stations. [8M]
   b) Explain about intersystem and intra system handoffs. [7M]

(OR)

8. a) Queuing of handoffs is more effective than two threshold level handoffs. Justify. [8M]
   b) Explain various vehicle locating methods. [7M]

UNIT-V

9. a) What are the channel types of GSM system? Explain [8M]
   b) What problems does OFDMA solve? How does OFDMA work? [7M]

(OR)

10. a) Explain services and features of TDMA. [8M]
    b) Explain the key differences between GSM, CDMA and LTE. [7M]

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Code No: R193204A **R19** **SET - 3**

III B. Tech II Semester Regular Examinations, June-2022

CELLULAR & MOBILE COMMUNICATION

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Describe the performance criteria of Cellular mobile systems. [8M]
   b) Explain the concept of cell sectoring. [7M]

(OR)

2. a) Propagation path loss increases not only with frequency but also with distance. Justify. [8M]
   b) If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses: (i) 4-cell reuse (ii) 7-cell reuse (iii) 12-cell reuse [7M]

UNIT-II

3. a) Describe how to find the cochannel interference area which affects a cell site. [8M]
   b) Write a short note on adjacent channel interference. [7M]

(OR)

4. a) Outline the two frequency reuse schemes and explain N-Cell reuse pattern in detail for four and seven cell reuse with illustrative diagrams. [8M]
   b) Discuss the method of finding C/I ratio in a directional antenna system for 6-sector case in 7-cell reuse pattern. [7M]

UNIT-III

5. a) Describe the fixed channel assignment schemes in detail. [8M]
   b) Derive the phase difference between direct and reflected paths. [7M]

(OR)

6. a) Explain the concept of channel sharing and borrowing. [8M]
   b) Derive the general formula for mobile radio propagation. [7M]

UNIT-IV

7. a) Explain how the handoffs implemented based on signal strength. [8M]
   b) How the dropped call rate is related to the capacity and voice quality. [7M]

(OR)

8. a) What are the various methods of delaying the handoff? Explain briefly. [8M]
   b) What is meant by handoff initiation? Explain the different methods of handoff initiation with suitable diagrams. [7M]

UNIT-V

9. a) Why CDMA is needed and explain it with an example? [8M]
   b) List the difference between TDMA/FDMA/CDMA. [7M]

(OR)

10. a) Explain GSM architecture in detail. [8M]
    b) Write a short note on TDMA structure frame length and frame offset. [7M]

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Code No: R193204A **R19** **SET - 4**

III B. Tech II Semester Regular Examinations, June-2022

CELLULAR & MOBILE COMMUNICATION

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 75

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All Questions Carry Equal Marks
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UNIT-I

1. a) What are the limitations of conventional mobile telephone system? [8M]
   b) Compare macro, micro, femto and picoradio coverage cells in cellular networks. [7M]

(OR)

2. a) Describe the operation of the cellular mobile system. [8M]
   b) If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses 7-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell. [7M]

UNIT-II

3. a) Describe the real-time cochannel interference measurement at mobile radio transceivers. [8M]
   b) Explain how the interference is reduced by means of directional antennas. [7M]

(OR)

4. a) Discuss the three cases where lowering the antenna height may or may not help reduce the interference. [8M]
   b) Define the co-channel interference reduction factor and derive the expression for it. [7M]

UNIT-III

5. a) Compare fixed and non-fixed channel assignment methods. [8M]
   b) Discuss the propagation of mobile radio signals over water between two fixed stations. [7M]

(OR)

6. a) Describe about setup channels and access channels. [8M]
   b) Obtain path-loss from a point-to-point prediction model. [7M]

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UNIT-IV

7. a) What are the different types of handoffs? Explain how to implement them? [8M]
   b) Compare soft and hard handoffs. [7M]

(OR)

8. a) Explain two-hand-off-level algorithms. [8M]
   b) What is mobile assisted handoff? Explain. [7M]

UNIT-V

9. a) What is WiMax? Explain the standard features of WiMax. [8M]
   b) With suitable block diagram explain the GSM system. [7M]

(OR)

10. a) List out the key differences between 3G and 4G communications. [8M]
    b) What is GPRS? Explain the features and benefits of GPRS. [7M]

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