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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

Information Technology

Third Semester

EC9212 Communication Techniques

(Regulation 2008)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Write equation of DSBSC modulated signal and draw its spectrum.
2. Draw the block diagram for getting FM signal using phase modulator.
3. State low pass sampling theorem and find the minimum sampling frequency for a signal having maximum frequency of 20kHz.
4. What is vocoder? Give an example.
5. Draw the constellation diagram of 4-ary QAM signal and 4-ary PSK signal.
6. What is ISI? How can its effect be reduced?
7. Define entropy and write its bound.
8. If a channel has 1MHz bandwidth and provides 30dB SNR at the input of a detector. Then calculate the capacity of the channel.
9. Differentiate multiplexing and multiple access.
10. What is the need for synchronization?

Part – B (5 x 16 = 80 marks)

11. (i) With suitable diagram, explain the working principle of PCM system. (8)
    (ii) What are the advantages of superheterodyne receiver? With suitable sketch, briefly explain how it can be achieved. (8)

12. a) Define modulation index of amplitude modulation. Discuss the modulation and demodulation of AM signal under different modulation index using envelope detector. Provide appropriate sketches on each case.

    (OR)

    b) Discuss the noise associated with delta modulation scheme and brief how it can be controlled in adaptive delta modulation.

13. a) Discuss on modulation and demodulation of QPSK signaling and derive the BER provided by this modulation technique.

    (OR)

    b) (i) Draw the "Eye Pattern" and mark the observations derived from it. (8)
    (ii) Briefly discuss about duo-binary signaling and the bandwidth required to transmit the signal. (8)

14. a) A discrete memoryless source emits the symbols at a rate of 1000 symbols per second from the set $\{x_i, i=1,2,..,5\}$. The probabilities for the first four symbols are

Roll No. | | | | | | | | | | |

given by {0.3, 0.35, 0.2, 0.1}.

(i) Calculate the probability of fifth symbol, information in each symbol and the entropy (6)

(ii) Find the optimum binary codeword for each symbol using Huffman coding technique. (6)

(iii) Calculate the average code length, efficiency and redundancy of the generated code (4)

(OR)

b) (i) List and discuss the properties of syndrome of cyclic codes with suitable example. (8)

(ii) Draw the diagram of cyclic encoder and brief its operation with an example. (8)

15. a) (i) List the properties of PN sequences and discuss with suitable example (8)

(ii) Differentiate FDMA, TDMA and CDMA. Also draw the block diagram of those systems.

(OR)

b) Briefly explain the DSSS technique and derive the its jamming margin.