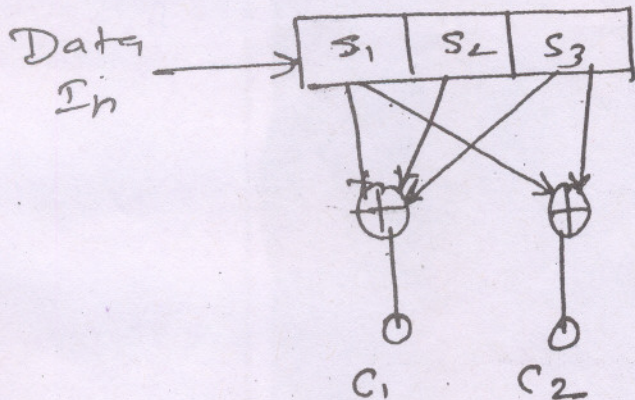


- N.B. : (1) Question No. 1 is compulsory.  
(2) Attempt any four questions out of remaining six questions.  
(3) Assume suitable data wherever necessary and justify it.

1. Attempt any four from the following :- 20
- (a) Explain need for equalization in digital communication system.
  - (b) Tamed FM
  - (c) The error function
  - (d) ISI and ICI.
2. (a) Explain the central limit theorem for random variables. 10  
(b) Explain in brief :- 10
- (i) Stationary and Non-stationary process.
  - (ii) Wide sense stationary process.
  - (iii) Ergodic process.
3. Explain in detail 16-QAM Transmitter and receiver system. Also draw signal constellation diagram for 16 QAM in detail. 20
4. (a) Distinguish between 'Matched Filter' and 'Correlator'. How are they related to each other. 10  
(b) Explain the principle and working of FHSS in detail. Differentiate between frequency hopping and fast frequency hopping. 10
5. (a) Explain the concept of "partial response signaling". What is the advantage of this type of signaling? 10  
(b) Draw the block diagram of a duobinary partial response signaling system and explain its working. 10
6. The generator polynomial for a (7, 4) cyclic code is  $g(x) = 1 + x + x^3$  20
- (a) Draw the block diagrams of an encoder and syndromes calculator for this code.
  - (b) Find the code polynomial for message vector (0 1 0 1).
  - (c) Assume that the first bit of the code vector for the message vector in (b) suffers transmission error. Find syndrome at the receiver.

7. (a) For the convolutional encoder shown below sketch the code tree.

10



(b) Write short notes on :

10

(i) Viterbi's algorithm

(ii) Compare coded and uncoded system.