

- 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 5  
 generator polynomial  $g(n) = x^3 + x^2 + 1$
- (c) Show that  $C = \{000, 111\}$  is a 5  
 linear code and  $C = \{000, 001, 101\}$  is not  
 a linear code.
- (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



(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 5  
 over analog communication?
- (c) A source is emitting 4 symbols with probabilities 5  
 $1/2, 1/4, 1/8$  and  $1/8$ . What is entropy of source  
 and what should be code length if code efficiency  
 is 100%?
- (d) A source is emitting 4 equiprobable symbols. 5  
 Construct a Huffman Code for source.
- (e) A channel has a bandwidth of 8 kHz. what is 5  
 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?





- (f) A binary symmetric channel (BSC) error probability is  $P_e$ . The probability of transmitting 1 is  $Q$  and that of transmitting 0 is  $1-Q$ . Determine the probabilities of receiving 1 and 0 at the receiver. 5 3

2 Attempt any four parts of 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) Manchester
- (ii) Bipolar.
- (d) Write a short note on 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

Attempt any two parts of the following:

- (a) Explain Quadrature Phase Shift Keying (QPSK) modulation and demodulation techniques. 10
- (b) (i) What do you understand by 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? Explain using block diagrams of modulation and demodulation. 10

4 Attempt any two parts of the following:

- (a) Explain T PCM hierarchy system from T1 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

