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

Question Paper Code: 12024

M.E. DEGREE EXAMINATION, DECEMBER 2013.

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. Which of the modulation scheme cannot be detected with the help of envelope detector? Justify your answer. a) BPSK b) BFSK c) BASK
2. What are the parameters can be obtained from EYE diagram?
3. How to overcome Carrier frequency offset problem in Orthogonal Frequency Division Multiplexing?
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. Draw the Binary symmetric channel.
6. State noisy channel coding theorem.
7. Prove that all the hamming codes are single error correcting codes.
8. Write a generator matrix for repetition code of size (codeword word n=5, information word k=1).
9. Write 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) Draw the block diagram of multicarrier OFDM digital communication system and explain function of each block diagram. (14)

Or

(b) (i) Explain how IFFT generates multiple carriers. (7)

(ii) Explain non linear amplifier problem in Orthogonal Frequency Division Multiplexing. (7)

13. (a) (i) Compute channel capacity of two binary symmetric channels (BSC) connected in series. (7)

(ii) Explain about binary erasure channel and find the capacity of the channel. (7)

Or

(b) Discuss the following terms with respect to AWGN channel

i) Channel model (6)

ii) Channel Capacity (4)

iii) Achievable performance (4)

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) Explain in detail about the Low Density Parity Check Codes. (14)

Or

(b) (i) Explain the rules for iterative decoding. (7)

(ii) Write short notes on parallel concatenated convolutional codes. (7)

PART - C (1 x 10 = 10 Marks)

16. (a) Explain how precoding and postcoding reduces Peak to Average Power Ratio problem in Orthogonal Frequency Division Multiplexing. (10)

Or

(a) (b) Block diagram of the convolutional Encoder is shown in Figure P1.

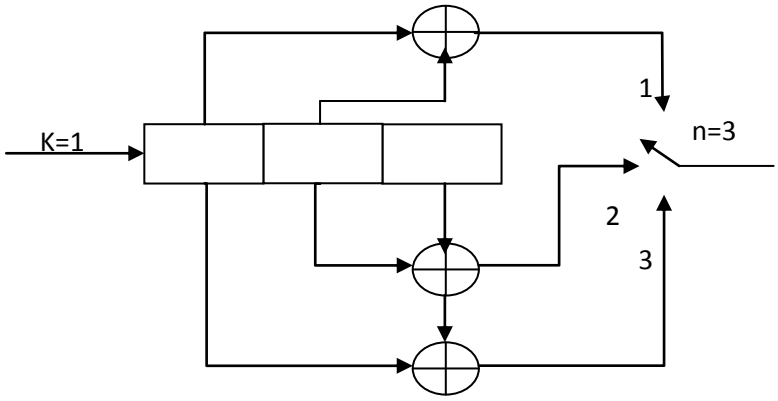

Figure P1

i) Draw the state diagram of the code. (2)

ii) Find the Transfer function of the Code. (2)

iii) What is the minimum free distance of the code? (2)

iv) If the received code sequence r is [110 110 110 111 010 101 101]. Find the transmitted bit sequence using Viterbi algorithm (4)