Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 86578

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Electronics and Communication Engineering

EC 1351 A – DIGITAL COMMUNICATION TECHNIQUES

(Regulations 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Define sampling theorem.

2.   State the advantages of adaptive delta modulation.

3.   State Nyquist pulse shape criterion.

4.   What is meant by correlative coding?

5.   State the different types of pass band modulation.

6.   Draw the signal space representation of MSK signal

7.   Define discrete memoryless channel.

8.   What is linear block code?   -

9.   What are the advantages of spread spectrum communication?

10. Define the term 'processing gain' of a direct sequence spread spectrum system.

PART B — (5 × 16 = 80 marks)

11. (a) With the help of neat block diagram, explain the transmitter and receiver of pulse code modulation.   (16)

Or

     (b) Describe the operation of delta modulation in detail. Also state the advantages of disadvantages of DM.   (16)

12. (a) Draw the block diagram of band limited communication system' with duobinary encoded source and explain with necessary derivation.

Or

(b) Explain the implementation of the M-ary waveform receiver using matched filter with neat block diagram and derive an expression for error probability.

13. (a) With the help of block diagram, explain the operation of BPSK transmitter and receiver. (16)

Or

(b) Write short notes on:

(i) Carrier synchronization. (8)

(ii) Symbol synchronization. (8)

14. (a) (i) Consider a linear block code with generator matrix in systematic form as (2+2+4+2)

$$G = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

(1) Determine the parity check, matrix in systematic form.

(2) Determine the minimum distance of the code,

(3) Draw the encoder and syndrome calculation circuits.

(4) Calculate the syndrome for the received vector $r = \begin{bmatrix} 1100011 \end{bmatrix}$.

(ii) Explain Viterbi decoding algorithm for convolution code. (6)

Or

(b) (i) The generator polynomial of a (7, 4) cyclic code is $g(X) = 1 + X + X^3$.

(1) Find parity check polynomial

(2) Find the generator and parity check matrix in systematic form.

(3) Draw the encoder and syndrome computation circuit. (2+6+4)

(ii) What is trellis coded modulation? Explain. (4)

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15. (a) Explain the working of a binary PSK direct sequence spread spectrum transmitted and receiver with neat block diagrams.

<div align="center">Or</div>

  (b) (i) What are PN sequences? Discuss their characteristics and explain how PN sequences are generated with an example. (8)

      (ii) Explain the principle of frequency hopped spread spectrum system. (8)

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