Code No.: 9A04601/R09

III B.Tech. II Semester Regular and Supplementary Examinations

Set-2

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)   Explain the principle and working of a quantizer.

           (b)   Explain in detail about non-uniform quantization.

2.   (a)   Explain about the T-1 carrier system by presenting the frame structure.

     (b)   Explain DM system. Also discuss the slope overload distortion and granular noise present in it. Find the signal amplitude for the maximum slope overload error in a DM system. If the step size is 1 V with a repetition period of 1 msec the information signal frequency of 100 Hz.

3.   (a)   What is the process to suppress or eliminate intersymbol interference and explain in detail?

     (b) $x(t)$ is a triangular pulse of 1 ms width and 10^{-2} volt height. Assuming the channel noise to be white with a PSD of $\eta = 10^{-8}$ W/Hz, determine the signal to noise ratio at the output of the matched filter.

4.   (a)   What is the difference between base band transmission and band pass transmission? Distinguish both features.

     (b)   There are two different principles for shaping the spectrum of a PAM signal. Describe briefly these approaches. What are the central goals and properties (advantages and disadvantages) of these approaches? How does the transmitted signal spectrum depend on the used pulse shape?

5.   (a)   Explain the operation of convolutional encoders.

     (b)   Design an encoder for a (7, 4) binary cyclic code generated by $g(X) = 1 + x + x^3$ and explain the operation using the message vector (1 0 1 1).

6.   Derive an expression for channel capacity of continuous channel in the presence of white Gaussian noise.

7.   (a)   Explain DPSK modulation and demodulation with neat block diagram and differential encoding and decoding table.

     (b)   In a binary PSK scheme using correlation receiver, the local carrier waveform is $A \cos(\omega_c t + \theta)$ instead of $A \cos(\omega_c t)$ due to poor carrier synchronization. Derive an expression for the probability of error and compute the increase in error probability when $\theta = 15°$ and $A^2 T_b/\eta = 10$.

8.   (a)   Draw the block diagram of QPSK demodulator and explain in detail.

     (b)   Derive a relation for probability of error and bandwidth in QPSK.