Total No. of Pages: One Roll No.:

SEMESTER: 8TH B. Tech: ECE

MID SEMESTER EXAMINATION (MAR-2019)

Paper Code: EC-404

Subject: WIRELESS COMMUNICATION

Time: 1:30 Hours Max. Marks: 20

Note: Answer all questions. All questions carry equal marks. Assume suitable missing data, if any.

1. A receiver in an urban cellular radio system detects a 1mV signal at d_0= 1m from the transmitter. To mitigate co-channel interference effects, it is required that the signal received at any base station receiver from another base station transmitter which operates with the same channel must be below -100dBm. If the path loss exponent is 3, determine the major radius of each cell if a 7- cell reuse pattern is used?
2. A cellular service provider uses a multiple access scheme which can tolerate a signal to interference ratio of 18 dB for satisfactory average performance. Find the optimal value of N for (a) omnidirectional antenna and (b) 120^0 sectoring if the interference from the ***first and second tier*** of interferers is considered. The value of the path loss exponent is 4.
3. Why there is send button in mobile phones? Describe with the help of suitable illustration.
4. Assume a system of 32 cells with a cell radius of 1.6 km, a total of 32 cells, a total frequency bandwidth that supports 336 traffic channels, and a reuse factor of N = 7. If there are 32 total cells, what geographic area is covered, how many channels are there per cell, and what is the total number of concurrent calls that can be handled? Repeat for a cell radius of 0.8 km and 128 cells.
5. Prove that for a hexagonal geometry, co-channel reuse ratio is given by $D/R=\sqrt{3N}$, where $N=i^2+ij+j^2$.