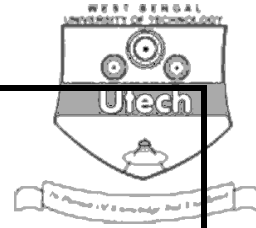
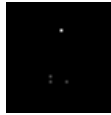


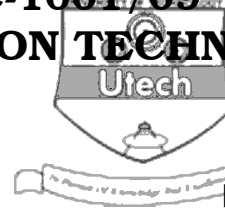
[Full Marks : 70



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CS/M.TECH (ECE)/SEM-2/EC-1001/09
MODERN DIGITAL COMMUNICATION TECHNIQUE
SEMESTER - 2



Full Marks : 70

Time : 3 Hours]

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* of the following.

5 × 14 =

1. What is PSEUDONOISE sequence ? Why is it so called ? State the randomness properties of a pseudonoise sequence. Generate a PN sequence with linear feedback shift register and test these properties. Draw the normalized auto correlation function of a PN sequence and explain. 14
2. a) In a Frequency hopping spread spectrum system the input data rate is 150 bits/s. The modulation technique used is 8-ary FSK. The frequency is hopped once per symbol. Draw the time-bandwidth plot of the communication system and explain.
b) With a neat block diagram, explain the principle of working of a Frequency hopping spread spectrum communication system. 7 + 7
3. a) What is an optimum filter ? For an optimum filter find the expression of probability of error.
b) What is noise bandwidth ? Find the noise bandwidth for low-pass RC filter.
c) Find the peak signal to RMS noise output voltage ratio for an integrate and dump receiver. 5 + 4 + 5
4. a) Describe briefly the different components of a digital communication system.
b) What is HDB3 signaling ?
c) Code the following input digits with HDB3 and draw the transmitted waveform :



1 0 1 0 0 1 0 0 0 0 1 0 1 0 1 1 0 0 0 0 1 0 0 0 0 1 1 0 1 0 0 0 0 1. 6 + 5 + 3



5. a) What do you mean by ISI ?
 b) Describe Nyquist criterion for zero ISI with neat diagram.
 c) What is the disadvantage of controlled ISI scheme ? How can it be eliminated ?
 4 + 5 + 5
6. a) Explain Detection error probability with proper diagram.
 b) Find expressions for error probability of on-off and bipolar signaling and hence make a comparative analysis.
 5 + 9
7. a) How can you represent a signal as a vector ?
 b) What is the difference between orthogonal and orthonormal signal set ?
 c) Prove that the integral of the product of two signals is equal to the scalar product of the corresponding vectors.
 d) What are basis vectors and why are they called so ?
 e) A signal space consists of 4 signals $x_1(t)$, $x_2(t)$, $x_3(t)$ and $x_4(t)$ shown below. Determine a suitable set of basis vectors and the dimensionality of the signals. Represent these signals geometrically in the vector space.
 2 + 2 + 2 + 2 + 6

Dia.

8. Write short notes on any *two* of the following :
 7 + 7
- OFDM
 - Factors influencing fading
 - Linear filtering of noise
 - CDMA.



END

