Exam.Code:0930

Sub. Code: 33675

2015

B.E. (Electronics and Communication Engineering)-6th Semester

EC-603: Digital Communication

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.***

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1.(a) What is Entropy? (2)

(b) Draw constellation diagrams for BFSK & BPSK and their modulated waveforms considering input as 10110001. (2)

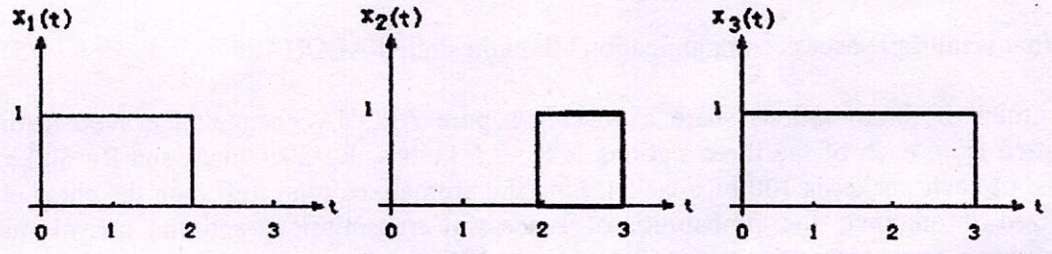
(c) What is throughput? Give its minimum & maximum possible values in case of ALOHA. (2)

(d) What is Inter Symbol Interference? (2)

(e) Why is FM signal not called spread spectrum signal? (2)

Part- A

2.(a) Consider the signals $X_1(t)$, $X_2(t)$, & $X_3(t)$ as shown in figure given below:



Use Gram-Schmidt Orthogonalization procedure to find an ortho-normal basis for the given set of signals. (5)

(b) How do we demodulate BPSK signals ? (5)

P.T.O.

3.(a) Draw the state diagram, tree diagram, and trellis diagram for the constraint length K=3, code rate as ½ generated by:

$$g_1(X) = 1+X + X^2$$

$$g_2(X) = 1+ X$$ (5)

(b) What is the Viterbi algorithm? Explain it with the help of suitable examples. (5)

4. (a) Consider that a source that produces six messages with probabilities $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}$ *and* $\frac{1}{32}$, Determine the average information contents in bits of a message. (3)

(b) What is the Continuous Phase FSK? Explain it with the help of block diagram. (5)

(c) How do we calculate the capacity of a Gaussian Channel? (2)

Part-B

5. (a) Describe three randomness properties that make pseudorandom signals appear to be random. Draw a block diagram for generating PN signal & verify its output for all the three randomness properties. (5)

(b) How do we synchronize DSSS ? Explain it with the help of suitable block diagram/s & give its performance parameters. (5)

6.(a) What is multiple access communication? Explain slotted-ALOHA. (5)

(b) A group of three stations share a 56-kbits/s pure ALOHA channel; the average bitrate transmitted from each of the three stations is R_1=7.5 kbits/s, R_2=20 kbits/s, and R_3=30 kbits/s. The size of each packet is 100 bits/packet. Find the normalized total traffic on the channel, the normalized throughput, the probability of successful transmission, and the arrival rate of successful packets. Assume that the arrival process is Poisson. (5)

7. (a) What is the need of pulse shaping for reduction of Inter Symbol Interference in baseband transmission? Explain with suitable examples. (5)

(b) How shaped pulses are detected/demodulated? (5)

X-X-X