B.Tech
PEEC5302

6th Semester Regular / Back Examination 2015-16
MOBILE COMMUNICATION
BRANCH: ECE, ETC
Time: 3 Hours
Max Marks: 70
Q.CODE: W590
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   Answer the following questions: **(2 x 10)**

a) Find the cluster size of a cellular system in order to achieve maximum capacity, given path loss exponent of 3 and S/I of 15 dB is required for satisfactory forward channel performance of cellular system.

b) How 120^0 sectoring improves the capacity of the cellular system?

c) Define co-channel reuse ratio.

d) In a mobile system there are 395 channels of 30 KHz each in a bandwidth of 12.5 MHz, what is the multiple access spectral efficiency for FDMA?

e) A DSSS system has chip rate of 1.2288 Mcps and 9.6 Kbps information rate. Calculate the processing gain.

f) Write the expression of received power as a function of distance from the transmitter for free space propagation model and ground reflected propagation model.

g) How the spectral characteristic of MSK is improved with GMSK.

h) What is coherence bandwidth of the channel?

i) Write the difference between frequency division duplexing and time division duplexing.

j) Write the difference between flat fading and frequency selective fading channel.

Q2 **a)** What is frequency reuse in cellular system and how it helps to improve the capacity of the system?   **(5)**

    b) Derive the expression for signal to interference power ratio for a mobile unit present at cell vertex (worst case scenario) assume a hexagonal cellular structure.   **(5)**

Q3 **a)** List the advantage and disadvantages of TDMA over other multiple access technology. **(5)**

b) If GSM uses a frame structure where each frame consists of eight time slots and each time slot contains 156.25 bits and data is transmitting at 270.833 kbps in the channel, find (a) the time duration of a bit (b) time duration of slot (c) time duration of frame (d) If a normal GSM time slot contains six trailing bits, 8.25 guard bits, 26 training bits and two traffic burst of 58 bit of data, find the frame efficiency. **(5)**

Q4 Explain briefly the evolution of cellular system from 1G to 4G. **(10)**

Q5 **a)** Calculate the minimum power received by a receiver situated 3 Km. from the transmitter. Given power at reference distance (d_0 = 100m) is -32dBm. Path loss exponent is 4 and shadowing loss is 10.5 dB. **(5)**

b) Explain three basic propagation mechanisms in wireless channel, reflection diffraction and scattering. **(5)**

Q6 **a)** Define Rician distribution. At what situation a wireless channel fading can be modeled with Rician distribution. **(5)**

b) A mobile station traveling at a speed of 60 Km/h transmits at 900 MHz. If the transmitted data rate is 64 kbps, then the channel fading is slow or fast? **(5)**

Q7 **a)** With block diagram of transmitter and receiver explain frequency hopping spread spectrum (FHSS) system. **(5)**

b) A communication system transmits at 120 kbps and uses 32-FSK. A hop rate of 2000 hops per second is used over an available spectrum of 10 MHz. Calculate (a) data symbol transmitted per hop (b) number of non overlapping hop frequencies. **(5)**

Q8 Write short notes on any two: **(5 x 2)**
a) Equalizer
b) Adjacent channel interference
c) Multicarrier DS-CDMA