Code No: RR420401 **Set No. 1**

IV B.Tech II Semester Supplementary Examinations, June 2007
CELLULAR AND MOBILE COMMUNICATION
(Common to Electronics & Communication Engineering, Computer Science & Engineering, Information Technology, Computer Science & Systems Engineering and Electronics & Computer Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the inefficient spectrum utilization based on the existing mobile systems MTS and IMTS
   (b) Describe the special features in amps and compare these with now a days systems? [8+8]
2. (a) In a total of 33MHz of BW is allocated to a particular FDD system which uses two 25KHz simplex channels to provide full dudplex voice and control channels. Compute the number of channels available per a cell if a system uses
      i. four cell reuse
      ii. seven cell reuse
      iii. 12 cell reuse. If 1MHz of allocated spectrum is dedicated to control channels. Determine a equitable distribution of control and voice channels in a each cell for each of the three systems?
   (b) Explain about the channel assignment strategies? [10+6]
3. Explain the designing of the omni directional antenna under the practical case conditions for K = 7, K = 12 and K = 19 with all the suitable values and explaining each of them? [16]
4. (a) Determine the straight line path loss slope with confidence level interval?
   (b) Explain about standard deviation along a path loss curve? [10+6]
5. (a) Discuss the characteristics of cell site antennas?
   (b) If the antenna heights are varying what are the effects you are getting at the time of operation of mobile system? [8+8]
6. (a) What do you understood by non fixed channel assignment ? Describe the corresponding algorithms?
   (b) Explain in detail access channels and operational techniques? [8+8]
7. (a) List the two types of hand off and explain them.
   (b) The hand off margin can not be too large or too small. Explain why? [8+8]
8. Explain narrow beam concept for increasing traffic capacity with neat diagram.[16]

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) Expalin about the trunking efficiency degradation with comparing the carriers per market also draw the graph related to the above (use Erlang B model)
   (b) Explain about the planning of the cellular system in detail? [10+6]
2. (a) Explain the concept of frequency reuse channels and maintain the two schemes of frequency reuse?
   (b) Explain the co channel interference reduction factor and derive the general formula for C/I? [8+8]
3. Explain the designing of the omni directional antenna under the worst case conditions for K = 7 , K = 12 and K = 19 with all the suitable values and explaining each of them? [16]
4. (a) Explain about the small scale multi path propagation?
   (b) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850MHz For a vehicle moving 60mph. Compute the received carrier frequency if the mobile is moving
      i. Direction towards the transmitter
      ii. directly away from the transmitter
      iii. in a direction which is perpendicular to the direction of the arrival of the transmitting signal? [10+6]
5. (a) Classify the cell site antennas and describe these in detail?
   (b) What do you understand by an engineering antenna pattern? Explain the corresponding pattern? [8+8]
6. (a) Discuss the concept of frequency management concern to the numbering the channels and grouping into the subsets?
   (b) Give the structure of the channels in 800MHz system with frequency ranges? [8+8]
7. (a) Define the dropped call rate? How dropped calls considered?
   (b) Give the relation among capacity, voice quality and dropped call rate? [8+8]
8. (a) Explain how diversity receiver can be used to fill the holes (weak spots).

(b) Explain the co-phase techniques. Give the application of feed forward cophase technique. [8+8]

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Code No: RR420401 **Set No. 3**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What do you mean by Mean Opinion Score and explain in detail?
   (b) Explain the history of 800MHz spectrum allocation to cellular systems? [8+8]
2. (a) Explain about the maximum number frequency channels per cell?
   (b) If the maximum number of calls per hour Qi in one cell be 5000 and an average calling time T be 1.76 min The blocking probability is 2% Find the offered load. If Qi is 35000 find the offered load Compare this with no of channels by using the Erlang B model [10+6]
3. (a) Show that the frequency reuse factor for a cellular system is given by K/S Where K is average number of channels per cell and S is the total number of channels available to the cellular system provider?
   (b) Explain co channel interference which effects at a cell site? [8+8]
4. (a) Explain the mobile point to point model based on standard condition and area to area prediction curves?
   (b) If h_1 = 100mt, h_2 = 6mt, d = 5Km, H = 100m use approximate method find incident angle, elevation angle, ground reflection and reflection point? [8+8]
5. (a) Explain in detail importance of consideration of cell site antennas?
   (b) Assume a receiver is located 10Km from a 50W transmitter. The carrier frequency is 6GHz and free space propagation is assumed Gt =1 and Gr =1W.
      i. Find the power at the receiver
      ii. The magnitude of the electric field at the receiving antenna
      iii. The rms voltage applied to the receiver input assuming that the receiving antenna has purely real importance of 50 ohms and is matched to the receiver. [8+8]
6. (a) Describe the grouping of the voice, setup and paging channels?
   (b) Present the reuse partition scheme in overlaid cell system Mention the advantages associated with it? [8+8]
7. (a) Explain clearly how to calculate δ and μ for single cell?
   (b) Why hand off is necessary for cellular systems Determine the two types of handoffs based on signal strength and C/I ratio? [8+8]

8. (a) Discuss the various vehicle locating methods at the cell site.
   (b) Discuss how antenna mountings used on the mobile units affect system performance. [8+8]

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Differentiate the analog and digital cellular systems with their operating capacities?
   (b) Explain the relation between the received power and the range of the system in detail? [8+8]
2. (a) Draw the general view of telecommunication and explain the function of the each unit?
   (b) Distinguish between the permanent splitting and dynamic splitting? [8+8]
3. Briefly explain different methods used for reducing near-end-far-end interference. [16]
4. (a) Discuss about the multi path propagation present the associated losses and place the problem?
   (b) Discuss about the point to point and area to area prediction model for cell coverage? [10+6]
5. (a) Explain in detail importance of consideration of cell site antennas?
   (b) Assume a receiver is located 10Km from a 50W transmitter. The carrier frequency is 6GHz and free space propagation is assumed Gt =1 and Gr =1W.
      i. Find the power at the receiver
      ii. The magnitude of the electric field at the receiving antenna
      iii. The rms voltage applied to the receiver input assuming that the receiving antenna has purely real importance of 50 ohms and is matched to the receiver. [8+8]
6. (a) Discuss the concept of frequency management concern to the numbering the channels and grouping into the subsets?
   (b) Give the structure of the channels in 800MHz system with frequency ranges? [8+8]
7. (a) Discuss the methods of queuing of hand offs.
   (b) Derive the blocking probability for hand off calls and the blocking probability of originating calls. [8+8]

8. (a) Explain how by increasing the transmitted power, the coverage is increased.
   (b) Discuss the methods for reducing the interference in cellular system. [8+8]

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