

B.Tech III Year I Semester (R13) Regular & Supplementary Examinations November/December 2016
DIGITAL COMMUNICATION SYSTEMS
 (Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
 (Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- Mention different types of quantization errors associated with Delta modulation system.
- What is differential pulse code modulation?
- Draw the block diagram of a modified duobinary signaling scheme.
- List the merits of eye pattern in pulsed binary data transmission system.
- State the properties of matched filter receiver.
- Obtain the signal constellation of 8 PSK modulated symbols.
- Write all the important performance parameters considered for deciding a particular digital modulation technique.
- Consider a binary sequence 011010. Draw the QPSK modulated waveform.
- What is the need of error correcting code?

- (i) The parity check matrix for a (7,4) linear block code is given by: $H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$. Find the codeword for the input message combination of 1010.

PART – B

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

UNIT – I

- 2 A linear delta modulator is designed to operate on speech signals limited to 3.4 kHz. The specifications of the modulator are as follows. Sampling rate = $10f_{\text{Nyquist}}$, Where f_{Nyquist} is the Nyquist rate of the speech signal, step size $\Delta = 100$ mV. The modulator is tested with a 1 kHz sinusoidal signal. Determine the maximum amplitude of this test signal required to avoid slope over load distortion.

OR

- 3 Explain with neat block diagram, encoding of analog signals using Pulse Code modulation technique.

UNIT – II

- 4 What is intersymbol interference? Explain the behavior of intersymbol interference for the baseband binary PAM transmission system.

OR

- 5 Explain the operation of duo-binary encoding scheme with neat block diagram and necessary mathematical equations. Also perform the encoding and decoding of binary sequence using duobinary signalling scheme.

UNIT – III

- 6 Explain with neat block diagram the structure and behavior of Matched filter receiver.

OR

- 7 State and prove Gram-Schmidt orthogonalization procedure.

UNIT – IV

- 8 Derive the expression for bit error probability of a binary phase shift keying modulation.

OR

- 9 Compare the transmission power, bandwidth and bit error rate parameters of various digital modulation techniques.

UNIT – V

- 10 Explain the operation of convolution code generation by using an appropriate shift register and modulo-2 adder configurations.

- 11 Consider a (6, 3) systematic linear block code, the three parity-check digits C_4 , C_5 and C_6 are $C_4 = d_1 + d_2 + d_3$, $C_5 = d_1 + d_2$ and $C_6 = d_1 + d_3$. Construct the appropriate generator matrix for this code and all possible code words.
