(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3091 Roll No.

B. Tech.

(SEM. VI) EXAMINATION, 2008-09

DIGITAL COMMUNICATION

Time : 3 Hours] *[Total Marks : 100*

Note : Attempt any **four** parts of the following:

1 (a) Discuss following terms in short: 5

(i) Bay's rule of probability

(ii) Entropy.

(b) What are advantages of digital communication over analog communication? 5

(c) A source is emitting 4 symbols with probabilities 1/2, 1/4, 1/8 and 1/8. What is entropy of source and what should be code length if code efficiency is 100%? 5

(d) A source is emitting 4 equiprobable symbols. Construct a Huffman Code for source. 5

(e) A channel has a bandwith of 8 kHz, what is channel capacity if signal to noise ratio being 31. For same channel capacity if signal to noise ratio is increased to 61, then what will be new channel bandwidth? 5

(f) A binary symmetric channel (BSC) error probability is Pe - The probability of transmitting 1 is Q, and that of trasmitting O is 1-Q. Determine the probabilities of receiving 1 and O at the receiver. 5

2 Attempt any **four** partsof the following:

(a) What are slope overload and Granular Noise problems in Delta Modulation? How these problems can be avoided? 5

(b) Discuss Differential Pulse Code Modulation (DPCM) with the help of neat sketches of modulation and demodulation. 5

(c) Explain following line coding schemes with at least one example of each. 5

(i) Manchaster

(ii) Bipolar.

(d) Write a short noteon Raised Cosine Spectrum 5

(e) A signal is sampled at 8 kHz and is quantized using 8 bits in a PCM modulator. Calculate data rate and signal to Noise Ratio considering sinusoidal signal. 5

(f) Write a short note on Matched Filter receiver. 5

3 Attempt any **two** parts of the following:

(a) Explain Quadrature Phase Shift Keying (QPSK) modulation and demodulation techniques. **10**

(b) (i) What do you understandby ASK and PSK modulation scheme? **5+5=10**

(ii) Draw spectrum and calculate transmission bandwidth of a standard BPSK signal. Consider bit period equal to 0.1 msec and a carrier frequency of 100 kHz. Carrier is sinusoidal.

(c) How FSK modulation and demodulation is done? Expain using block diagrams of modulation and demodulation. **10**

4 Attempt any **two** parts of the following:

(a) Explain T PCM hierarchy system fromT1 to T4 level. **10**

(b) (i) Line Coding used in T1 multiplexing scheme is AMI with B8ZS. Explain this line coding with its advantages over other line coding schemes. **5**

(ii) What is Time Division Multiplexing and what is advantage of using TDM? Also explain how TDM commutator works? **5**

(c) Explain T1 frame format and also discuss T1 super frame structure. **10**

5 Attempt any **four** parts of the following:

(a) Write short notes on: **5**
   (i) Trellis Diagram
   (ii) Cyclic Codes

(b) Construct systematic (7,4) cyclic code using generator polynomial $g(n) = x^3+x^2+1$ **5**

(c) Show that C = { 000, 111 } is a linear code and C = {000, 001,101} is not a linear code. **5**

(d) What do you mean by: **5**
   (i) Generator Matrix
   (ii) Parity-check Matrix

(e) Write a short note on convolutional codes. **5**

(f) Explain generation and coding cyclic codes. **5**