Exam.Code:0970
Sub. Code: 7065

2054

M.E. (Electronics and Communication Engineering)

Second Semester

ECE-1203: 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) For $i=2$ and $j=1$, find out the group size N and draw the cellular structure depicting the co-channel cells.

b) Illustrateco-channel reuse ratio.

c) Consider a transmitter which radiate a sinusoidal carrier frequency of 180 MHz. For a vehicle moving 60 mph, compute the receiver carrier frequency if the mobile is directly towards the transmitter.

d) Write about mean access delay and rms delay spread.

e) Define repeaters for range extension. (5x2)

UNIT - I

II. Discuss a cellular service provider that decides to use a digital TDMA scheme which can tolerate a signal –to-interference ratio of 15dB in the worst case. Find the optimal value of N for

a. Omnidirectional antennas

b. 120°sectoring

c. 60°sectoring

d. Should sectoring be used? If so, which case (120°or 60°) should be used? (Assume a path loss exponent of n=4 and consider trun king efficiency? (10)

III. a) Consider Global System for mobile which is a TDMA/FDD system that uses 25MHZ for the forward link, which is broken into radio channels of 200 MHz. if 8 speech channels are supported on a signal radio channel and if no guard band is assumed find the number of simultaneous users that can be accommodated in GSM.

b) Prove that for hexagonal cell geometry, the co-channel reuse ratio is given by $Q = \sqrt{3N}$

(2x5)

P.T.O.

IV. A cellular service provider decides to use a TDMA scheme that can tolerate an SIR of 16dB in worst case. Find the optimum value of cluster size N in case of (a) an omnidirectional antenna (b) 120° sectoring and (c) 60° sectoring. Out of a), b) and c) which would yield better SIR and why? (10)

UNIT - II

V. Consider an indoor wireless LAN with fc = 900 MHz, cells of radius 100 m, and with omni-directional antennas. Under the free-space path loss model, what transmit power is required at the access point such that all terminals within the cell receive a minimum power of 10 μW. How does this change if the system frequency is 5 GHz? Comment on results obtained. (10)

VI. a) Explain Okumura model for large urban microcells. Give its significance.
b) Explain fading effects due to multi-path time delay spread. (2x5)

VII. a) Compare FDMA,TDMA and CDMA schemes, including in terms of their capacities.
b) Explain key features of CDMA digital cellular standards. (2x5)

x-x-x