

R07**Code: R7310406**

B.Tech III Year I Semester (R07) Supplementary Examinations December 2015

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

- 1 (a) Draw the block diagram of digital communication system and explain each block in detail.
(b) Mention the advantages of digital communication over analog communication.
- 2 (a) With a neat block diagram, explain the operation of delta modulation system.
(b) A DM system is designed to operate at 3 times the Nyquist rate for a signal with 3 kHz bandwidth. The quantizing step size is 250 mV.
(i) Determine the maximum amplitude of a 1 kHz input sinusoid for which the delta modulator does not show slope overload.
(ii) Determine the post-filtered output signal to quantizing noise ratio for the signal of part (i) above.
- 3 (a) Explain with neat block diagram the generation and receiving of BFSK signals.
(b) Evaluate the magnitude spectrum for an FSK with alternating 1 and 0 data. Assume that the mark frequency is 50 kHz, the space frequency is 55 kHz and the bit rate is 2400 bits/sec. Find the first null-to-null bandwidth.
- 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 and 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 (a) A source emits one of four symbols during each signaling interval. The symbols occur with the probabilities of 0.4, 0.3, 0.2, 0.1. Find the amount of information gained by observing the source emitting each of these symbols.
(b) Let X represents the outcome of a single roll of a fair die. What is the entropy of X?
- 6 (a) Calculate the bandwidth limits of Shannon-Hartley theorem.
(b) What is an Ideal system? What kind of method is proposed by Shannon for an Ideal system?
- 7 What are cyclic codes? Why they are called subclass of block codes.
- 8 Draw the block diagram, explain the operation of any Convolution code.
