Roll No.								

B.E. / B.Tech (FullTime)DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011

ELECTRONICS AND COMMUNICATION ENGINEERING BRANCH

SIXTH SEMESTER

35

EC 9352 WIRELESS COMMUNICATION

(REGULATION 2008)

Time: 3 Hours Max.marks: 100

Answer ALL Questions

Part-A (10x2=20 Marks)

1. Assume a receiver is located 10 km from a 50 W transmitter. The carrier frequency is 6 GHz, $G_t = 1$, $G_r = 1$ and free space propagation is assumed. Find the power at the receiver.
2. What is meant by coherence time and coherence bandwidth?
3. Distinguish between hard handoff and soft handoff. Mention their applications.
4. Prove that co-channel reuse ratio is given by $Q = \sqrt{3N}$, where $N = i^2 + ij + j^2$.
5. Mention any two techniques to overcome the effect of PAPR in OFDM systems.
6. Define spectral efficiency and power efficiency.
7. Compare spatial multiplexing and special diversity.
8. Assume four branch diversity is used where each branch receives an independent Rayleigh fading signal. If the average SNR is 20 dB, determine the probability that the SNR will drop below 10 dB.
9. List out the advantages of spread spectrum techniques.
10. The GSM system uses the GMSK modulation scheme. Show that the bandwidth efficiency of the standard GSM system is 1.35 bps/Hz.

Part-B (5x16=80 Marks

11.(a)(i)Derive the expression for a received power at a distance "d" from the transmitter for the two ray ground reflection model. **(8)**

(ii) Derive and explain the Clarke's model for Flat fading channel. **(8)**

12.(a) Explain the various cellular design techniques to improve the coverage and capacity of the cellular system.

OR

12.(b)(i) A cellular service provider decides to use a digital TDMA scheme which can tolerate a signal to interference ratio of 15 dB in the worst case. Find the optimal value of N for (I) omni-directional antenna (II) 120^0 sectoring (III) 60^0 sectoring. Assume a path loss exponent of n = 4. **(8)**

(ii) With timing diagram, illustrate how a call to a mobile user initiated by a landline subscriber is established. **(8)**

13.(a)(i) With neat block diagram, explain the transceiver implementation of OFDM system. **(8)**

(ii) Explain GMSK transmitter and receiver. **(8)**

OR

(b)(i) With neat block diagram and constellation diagram, explain the π/4 QPSK transmitter and receiver. Also compare the advantages of π/4 QPSK over QPSK and OQPSK. **(12)**

(ii) Assume that $\theta_0 = 0^0$. The bit stream 001011 is to be sent using π/4 DQPSK. The least most bits are first applied to the transmitter. Determine the phase of θ_k, and the values of I_K, Q_K during transmission. **(4)**

14.(a)(i) Explain the various diversity techniques. **(8)**

(ii) Explain the selection diversity and maximum ratio combining techniques. Also derive the improvement of SNR due to maximal ratio combining technique. **(8)**

OR

(b)(i) Explain the M branch RAKE receiver implementation. **(8)**

(ii) With neat block diagram explain the system model of MIMO system. Also compare the capacity of MIMO System with SISO system. **(8)**

15.(a)(i) Compare the features of FDMA, TDMA and CDMA. **(6)**

(ii) With neat diagram, explain the GSM protocol architecture. **(10)**

OR

(b)(i) With neat block diagram, explain the IS-95 reference architecture. **(10)**

(ii) List out and compare the various versions of Wifi and Wimax.. **(6)**
