Exam.Code:0930
Sub. Code: 6606

2014

B.E. (Electronics and Communication Engineering)

Sixth Semester

EC-603: Digital Communication

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

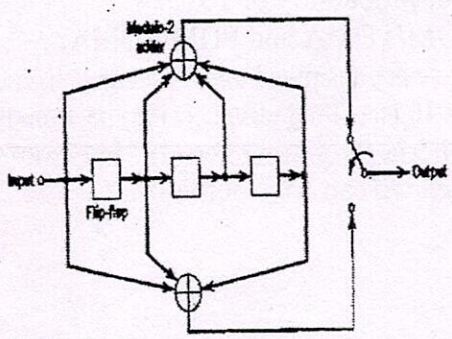
NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Use of scientific calculator is allowed.

x-x-x

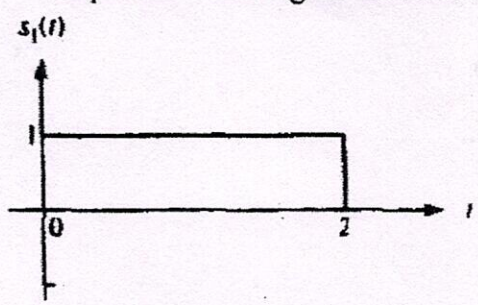
I. **(a)** Why we preferred to use low pass equivalent of any pass-band signal. **(2)**
(b) Define error bounds for convolutional codes. **(2)**
(c) Give Shannon capacity of CDMA systems. **(2)**
(d) Explain the processing gain of DS-CDMA systems. **(2)**
(e) What is run property of PN sequence. **(2)**

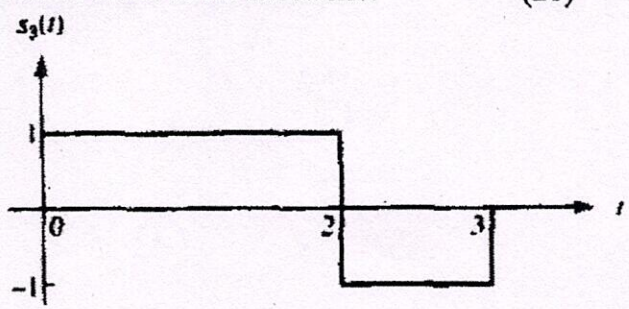
Part- A

II. **(a)** Prove that any given set of energy signals over given time interval can be completely described by a subset of energy signals whose elements are linearly dependent. **(5)**
(b) Construct trellis diagram for encoder shown below. Trace the path through trellis for message sequence 10111…. **(5)**



III. Apply Gram-schemdithe signals in the sequence s_4, s_3, s_2 and s_1 to construct basis functions. Represent each signal waveform in terms of these basis functions. **(10)**





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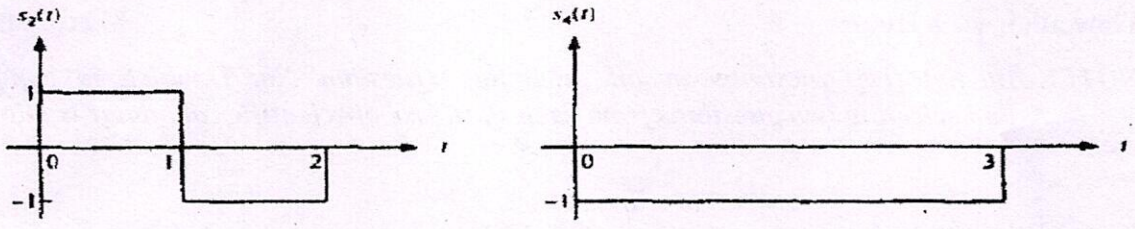

IV (a) Explain how to calculate capacity of Gaussian channels. What do you mean by bandwidth S/N trade off? **(5)**

(b) Show that BPSK and OPAK have same error probabilities. **(5)**

Part-B

V. (a) Explain error probability for DS-CDMA systems on AWGN channels. **(5)**

(b) Find capacity of DS-CDMA systems containing K users. It is given that system is interference limited rather than noise limited. **(5)**

VI. (a) A CDMA system is designed based on DSSS with processing gain of 1000 and binary PSK modulation. Determine number of users, if each user has equal power and desired level of performance with an error probability of 10^{-6}. **(5)**

(b) Differentiate TDM/TDMA and FDM/FDMA. **(5)**

VII.(a) A binary PAM wave is transmitted over baseband channel with maximum bandwidth of 75kHz. The bit duration is 10μsec. Find raised cosine spectrum that satisfy these requirements. **(5)**

(b) State Nyquist criteria for getting zero ISI in communication systems. Explain the methods by which we can control the ISI. **(5)**

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