

Code: 13A04502

R13

B.Tech III Year I Semester (R13) Supplementary Examinations June 2017

DIGITAL COMMUNICATION SYSTEMS

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART - A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Define aliasing. How to overcome it?
 - (b) Explain companding.
 - (c) Define matched filter and give its expression.
 - (d) Compare Duo binary and modified Duo binary signaling schemes.
 - (e) Define probability of error. Give the expression for probability of symbol error average over all the M symbols.
 - (f) What is the significance of signal constellation diagram?
 - (g) Draw the functional model of pass band data transmission system.
 - (h) Compare BFSK & BPSK.
 - (i) Define interleaving & hamming distance.
 - (j) What are the properties of syndrome?

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

- 2 A signal $m(t)$ band limited to 3kHz is sampled at a rate 33 1/3% higher than the Nyquist rate. The maximum acceptable error in the sample amplitude (the maximum quantization error) is 0.5% of the peak amplitude m_p . The quantized samples are binary coded. Find the minimum bandwidth of a channel required to transmit the encoded binary signal. If 24 such signals are time division multiplexed, determine the minimum transmission bandwidth required to transmit the multiplexed signal.

OR

- 3 (a) Draw and explain the block diagram of PCM.
(b) What are the advantages and disadvantages of delta modulation?

UNIT - II

- 4 Explain baseband M-ARY PAM transmission in detail.

OR

- 5 (a) Give the expression for error rate due to noise.
(b) Explain generalized form of correlative level coding (partial response signaling).

UNIT - III

- 6 (a) Explain geometric representation of signals.
(b) Explain correlation receiver with neat block diagram briefly.

OR

- 7 Explain the concept of maximum likelihood decoding in detail.

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UNIT - IV

- 8 Explain coherent generation and detection of BFSK signals and derive the expression for probability of error.

OR

- 9 Write short notes on:

- (a) M-array QAM.
- (b) Power bandwidth.

UNIT - V

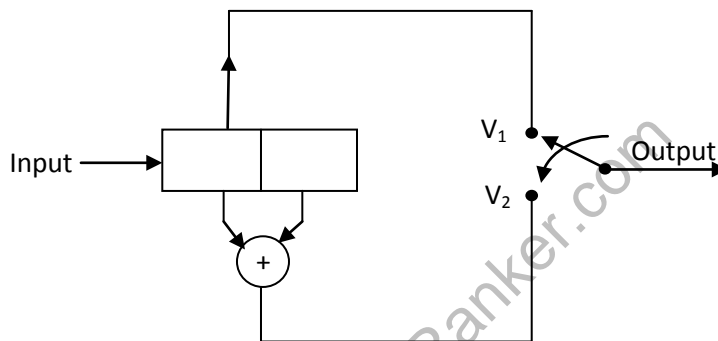
- 10 Consider a (7, 4) linear block code with parity check matrix H given by:

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

- (a) Construct code words for this (7, 4) code.
- (b) Show that this code is a hamming code.
- (c) Illustrate the relation between the minimum distance and the structure of the parity check matrix H by considering the codeword 0101100.

OR

- 11 Consider the convolutional encoder shown in figure below.



- (a) Find the impulse response of the encoder.
- (b) Sketch the state diagram, the tree diagram and trellis diagram.
