M.E. First Semester (Digital Electronics) (Part Time / Full Time) (C.G.S.- New)

13206 : Digital Communication Techniques : 1 UMEF 4

P. Pages : 2 **AW - 3760**

Time : Three Hours * 0 3 6 6 * Max. Marks : 80

Notes : 1. All question carry equal marks.
2. Answer **three** question from Section A and **three** question from Section B.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Derive expression for power density spectrum of CPFSK. **6**

b) Explain memory-less modulation with signal space diagram. Explain digital PAM system. **7**

OR

2. a) Derive an expression for output SNR of matched filter in frequency domain. **7**

b) How M-ary optimum receiver can be designed using correlators. **6**

3. a) Find the code word for binary sequence 10101110001010010101001100 11 using Lempel-Ziv Algorithm. **7**

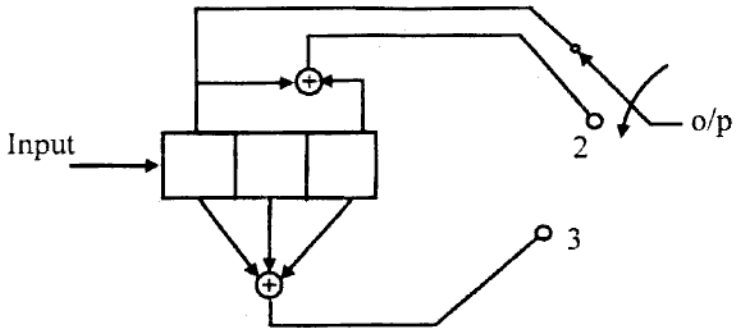
b) What are the different analog source coding techniques that are designed to represent the time domain characteristics of the signal ? Explain any two technique in detail. **6**

OR

4. a) Consider a discrete memoryless source with seven possible symbols. **7**
$x_1, x_2, x_3 \ldots\ldots x_7$ having the probability 0.004, 0.005, 0.04, 0.10, 0.25. 0.30, 0.25 resp. Obtained the Huffman code for each of the symbol, calculate average length entropy & efficiency of source.

b) Explain with example vector quantization in detail. **6**

5. a) A convolution encoder of rate ½ k = 3 shown in fig. **8**



Assume that the encoder is in the all zero state initially.
Draw : i) Tree diagram ii) Trellis diagram iii) State diagram

b) Explain Reed Muller codes. 6

OR

6. a) Explain stack sequential decoding algorithm with an example for decoding a rate 1/3 convolutional code. 7

b) Determine the generator polynomial and rate of double error correcting Reed Solomon code with a block length n = 7. 7

SECTION - B

7. a) State and prove Nyquist criterion for zero ISI. 6

b) What are the methods for detecting the information symbols at the receiver for the controlled ISI signals ? Explain any one. 7

OR

8. a) Explain what is partial response signalling. 6

b) What is Eye pattern ? Draw eye pattern for an 8 PSK signal in the absence of ISI and noise explain in detail. 7

9. a) Explain working of linear transversal filter. 7

b) What do you mean by a decision directed mode of adaptation. Explain zero forcing equalizer. 7

OR

10. a) With regards to the probability of error discuss the linear MSE Equalizer. 7

b) Define peak distortion criterion. Explain the minimization of peak distortion assuming that the equalizer have finite number of taps. 7

11. a) Explain and draw the block diagram of QPSK modulator for a D S spread spectrum system. 6

b) What are the applications of D S spread spectrum signal. Explain any one in detail. 7

OR

12. a) With neat block diagram explain Delay - locked loop (DLL) for PN code tracking. 6

b) Explain with block diagram time hopping spread spectrum system ? 7

****