Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(ECE) (2018 Batch) (Sem.–1)

WIRELESS AND MOBILE COMMUNICATION

Subject Code : MTEC-102-18

M.Code : 75173

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. Describe various types of fading based on Multipath time delay spread and Doppler spread.
2. a) What are the functions of authentication and encryption in GSM system? How is the system security maintained
   b) Discuss briefly :
      i. GSM control channels
      ii. Frame structure of GSM
      iii. TDMA, FDMA, and CDMA
   c) Cell splitting and sectoring are two ways of improving capacity in cellular systems. Explain why the capacity is increased using cell splitting and sectoring. Give at least one drawback using cell splitting and sectoring, respectively.
3. Discuss the architecture of GSM system in detail.
4. What is coherent time and coherent bandwidth? Derive expression for Doppler shift when a car is travelling at constant velocity with respect to transmitted antenna.
   a) When car is moving towards antenna
   b) Away from antenna
   c) At some distance‘d’ from antenna
5. Discuss modulators and demodulators of DSSS using BPSK with block diagram and using data input stream of 10 bits with positive logic. Also explain with waveforms.
6. Differentiate between soft hand off and hard hand off. Discuss handoff situations for GSM and CDMA systems.

7. What is the role of equalizers in communication system, Discuss various types of equalizers in the receiver circuit.

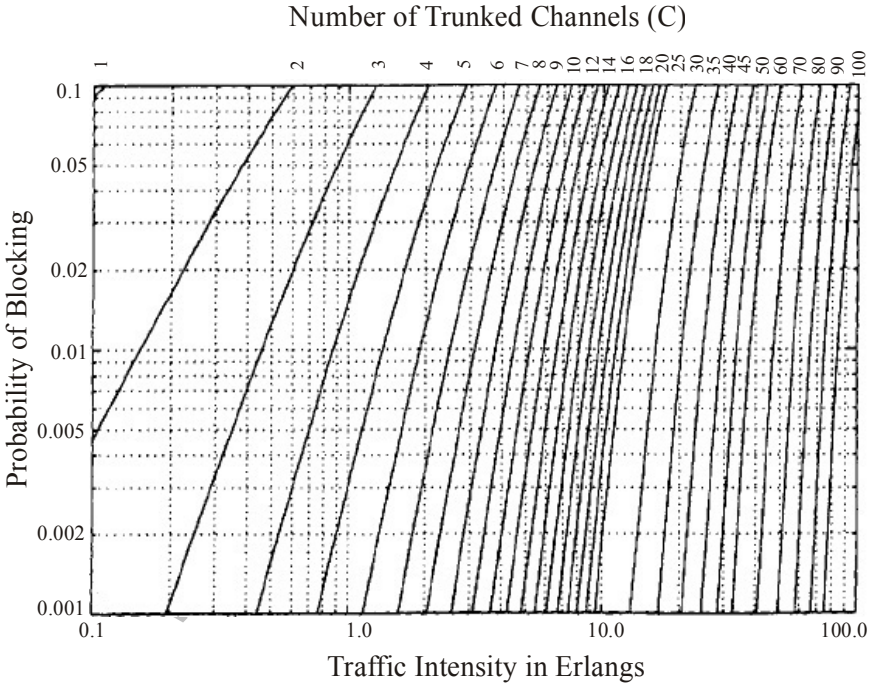
8. A total of 24 MHz of bandwidth is allocated to a particular GSM cellular system that uses two 30 kHz simplex channels to provide full duplex voice and control channels. Assume each cell phone user generates 0.1 Erlang of traffic. Use Erlang B chart.

   a) Find the number of channels in each cell for a 4 cell reuse system.

   b) If each cell is to offer capacity that is 90% of perfect scheduling, find the maximum number of users that can be supported per cell where omni directional antennas are used at each base station.

   c) What is the blocking probability of the system in (b) when the maximum numbers of users are available in the user pool?

   d) If each new cell now uses 1200 sectoring instead of omnidirectional for BTS, what will be the new total number of users that can be supported per cell for same blocking probability as in (c)?



The Erlang B chart showing the probability of blocking as functions of the number of channels and traffic intensity in Erlangs.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.