

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Suppl.) Examination, December 2010

Subject : Digital Communication systems

Time : 3 Hours

Max.Marks: 75

Note: Answer all questions from Part – A. Answer any Five questions from Part – B.

PART – A (25 Marks)

1. Distinguish between DPCM & DM. 2
2. Derive the expression for quantization error in PCM system. 3
3. An analog signal is band limited to 3 Hz sampled at the Nyquist rates, and samples are quantized into 4 levels. The quantization levels Q_1, Q_2, Q_3 and Q_4 are assumed independent and occur with probabilities $P_1 = P_4 = 1/8$ and $P_2 = P_3 = 3/8$. Find the information rate of the source. 2
4. Show that $I(X;Y) = H(X) - H(X/Y)$ or $H(Y) - H(Y/X)$. 3
5. List the properties of standard array. 3
6. What are the advantages of convolutional codes over linear block codes? 2
7. Sketch the impulse response of the matched filter. 3
8. List the assumptions while deriving the probability error in order to compare the digital modulation schemes. 2
9. Explain the direct sequence spread spectrum. 2
10. Explain how to obtain ranging using direct sequence spread spectrum. 3

PART – B (50 Marks)

- 11.(a) Draw the block diagram of PCM system and explain. 4
- (b) Derive the expression for the Band width of the PCM system. 2
- (c) In telephone channels, each band limited to 3.4 KHz, are to be time division multiplexed by using PCM. Calculate the band width of PCM system for 128 quantization levels and on 8 KHz sampling frequency. 4
- 12.(a) Explain the Huffman coding algorithm. 3
- (b) Find the efficiency of the code using Huffman coding algorithm. 5
- Message : $x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7$
Probability : 0.4 0.2 0.12 0.08 0.08 0.08 0.04
- (c) Calculate the capacity of Gaussian channel with band width of 1 MHz and S/N ratio of 3003. 2
- 13.(a) Explain the encoding of binary cyclic codes using n-k bit shift register. 4
- (b) Design a feedback shift register encoder for an (8,5) cyclic code with a generator $g(x) = 1+x+x^2+x^3$ use the encoder to find the code word for the message 10101 in systematic form. 6
- 14.(a) Describe the coherent FSK and PSK schemes. Show that coherent FSK is 3dB inferior to coherent PSK system. 7
- (b) Compare binary digital modulation schemes. 3
- 15.(a) Explain the generation and characteristics of PN sequences. 5
- (b) Explain the acquisition of FH signal using coarse synchronization. 5
- 16.(a) Explain the principles of DPSK modulator. 5
- (b) Explain the correlation receiver. 5
17. Write short notes on the following: 3
- a) Vocoders