

# FACULTY OF ENGINEERING

B.E. 3 / 4 (ECE) II Semester (Supplementary ) Examination, December 2006

Subject : Digital Communication Systems

Time : 3 Hours}

{Max. Marks : 75

**Note :** Answer All questions of Part – A and Answer any five questions from Part-B. Assume any data if missing .

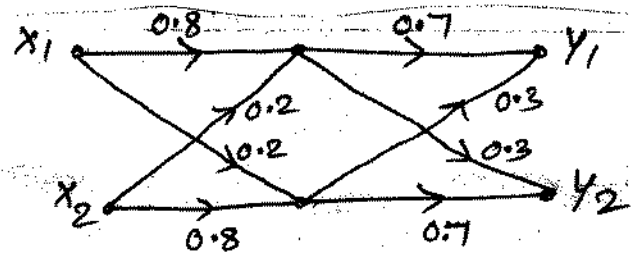
### PART – A (25 Marks)

1. Discuss about maximum length shift register codes. (3)
2. Explain the terms processing gain and jamming . (2)
3. Define PN sequence and give an example. (2)
4. Define information and entropy of a discrete memory less source. (3)
5. List the advantages of convolution codes over block codes . (2)
6. Distinguish between base band transmission and band pass transmission. (2)
7. Calculate the capacity of a low pass channel with a usable band width of 3 KHZ and S/N = 100 at the channel output. (3)
8. What is companding ? Draw the input – output characteristics of compressor. (3)
9. List the advantages and disadvantages of Delta modulation over PCM. (3)
10. Why coding of information is required ? (2)

### PART – B (50 Marks)

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- 11.(a) ~~Derive~~ <sup>Derive</sup> the expression for optimum gain in DPCM.
- (b) Derive the condition for optimum quantization step in case of
  - (i) Uniform quantization
  - (ii) Non- uniform quantization
- 12.(a) Derive the channel capacity of a binary symmetric channel with a symbol transmission error probability 'P'.
- (b) Find the channel capacity for the channel shown below.



- 13.(a) Define channel coding theorem and explain the need of channel coding.
- (b) Consider the (15,11) Cyclic Hamming code generated by
 
$$g(x) = 1 + x + x^4$$
  - (i) Determine the parity polynomial  $h(x)$  of this code
  - (ii) Determine the generator polynomial of its dual code
  - (iii) Find the generator and parity matrices in symmetric form

..2..

- 14.(a) Consider the (3,1,2) convolution code with  $g^{(1)} = (110)$ ,  $g^{(2)} = (101)$ ,  
 $g^{(3)} = (111)$ .
- (i) Draw the encoder block diagram
  - (ii) Find the generator matrix 'G'
- (b) Compare binary and quaternary modulation schemes.
- 15.(a) Describe the structure of feed back shift register for generating PN sequences.
- (b) Discuss about synchronization and tracking of frequency HOP spread spectrum signals.
- 16.(a) Compare correlation receiver with matched filter receiver.
- (b) Derive an expression for bit error rate for coherent binary FSK.
17. Write short notes on the following :
- (a)  $\mu$  - law and A - Law
  - (b) BCH codes

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