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First Semester M.Tech. Degree Examination, June/July 2013
Advanced Digital Communication

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1
 - a. Bring out the advantages and disadvantages of digital communication over analog communication. (08 Marks)
 - b. Explain the salient features of different types of channels used for digital communication. (08 Marks)
 - c. An analog signal is expressed by the equation $x(t) = 3 \cos 100\pi t + 10 \sin 400\pi t + \cos 200\pi t$, calculate the Nyquist rate and interval for the signal. (04 Marks)
- 2
 - a. Why line coding is required? For the binary bit stream 1011011 draw the waveform for the following cases:
 - i) Polar NRZ
 - ii) Manchester RZ
 - iii) Differential Manchester encoding (07 Marks)
 - b. A noisy channel has a bandwidth of 2 MHz of the SNR is 36 dB. Find the channel capacity. (05 Marks)
 - c. Find the code word to be transmitted from the source for 1100 information bits, when $g(n) = n^3 + n + 1$. (08 Marks)
- 3
 - a. Characterize the properties of ideal system. Discuss the “bandwidth efficiency” diagram. (10 Marks)
 - b. Explain the PCM signal processing operations in brief. (10 Marks)
- 4
 - a. Consider a DM system designed to operate at four times the Nyquist rate for a signal with a 4 kHz bandwidth. The step size of the quantizer is 400 mV.
 - i) Find the maximum amplitude of a 1 kHz I/P sinusoidal for which the DM does not show slope overload.
 - ii) Find the post filtered O/P SNR. (10 Marks)
 - b. Compare between DPCM, DM and ADM in detail. (10 Marks)
- 5
 - a. How the voice and video signals are combined in one data stream of communication? Explain in detail. (10 Marks)
 - b. Discuss the channel capacity theorem in detail. (07 Marks)
 - c. Explain the two dimensional parity checks in brief. (03 Marks)
- 6
 - a. The binary data 0010110 is applied to the input of a duobinary system. Construct the duobinary coder O/P and corresponding receiver O/P with a precoder. (06 Marks)
 - b. Explain how adaptive equalizers are realized (implemented). (06 Marks)
 - c. Explain the Nyquist’s criterion for distortionless baseband binary transmission in detail. (08 Marks)
- 7
 - a. Show that under the assumption of no slope overload distortion, the maximum output signal-to-noise ratio of a delta modulator, is proportional to the sampling rate cubed. (10 Marks)
 - b. What is correlative coding? Explain the generalized form of correlative coding with a neat diagram. (10 Marks)
- 8

Write short notes on:

 - a. Inter symbol interference
 - b. Quadrature amplitude modulation
 - c. Eye pattern
 - d. Zero forcing algorithm (20 Marks)

