Code No.: 9A04601/R09

III B.Tech. II Semester Regular and Supplementary Examinations

April/May - 2013

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) Compare and contrast under sampling and over sampling.
   (b) What is quantization? Briefly explain about different types of quantization.

2. (a) What is mean by multiplexing? Explain in detail about TDM.
   (b) Write about different types of digital multiplexers.
   (c) Give the advantages of digital multiplexing.

3. (a) Describe spectral shaping by precoding.
   (b) An analog signal is PCM formatted and transmitted using binary waveforms over a channel that is band limited to 100 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 0.6. 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) Discuss the inter symbol interference problem and explain how Nyquist pulse shaping criterion is helpful in eliminating it.)

5. (a) Define burst of length (q) and briefly explain about the burst error correcting codes.
   (b) Draw and explain a decoder diagram for a (7, 4) majority logic code whose generator polynomial $g(X) = 1 + X + X^3$.

6. Explain the following,
   (i) Entropy
   (ii) Information rate
   (iii) Channel capacity
   (iv) Mutual information.

7. Derive a relation for probability of error and transfer function for optimum filter.

8. (a) Compare M-ary signaling scheme with binary scheme in terms of bandwidth requirements, probability of error and equipment complexity.
   (b) With the help of block diagram explain M-ary signaling scheme.