ANNA UNIVERSITY – 2007
B.E/B.TECH DEGREE EXAMINATION
DIGITAL COMMUNICATION
(ELECTRICAL & ELECTRONICS ENGINEERING)

TIME-3HOUR
MARK-100

ANSWER ALL QUESTIONS

PART A (10 X 2 = 20)

1. If x(t) = cos (2pt / T) sin (4 pt / T) is to be sampled, what is the maximum sampling interval?

2. Find the step size S when a signal m(t) = 5 sin(2pft) is quantized using uniform quantizer to achieve an SNR= 1536.

3. What is inter symbol interference? Explain.

4. What is raised cosine pulse? Explain.

5. Obtain the signal constellation of a QPSK signal.

6. Compare the bandwidth efficiency of the M-ary FSK and M-ary PSK modulation schemes.

7. Obtain the parity cheque matrix of a (5,1) repetition code whose generator matrix is G = [11111]

8. Give the Hamming bound of (n,k) linear block code and hence explain perfect code.

9. List the applications of spread spectrum systems.

10. List the properties of PN sequence and explain..

PART B (5 X 16 = 80)

11. It is required to transmit data at the rate of 2Mbps through a channel whose bandwidth is 2MHz and No = 10-14 W/Hz.

i) Suggest a suitable modulation scheme and find out the amplitude of the transmitted carrier to achieve a BER of 10-5 at the receiver and the bandwidth efficiency ? of the system and

ii) If the required ? is 0.5, what modulation scheme would you choose for transmission and draw the block diagram of the modulator and demodulator for the same.

12.a) With the help of a neat block diagram, explain the encoder and decoder of differential PCM system. Also obtain an expression for prediction coefficient of first order predictor.

(OR)

12.b)i) Explain the encoder and decoder for Delta Modulation.

ii) What are slope overload and granular noise? How to overcome them.

13.a) Derive and plot the power spectra of NRZ unipolar and bipolar format signals.

(OR)

13.b) Draw the block diagram of duobinary encoder and decoder and explain. What are the draw backs of this scheme? Suggest a method to overcome the same.

14.a) For(7,4) Hamming code with the generator binomial g(D) = 1+D2 + D3

(i) Form the generator matrix in systematic form.

(ii) Obtain the code word polynomial for a message polynomial m(D) = 1+D+D3.

(iii) Design the encoder for the above code.

(OR)

14.b) For a (2,1,3) convolution code with g1 = (1 0 1 1) and g2 = (1 1 1 1), design the encoder and find the following.

(i) Generator matrix

(ii) Transfer function matrix Compute the coded output using both the methods assuming the input u = (101101).

15.a) Explain with the help of block diagrams and waveforms, the following techniques of spread spectrum communication.

(i) Direct sequence

(ii) Frequency hopping

(OR)

15.b)i) Derive an expression for Jamming margin for direct sequence spread spectrum system with BPSK modulation.

ii) An PN sequence is generated using a feed back register of length m = 4. The chip rate is 107 chips per sec. Find the length, chip duration and the period of the PN sequence.