Exam. Code: 0931
Sub. Code: 33693

2125

B.E. (Electronics and Communication Engineering)
Seventh Semester
EC-710: Wireless and Mobile Communication

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit. Use of scientific calculator is allowed.

x-x-x

I. Attempt the following:-

(a) Differentiate between TDMA, FDMA and CDMA schemes.

(b) What are the differences between frequency and time diversity schemes?

(c) A cellular system with 21 cells has 630 channels. Calculate the frequency reuse factor and channels per cell.

(d) Is self-jamming a problem in CDMA? Justify.

(e) Why RAKE receiver is used in CDMA systems? (5x2)

UNIT - I

II. (a) A mobile moves at 70 km/hr, and a handoff is initiated if the RSS drops below –120dBm. Calculate the time it takes to reach the handoff threshold if signal drops at a rate of 1.5 dB/s.

(b) Explain how EDGE improves data rates in GSM / GPRS network. Discuss its modulation technique. (2x5)

III. (a) Explain how the umbrella cell approach works to optimize cellular coverage and capacity, especially in scenarios with high-speed and low-speed users.

(b) Explain the method of sectoring in cellular networks, and analyze how it helps in reducing interference and improving capacity. (2x5)

IV. (a) What is the "channel borrowing" strategy in channel assignment? How does it help, and what are its risks?

(b) Explain how handover / handoff works in UMTS. What are the different types of handover in W-CDMA? (2x5)

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UNIT - II

V. (a) Why does a RAKE receiver provide "time diversity"? Explain how it improves SNR.

(b) Compare linear equalizers and non-linear equalizers in terms of structure, complexity, and performance under deep spectral nulls. (2x5)

VI. (a) Explain how control channels help in mobile registration and call setup.

(b) What are the differences between Rayleigh and Rician Fading. (2x5)

VII. (a) A planner initially uses a cluster of $N = 7$in a GSM system with cell radius $R = 2.5$km, path-loss exponent $\gamma = 3.5$. Further, N is increased to 12 for reducing interference.

(a) Calculate the worst-case S/I for $N = 7$.

(b) Calculate the worst-case S/I for $N = 12$.

(c) Compute the improvement (in dB) in S/I from N=7 to 12.

(d) If the system requirement is at least 16 dB S/I, does the new plan with $N = 12$ satisfy it?

(b) Differentiate between

(i) Precoding and beamforming

(ii) Spatial multiplexing and transmit diversity (2x5)

x-x-x