

Code: R7310406

R7

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

DIGITAL COMMUNICATIONS

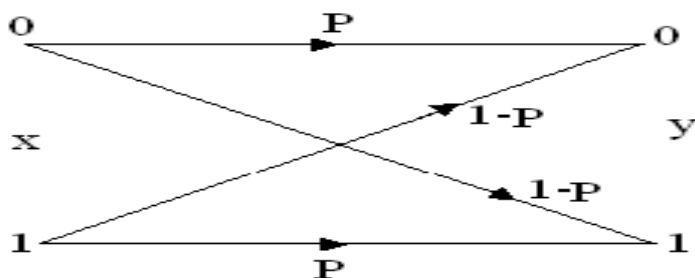
(Electronics and Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 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 $m(t) = A \sin \omega_m t$.
- 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:



$P(x=0) = \alpha$ and $p(x=1) = 1-\alpha$. 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?
