Code No: 09A60404 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year II Semester Examinations, June – 2014
DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Explain the bandwidth- S/N tradeoff.
b) Explain about the line coding and scrambling.
c) List the advantages of digital communications.

2.a) Explain the compression laws μ-Law and A-Law.
b) Consider a low pass signal with a bandwidth of 3 KHz. A linear delta modulation system with a step size Δ=0.1V is used to process this signal at a sampling rate ten times the Nyquist rate.
i) Evaluate the maximum amplitude of a test sinusoidal signal of frequency 1 KHz which can be processed by the system without slope overload distortion.
ii) For the specifications given in part (i) evaluate the output signal to noise ratio under pre filtered and post filtered conditions.

3.a) Explain the DPSK transmitter and receiver.
b) Explain the non coherent ASK detector in detail.

4.a) What is inter symbol interference (ISI) and ISI free signals? Explain.
b) Obtain the optimum filter transfer function.

5.a) State and prove the properties of mutual information.
b) Consider a discrete memory less source with a alphabets $\{s_0, s_1, s_2\}$ and statistics {0.7, 0.15, 0.15} for its output.
i) Apply Huffman algorithm to this code. Hence show that the average code word length of the Huffman code equal to 1.3 bits/symbol.
ii) Let the source be extended to order two. Apply the Huffman algorithm for the resulting extended source, and show that the average code word length of the Huffman code equal to 1.1975 bits/symbol.
iii) Compare the average code word length calculated in part (ii) with the entropy of the original source.

6.a) Draw the general form of a decoder for the cyclic code and explain the error correction procedure for it.
b) Describe the matrix description of linear block codes.

7.a) Compare Error Rates in Coded and Uncoded Transmission.
b) Discuss the code tree and trellis diagram for a convolution codes.

8.a) Explain the ranging using Direct Sequence spread spectrum.
b) Explain the slow and fast frequency hoping techniques in detail.

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