

M.E. First Semester (Electronics & Tele.) (Full Time) (C.G.S.- New)  
**13333 : Digital Communication Techniques : 1 ENTC 3**

P. Pages : 2  
Time : Three Hours



**AW - 3628**  
Max. Marks : 80

- Notes :
1. Answer **three** question from section "A" and **three** questions from section "B"
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answer necessary with the help of neat sketches.
  5. Use of pen Blue/Black ink/refill only for writing the answer book.

**SECTION – A**

1. a) Derive expression of probability of error for m-array signals. 7  
b) Derive the expression for power spectra of CPFSK in detail. 7

**OR**

2. a) Derive expression for signal to noise ratio of matched filter demodulator. 7  
b) Explain signal space and vector space concept in detail. 7
3. a) Show that the entropy of an n-dimensional Gaussian vector  $X = (x_1, x_2, x_3, \dots, x_n)$  with zero mean and covariance matrix C is 7  
$$H(x) = \frac{1}{2} \log (2\pi e)^n |C|$$
  
b) Explain average mutual information & entropy of discrete memory – less sources. 6

**OR**

4. a) Explain rate distortion function, scalar and vector quantization. 7  
b) Explain in detail Lempel – Ziv algorithm with suitable example. 6
5. a) Explain in detail BCH code. 6  
b) Explain trellis code modulation. 7

**OR**

6. a) Explain the temporal wave form coding for PCM and DPCM with block diagram. 7  
b) Explain in detail stock algorithm for channel coding. 6

**SECTION – B**

7. a) Explain effect of ISI on eye opening. 7  
b) Discuss the probability of error detection for PAM with zero ISI. 7

**OR**

8. a) Explain the data detection for controlled ISI. 7  
b) Explain the Nyquist pulse shaping criteria for zero and controlled ISI. 7  
9. a) Explain in detail decision Feedback equalization and its performance characteristics. 7  
b) Explain in detail peak distortion criteria. 6

**OR**

10. a) Explain in detail LMS algorithm. 6  
b) Explain in detail adaptive linear equalization. 7  
11. a) Explain the following terms 6  
i) Processing Gain  
ii) Jamming margin.  
b) Explain in detail block schematic of direct sequence spread spectrum system. 7

**OR**

12. a) Explain fast frequency hopping in spread spectrum system. 6  
b) Explain synchronization of spread spectrum signal through acquisition and tracking. 7

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