Registration Number :

B.E. / B.Tech.DEGREE (FULL TIME) ARREAR EXAMINATION – NOVEMBER 2012

ELECTRONICS AND COMMUNICATION ENGINEERING BRANCH

SEVENTH SEMESTER – (REGULATIONS R 2004)

EC471 – WIRELESS AND MOBILE COMMUNICATION

Duration : 3 Hours Max. Marks = 100

Answer **ALL** the questions.

PART- A (10 x 2 = 20 marks)

1. What is the necessity for the Umbrella cell approach ?
2. How is the cluster size related to the cochannel interference in a cellular system.
3. Differentiate between scattering and reflection of radio waves.
4. What is the implication of Coherence time of the channel in system design.
5. Show a diagram to depict orthogonal carriers in specific duration of time.
6. Compare the gains that can be achieved by Space Time Trellis Coding Schemes.
7. What are the drawbacks of the Zero-Forcing Equalizer.
8. List out the advantages of diversity techniques over equalization techniques.
9. List the merits and demerits of soft handoff in CDMA systems.
10. Relate physical and logical channels in a GSM system.

PART – B (5 x 16 = 80 marks)

11. A city has an area of 1300 square miles and is covered by a cellular system using a seven-cell reuse pattern. Each cell has a radius of 4 miles and the city is allocated 40 MHz of spectrum with full duplex channel bandwidth of 60KHz. Assume, a GOS of 2% for an Erlang B system is specified. If the offered traffic per user is 0.03 Erlangs, compute (a) the number of cells in the service area, (b) the number of channels per cell, (c) traffic intensity of each cell, (d) the maximum carried traffic, (e) the total number of users that can be served for 2% GOS, (f) the number of mobiles per unique channel , and (g) the theoretical maximum number of users that could be served at one time by the system. Use the following Erlang B table.

P.T.O

No. of trunked channels	70	75	80	85	90	95	100
Traffic Intensity in Erlangs for 2 % blocking	60	67	70	76	80	84	90

12a. Differentiate between large scale fading and small scale fading. Explain the time dispersion and frequency dispersion parameters that can be used to characterize the small scale fading effect of the channel. Also discuss the impact of the small scale fading parameters on the baseband signal.

'OR'

12b. Explain the diffraction phenomena with suitable diagrams. Explain its impact on the radio signal strength and also the method to estimate the loss due to diffraction.

13a. Briefly explain how OFDM mitigates the impact of a frequency selective fading channel. Explain with suitable diagrams the importance of cyclic prefix addition and the windowing techniques in OFDM systems.

'OR'

13b. Give the mathematical model of a Multiple Input Multiple Output (MIMO) channel with a suitable figure. Explain with a suitable example the encoding process using Space Time Trellis Coding Scheme with QPSK modulation and 2 transmit antennas.

14a. Differentiate between Linear and Non-Linear Adaptive Equalizers. Draw the structure of a Tapped Delay Line based Linear transversal Equalizer and show how the Least Mean Squares (LMS) algorithm could be used to update the tap weights to train the equalizer.

'OR'

14b. Explain the different methods that can be used to combine diverse signals. Mathematically show the benefits of using Maximal Ratio Combining of the diverse path signals.

15a. Explain with suitable diagrams, the difference in the forward and the reverse link, physical layer processing that is implemented in the IS-95 standard .

'OR'

15b. Explain the GSM network architecture and the different signal processing used in the process of setting up of a call. How is the GSM handoff different from CDMA handoff.