Reg. No. : | | | | | | | | | | |

Question Paper Code: 12023

M.E. DEGREE EXAMINATION, OCTOBER 2014.

First Semester

Communication Systems

01PCM103 – DIGITAL MODULATION AND CODING

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. List the causes for ISI.

2. What are the parameters can be obtained from EYE diagram?

3. Why does the peak power problem occur in OFDM?

4. 'Orthogonal Frequency Division Multiplexing converts frequency selective channels into frequency non selective channel' the above statement is true or false. Justify with reason.

5. Justify the necessity of coding in a communication system.

6. Explain the noisy channel coding theorem.

7. Prove that all the hamming codes are single error correcting codes.

8. Define Hamming distance.

9. Mention the advantages of Low Density Parity Check codes.

10. Compare sequential decoding with threshold decoding.

PART - B (5 x 14 = 70 Marks)

11. (a) (i) Explain optimum decoding and detection of QAM. (7)

(ii) With neat diagram explain linear Equalizers. (7)

Or

(b) (i) Compare bit error rate performance of various digital modulation techniques with spectral efficiency. (7)

(ii) Derive a condition for which zero Inter Symbol Interference can be achieved for band limited channels. (7)

12. (a) (i) Mathematically prove that an IFFT/FFT pair can be used to implement the Modulator/Demodulator in OFDM system. (10)

(ii) Explain the siginificance of cyclic prefix in OFDM. (4)

Or

(b) (i) Draw the block diagram of an OFDM system and explain. (8)

(ii) Write short notes on windowing technique in OFDM. (6)

13. (a) (i) Derive the channel capacity equation for BSC. (10)

(ii) Discuss about the modulation constrained information rate. (6)

Or

(b) (i) Write a brief note on different channel models. (8)

(ii) Explain the different tradeoffs in selecting the channel coding. (6)

14. (a) Consider standard generator matrix for Hamming code (codeword word n=7, information word k=4). (2)

i) Find Parity check matrix (2)

ii) Generate standard array matrix (4)

iii) Use the ii) and decode the received sequence 1 1 1 0 1 0 0. (6)

Or

(b) Explain Viterbi algorithm for convolutional decoder. (14)

15. (a) Discuss in detail low density parity check codes. (14)

Or

(b) Write short notes on:

(i) Parallel concatenated convolutional codes. (8)

(ii) Coding for non Gaussian channels. (6)

PART - C (1 x 10 = 10 Marks)

16. (a) Explain how pre-coding and post-coding reduces peak to Average Power Ratio problem in Orthogonal Frequency Division Multiplexing. (10)

Or

(b) With neat diagrams explain M-ary QAM scheme. (10)

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