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Register Number:……….…….

M.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

COMMUNICATION SYSTEMS

P14COT201: Wireless Communication Engineering

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the appropriate item from the RHS with those on the LHS   [K_1]

List I	List II
A. Frequency reuse	1.Digital cellular Technology
B.GSM	2.Co-ChannelInterferance
C.WLAN	3.CSMA
D.GPRS	4.Packet oriented Service

	A	B	C	D
a)	2	1	3	4
b)	3	4	2	1
c)	3	1	2	4
d)	2	4	3	1

2. Current wireless MACs are based on   [K_1]
   a) CSMA/CD   b) Hybrid technique depending on traffic
   c) CSMA/CA   d) Hybrid technique with fixed time partitions

3. A modem uses a 4 different amplitudes and 16 different phase angles. Number of bits   [K_2]
   transmitted   to transmit each symbol is
   a) 4   b) 8
   c) 6   d) 16

4. CDMA is a multiple access strategy for wireless communications based on   [K_1]
   a) DSSS   b) Fast FHSS
   c) Slow FHSS   d) GMSK

5. The reasons that contributes to the rapid fluctuations of the signal amplitude in mobile communications are (i)Multipath fading (ii)Doppler effect (iii)Diffraction (iv)Scattering (v)Shadowing   [K₃]

   a) (i),(ii)   b) (iv),(v)
   c) (i),(iv)   d) (ii),(v)

6. An access point has a data rate of 2.0 Mbps and only yields 1000 kbps of throughput because of overhead. What is the efficiency of the access point?   [K₂]

   a) 25%   **b**) 50%

   c) 75%   d) 85%

7. Considering the design of digital cellular equalizer, If f=900Mhz and the mobile velocity v=80Km/hr, the maximum Doppler shift in Hz is given by   [K₂]

   a) 55   b) 77
   c) 67   d) 80

8. Interleaving is used to obtain the following in digital communication systems.   [K₃]

   a) Space diversity   b) High correlation
   c) Low BER   d) Time diversity

9. CDMA uses the idea of tolerating interference by _____   [K₃]

   a) intelligent modulation   b) Spread spectrum modulation
   c) Manchester coding   d) Bipolar non return to zero coding

10. A) Near –far problem occurs in CDMA receiver B) Complexity of FDMA mobile system higher compared to TDMA   [K₁]

   a) Both are true   b) Both are false
   c) A is True and B is false   d) A is false and B is true

PART B (10 x 2 = 20 Marks)

11. Why does multipath in wireless channels limit the maximum symbols transmission rate?   [K₁]

12. What techniques can be used to combat the effects of frequency selective fading?   [K₂]

13. List the features that influence the choice of digital modulation.   [K₃]

14. Find the velocity of vehicle in a mobile communication system having a Doppler spread of 350Hz and frequency of operation equals to 900MHz.   [K₂]

15. Define peak to average power ratio..   [K₁]

16. What is meant by direct sequence spread spectrum modulation?   [K₂]

17. Draw the DSSS model [K2]

18. Compare fast and slow hopping. [K3]

19. The GSM TDMA system uses a 270.833Kbps data rate to support 8 users per frame. What is the raw data rate provided for each user? If guard time and synchronization bits occupy 10.1kbps, determine the traffic efficiency for each user? [K2]

20. What is the maximum fade slope (in dB/s) which can be compensated for by the reverse power control subchannel in the CDMA system? [K3]

PART C (10 x 5 = 50 Marks)

21. Mention the radio propagation phenomena at high frequencies. [K1]

22. Consider a single branch Rayleigh fading signal has a 20% chance of being 6dB below some mean SNR threshold. a) Determine the mean of the Rayleigh fading signal as referenced to the threshold. b) Find the likelihood that a two branch selection diversity receiver will be 6dB below the mean SNR threshold. [K2]

23. Explain Multi-Carrier Code Division Multiple Access (MC-CDMA) [K3]

24. Discuss in detail about delay spread and coherence bandwidth of fading channel. [K1]

25. Enumerate the features of IEEE 802.11a. [K1]

26. Explain in detail about FHSS technique. [K2]

27. Mention the merits and demerits of spread spectrum techniques. [K3]

28. Explain in detail about RAKE receiver. [K3]

29. State the significance of power control in CDMA system. [K2]

30. Compare the performance of Multiple access schemes. [K1]

PART D (2 x 10 = 20 Marks)

31. Explain the concept of multicarrier modulation with overlapping subchannels and implementation of multicarrier modulation [K2]

32. Discuss in detail the principles of MIMO multiuser system and its merits and limitations [K2]

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