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Question Paper Code : 51245

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Sixth Semester

Electronics and Communication Engineering

080290039 — DIGITAL COMMUNICATION

(Regulation 2008)

Time : Three hours . Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State sampling theorem for band-limited signals of finite energy.

2. Compare uniform and non-uniform quantization.

3. Sketch the power spectra of different binary data formats.

4. Define inter symbol interference.

5. State Maximum likelihood criterion.

6. Sketch the two subsystems of the correlation receiver.

7. List the errors that are detected by cyclic redundancy check codes.

8. Give the asymptotic coding gain for binary input AWGN channel.

9. List the properties of Gold sequence.

10. Define Jamming margin.

PART B — (5 × 16 = 80 marks)

11. (a) (i) How would you reconstruct the message from it's samples. Explain the concept for the following signal $g(t) = 15\cos(10\Pi t)\cos(300\Pi t)$, which is sampled at the rate of 300 samples per second. Determine the spectrum of the resulting sampled signal. (8)

(ii) Describe and Illustrate Time Division Multiplexing. (8)

Or

(b) Describe and Illustrate Delta modulation and explain how Adaptive delta modulation performs better and gains more SNR than Delta modulation. (16)

12. (a) (i) Determine the powerspectral density for NRZ bipolar and unipolar data formats. Assume that 1 s and 0s in the input binary data occur with equal probability. (8)

(ii) Discuss the performance of any data transmission system by illustrating the eyepattern. (8)

Or

(b) (i) Describe modified duobinary coding technique and its performance by illustrating it's frequency and impulse responses. (8)

(ii) Describe and illustrate the modes of operation of an adaptive equalizer. (8)

13. (a) Describe the generation, detection, signal space diagram, power spectra and bandwidth efficiency of Quadrature Phase Shift Keying. (16)

Or

(b) Describe how Minimum Shift Keying is derived from Continuous Phase Frequency Shift Keying by illustrating phase tree and signal space diagram. (16)

14. (a) (i) Show that the decoder for a Hamming code fails if there are two or more transmission errors in the received sequence. (8)

(ii) Describe Trellis coded modulation and construct the trellis for an Ungerboeck 4-state for 8-PSK. (8)

Or

(b) Figure 1. Shows the encoder for a rate $r = 1/2$, constraint length K = 4 convolutional code. Determine the encoder output produced by the message sequence 10111..... using the following two approaches. (16)

(i) Time-domain approach, based on convolution

(ii) Transform-domain approach.

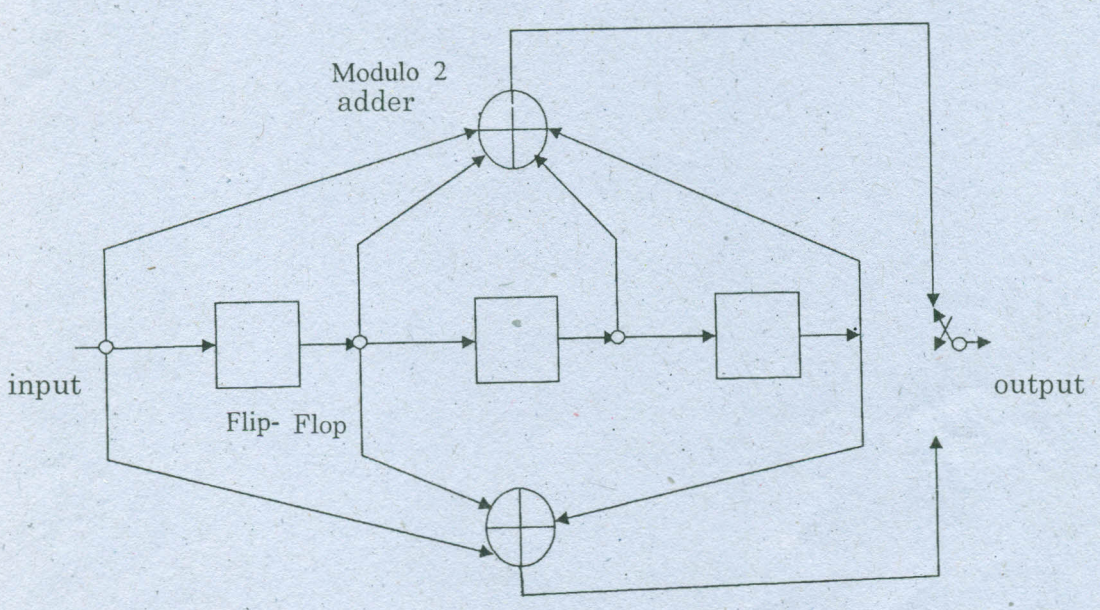

Figure. 1

15. (a) Describe the implementation of Direct Sequence Spread Spectrum and discuss it's signal space dimensionality and processing gain. (16)

Or

(b) Describe the slow and fast frequency hopping spread spectrum and compare their performance based on probability of symbol error. (16)