Code: R7310406

R7

B.Tech III Year I Semester (R07) Supplementary Examinations, May 2013

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) Draw the block diagram of a PCM system and explain each block in detail.
(b) Give the advantages of PCM over other digital techniques.

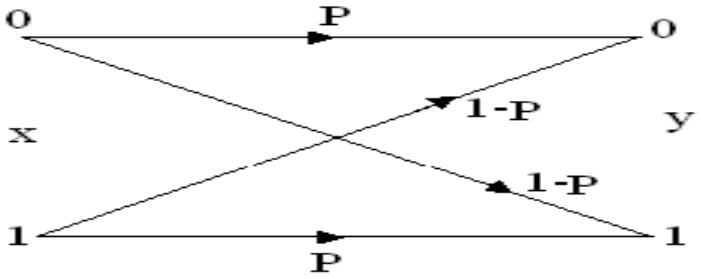
2 (a) Draw the block diagram of adaptive delta modulation and explain in detail with neat waveforms.
(b) Find the step size 'δ' required to prevent slope overload noise for the case when the input signal is $m(t) = A \sin w_m t$.

3 (a) What are power spectra? Explain power spectra of BPSK and BFSK signals along with graphs.
(b) What are three general methods used for synchronization in digital modulation schemes? Explain.

4 (a) Derive an expression for error probability of a optimum filter.
(b) Design a binary baseband PAM system to transmit data at a bit rate of 9600 bits/sec, with a bit error probability less than 10^{-5}. The channel available is an ideal low pass channel with a bandwidth of 9600 Hz. The noise can be white Gaussian with a two-sided power spectral density of $\eta/2=10^{-13}$ W/Hz. Find the transmitted power requirements.

5 Write short notes on the following:
(a) Mutual information.
(b) Self information.
(c) Logarithmic measure for information.

6 A Binary symmetric channel is shown in figure:



$P(x = 0) = \propto$ and $p(x = 1) = 1-\propto$. Determine the channel capacity of binary symmetric channel.

7 Design an encoder for the (7, 4) binary cyclic code generated by $g(x) = 1 + x + x^3$ and verify its operation using the message vector (0 1 01).

8 (a) What are convolution code? How are they different from block codes?
(b) What is constraint length for convolutional codes?

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