Roll No. ..... Total Pages : 04

BT-8/M-19 38139

WIRELESS AND MOBILE COMMUNICATION

ECE-402N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section.

Section I

1. (a) Explain the principle of Cellular Networks and various types of Handoff techniques. 8

   (b) Under what circumstances, static channel assignment is normally used ? 4

   (c) Distinguish between a cell and a cell site. 3

2. (a) What are advantages of cellular mobile communication systems over conventional mobile telephone system ? 8

   (b) Describe the step-by-step procedure for placing a call from a calling mobile subscriber to a called landline telephone subscriber. 7

Section II

3. (a) Discuss the similarities and differences between a conventional cellular radio system and a space-based (satellite) cellular radio system. What are the advantages and disadvantages of each system ? Which system could support a larger number of users for a given frequency allocation ? Why ? How would this impact the cost of service for each subscriber ? 8

   (b) Explain in detail capacity of cellular system. Explain the benefits of Frequency Re-use and using Hexagonal cells and give the concept of Handoff and Handover ? 7

4. (a) Discuss, what are the problems encountered in implementing handoff strategies and how they are resolved ? 8

   (b) A cellular system has a total 500 duplex voice channels without frequency reuse. The service area is divided into uniform 150 cells. The required C/I value is 18 dB. Determine the cell cluster size, number of cell clusters in the given service area, and maximum number of users at any instant in the service area. Assume the path-loss exponent as 3. 7

Section III

5. (a) The basic TDMA frame structure of GSM cellular system comprises of 156.25 bits in a time slot, of which 40.25 bits are overhead (ignoring the 2 flag bits), compute the frame efficiency. 8

   (b) Explain the main properties of the basic multiple access techniques-FDMA, TDMA, and CDMA. 7

6. (a) In IS-136 TDMA cellular system, the one-way allocated RF bandwidth is 12.5 MHz. The channel spacing is 30 kHz. There are 395 voice channels in the system. The TDMA frame duration is 40 ms. with 6 time-slopts per frame. The system offers an individual user data rate of 16.2 kbps in which the speech with error protection is @ 13 kbps. Compute the overall system efficiency. 8

   (b) Compare similarities and differences in the fundamental concepts of a DS-SS system versus FH-SS System. 7

Section IV

7. (a) What is the different between a physical channel and a logical channel ? Describe the important functions of various types of logical channels in GSM. 8

   (b) With the help of a block diagram draw the GSM network architecture and identify various interfaces used in its different entities. 7

8. Explain the following in detail :

   (a) FDMA 5

   (b) IMT-2000 5

   (c) IS-95. 5