

Code: 15A04502

B.Tech III Year I Semester (R15) Supplementary Examinations June 2018

**DIGITAL COMMUNICATION SYSTEMS**

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) Differentiate uniform and non-uniform quantization.
  - (b) What is the role of regenerative repeaters in PCM?
  - (c) State the properties of matched filter.
  - (d) What is ISI?
  - (e) Illustrate the geometric representation of energy signals for a two-dimensional signal space with three signals, that is,  $N = 2$  and  $M = 3$ .
  - (f) With a neat diagram, explain the vector receiver part of the correlation receiver.
  - (g) Draw the block diagram for QPSK receiver.
  - (h) Plot the BPSK signal for the given sequence 0010110010.
  - (i) What is the difference between block code and convolution code?
  - (j) Find the hamming distance between 101010 and 010101. If the minimum hamming distance of a  $(n, k)$  linear block code is 3, what is its minimum hamming weight?

**PART – B**

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

**UNIT – I**

- 2 With neat block diagram, explain the PCM communication system.

**OR**

- 3 With a neat block diagram, explain the delta modulation and demodulation also discuss the types of quantization errors occurring in it.

**UNIT – II**

- 4 Discuss about the Nyquist's criterion for distortion less base band binary transmission.

**OR**

- 5 Explain briefly about baseband M array PAM transmission.

**UNIT – III**

- 6 Explain the methods to find basis function in Gram-Schmidt Orthogonalization procedure.

**OR**

- 7 What is matched filter receiver? Obtain the impulse response of the matched filter.

**UNIT – IV**

- 8 Discuss about the bit error probability and power spectra of BPSK signal.

**OR**

- 9 With block diagram, explain the generation and detection of DPSK.

**UNIT – V**

- 10 Consider a  $(6, 3)$  linear block code whose generator matrix is:

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

- (i) Determine if the code is a Hamming code. Find the parity check matrix  $H$  of the code in systematic form. (ii) Find the encoding table for the linear block code. (iii) What is the minimum distance  $d_{\min}$  of the code? How many errors can the code detect? How many errors can the code correct? (iv) Find the decoding table for the linear block code.

**OR**

- 11 A convolutional encoder has single shift register with two stages three modulo-2 adders and an output multiplexer. The following generator sequences are combined by the multiplexer to produce the encoded output.

$$g_1 = (1, 0, 1); g_2 = (1, 1, 0); g_3 = (1, 1, 1)$$

- (i) Draw the block diagram of the encoder  
(ii) For the message sequence (10011), determine the encoded sequence.