Code: 9A04601

R09

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2014/2015

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain in detail about non-uniform quantization.
(b) What is the disadvantage of uniform quantization over the non-uniform quantization?

2 (a) Explain T-1 carrier system used for long distance data transmission with special reference to the companding details and bit-rates.
(b) A Delta modulator is used to encode speech signal band-limited to 3 kHz with sampling frequency 100 kHz. For ±1 volt peak signal voltage, find (i) minimum step size to avoid slope overloading. (ii) signal to quantization noise ratio, if speech is assumed to have non-uniform probability density function (PDF).

3 (a) What is meant by ISI? Explain how it differs from cross talk in the PAM.
(b) What is the process to suppress (or) eliminate intersymbol interference? Explain in detail.
(c) An analog signal is PCM formatted and transmitted using binary waveforms over a channel that is band limited to 200 kHz. Assume that 32 quantization levels are used and that the overall equivalent transfer function is of the raised cosine type with roll off of 0.45. Find: (i) The maximum bit rate that can be used by this system without introducing ISI. (ii) The maximum bandwidth of the original analog signal that can be accommodated with these parameters.

4 (a) What are optimal filters? Derive the transfer function of optimum filter.
(b) What is the difference between base band transmission and band pass transmission? Distinguish them.

5 Draw and explain the block diagram of ARQ systems in detail.

6 (a) Explain the following terms: (i) Coding efficiency. (ii) Source coding.
(b) Consider the AWGN channel with S/N = 10^4. Find the maximum rate for reliable transmission when B = 1 kHz, 10 kHz and 100 kHz.

7 (a) Explain the operation of a DPSK system with the help of a block diagram.
(b) Compare different modulation/demodulation schemes used in digital pass band transmission systems.

8 (a) Compare and contrast between binary signaling scheme and M-ary signaling scheme.
(b) Explain about demodulation of QAM.

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