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Question Paper Code : 91464

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Fifth/Eighth Semester
Electronics and Communication Engineering
EC 6801 – WIRELESS COMMUNICATION
(Common to Robotics and Automation Engineering/Information Technology)
(Regulations 2013)
(Also common to PTEC 6801 – Wireless Communication for B.E. (Part-Time) Sixth Semester – Electronics and Communication Engineering – Regulations 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is shadow fading ? Why it is called so ?
2. Which factors does diffraction depend on at high frequencies ?
3. Write any three features of FDMA.
4. What are the disadvantages of TDMA ?
5. What is MSK ? Why it is named so ?
6. State the features of offset QPSK.
7. What is the use of equalization technique ? Name the types.
8. Differentiate micro from macro diversity.
9. What is meant by spatial multiplexing ?
10. 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. Compare this with the case of a single receiver without diversity.

PART – B (5×13 = 65 Marks)

11. a) i) Determine the proper spatial sampling interval required to make small-scale propagation measurements which assume that consecutive samples are highly correlated in time. How many samples will be required over 10 m travel distance if f_c = 1900 MHz and v = 50 in/s. How long would it take to make these measurements, assuming they could be made in real time from a moving vehicle ? What is the Doppler spread B_D for the channel ? (8)

ii) Compare and contrast wired and wireless communication. (5)

(OR)

b) i) Explain the free space path loss and derive the gain expression. (8)

ii) Write down the three small scale fading effects and also name the techniques that are used to mitigate the effects of small-scale fading. (5)

12. a) A certain city has an area of 1,300 square miles and is covered by a cellular system using a 7-cell reuse pattern. Each cell has a radius of 4 miles and the city is allocated 40 MHz of spectrum with a full duplex channel bandwidth of 60 kHz. Assume that a GOS is 2% and traffic intensity per cell A = 84 Erlangs/cell. If the offered per user is 0.03 Erlangs, compute

i) the number of cells in the service area,

ii) the number of channels per cell,

iii) the maximum carried traffic;

iv) the total number of users that can be served for 2% GOS,

v) the number of mobiles per channel, and

vi) the theoretical maximum number of users that could be served at one time by the system. (13)

(OR)

b) i) Explain in detail the handoff strategies. (10)

ii) Write a note on grade of service. (3)

13. a) Explain in detail about $\frac{\pi}{4}$ QPSK transmission and detection with necessary block diagram. (13)

(OR)

b) With neat diagram, explain the operation of OFDM transceiver. (13)

14. a) i) Explain the working of RAKE receiver with a neat sketch. (8)

ii) Write down the purpose of algorithms for adaptive equalization and also state on what factors the performance of these algorithms depend on. (5)

(OR)

b) Explain selection combining technique in detail. (13)

15. a) i) Write a brief note on Pre-coding. (6)

ii) Explain the MIMO system model and find the capacity. (7)

(OR)

b) What is capacity of flat fading channel and explain CSI known at the Transmitter and Receiver with necessary diagrams. (13)

PART – C (1×15 = 15 Marks)

16. a) i) If W = 1.25 MHz, R = 9600 bps, and a minimum acceptable E_b/N_0 is found to be 10 dB, determine the maximum number of users that can be supported in a single-cell CDMA system using

1) ornni-directional base station antennas and no voice activity detection, and

2) 3-sectors at the base station and activity detection with α= 3/8.

Assume the system is interference limited. (5)

ii) Explain any two ways of improving the coverage and capacity in cellular systems. (10)

(OR)

b) Examine the effectiveness of flat fading and frequency selective fading. (15)

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