3. PROBLEM SOVING METHODOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

APTITUDE TEST

Our college conducted aptitude test to develop the mathematical knowledge and logical reasoning to the students

1.A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train?

a) 120 meters
b) 180 meters
c) 324 meters
d) 150 meters

Answer: **Option d)**

2. A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is:

a) 45 km/hr
b) 50 km/hr
c) 54 km/hr
d) 55 km/hr

Answer: **Option b)**

3. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:

a) 15
b) 16
c) 18
d) 25

Answer: **Option b)**

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4. In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit?

a) 30%
b) 70%
c) 100%
d) 250%

Answer: **Option b)**

5. A father said to his son, "I was as old as you are at the present at the time of your birth". If the father's age is 38 years now, the son's age five years back was:

a) 14 years
b) 19 years
c) 33 years
d) 38 years

Answer**: Option a)**

6. Present ages of Sameer and Anand are in the ratio of 5: 4 respectively. Three years hence, the ratio of their ages will become 11: 9 respectively. What is Anand's present age in years?

a) 24
b) 27
c) 40
d) Cannot be determined
e) None of these

Answer**: Option a)**

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7. A watch which gains uniformly is 2 minutes low at noon on Monday and is 4 min. 48 sec fast at 2 p.m. on the following Monday. When was it correct?

a) 2 p.m. on Tuesday
b) 2 p.m. on Wednesday
c) 3 p.m. on Thursday
d) 1 p.m. on Friday

Answer: **Option b)**

Read each sentence to find out whether there is any grammatical error in it. The error, if any will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore the errors of punctuation, if any).

8. (Solve as per the **direction** given above)

a) A small baby breathes about
b) 45 times per minute while
c) a child of about six years breathes about 25 times per minute.
d) No error

Answer: **Option d)**

9. (solve as per the direction given above)

a) He was sure
b) that he should
c) win the Prize.
d) No error.

Answer: **Option b)**

In the following questions choose the word which is the exact OPPOSITE of the given words.

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10. ENORMOUS

a) Soft
b) Average
c) Tiny
d) Weak

Answer: **Option c)**

11. EXODUS

a) Influx
b) Home-coming
c) Return
d) Restoration

Answer: **Option a)**

In the questions below the sentences have been given in Active/Passive voice. From the given alternatives, choose the one which best expresses the given sentence in Passive/Active voice.

12. After driving professor Kumar to the museum she dropped him at his hotel.

a) After being driven to the museum, Professor Kumar was dropped at his hotel.
b) Professor Kumar was being driven dropped at his hotel.
c) After she had driven Professor Kumar to the museum she had dropped him at his hotel.
d) After she was driven Professor Kumar to the museum she had dropped him at his hotel.

Answer: **Option a)**

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13. They greet me cheerfully every morning.

a) Every morning I was greeted cheerfully.

b) I am greeted cheerfully by them every morning.

c) I am being greeted cheerfully by them every morning.

d) Cheerful greeting is done by them every morning to me.

Answer: **Option b)**

14. Find the odd man out --- 3, 5, 11, 14, 17, 21

a) 21

b) 17

c) 14

d) 3

Answer: **Option c)**

15. Find the missing numbers -- 3, 7, 6, 5, 9, 3, 12, 1, 15, (....)

a) 18

b) 13

c) -1

d) 3

Answer: **Option a)**

16. Look at this series: 7, 10, 8, 11, 9, 12,... What number should come next?

a) 7

b) 10

c) 12

d) 13

Answer: **Option b)**

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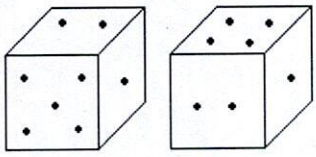
17. Two positions of dice are shown below. How many points will appear on the opposite to the face containing 5 points?



a) 3
b) 1
c) 2
d) 4

Answer: **Option d)**

18. Pointing to a photograph of a boy Suresh said, "He is the son of the only son of my mother." How is Suresh related to that boy?

a) Brother
b) Uncle
c) Cousin
d) Father

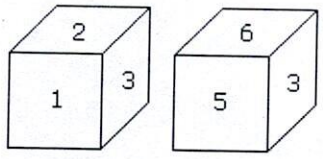
Answer: **Option d)**

19. A, P, R, X, S and Z are sitting in a row. S and Z are in the centre. A and P are at the ends. R is sitting to the left of A. Who is to the right of P ?

a) A
b) X
c) S
d) Z

Answer: **Option b)**

20. Which digit will appear on the face opposite to the face with number 4?



a) 3

b) 5

c) 6

d) 2/3

Answer: **option a)**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

APTITUDE TEST

NAME : GAUTHAM S YEAR: IV

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16/20

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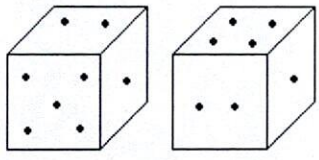

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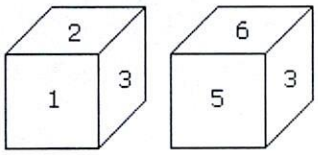

a) 3

b) 5

c) 6

d) 2/3

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ASSIGNMENT

Assignments encourage critical thinking and problem solving by requiring individuals to apply knowledge to new situation or complex problems. Following each subject, we used give number of assignments to students in number of subjects. One example is

Subject name: Digital Communication

Subject Code: EC T61

Year/Sem: III/VI

Questions

1. Explain detail about the generation of PN sequence. (CO3)
2. Enumerate in detail about the direct sequence spread spectrum. (CO3)

for
H. Rajeswary
Subject Staff

HoD

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Name: J. Farid H Khan

Subject: Digital communication

Reg.No: 20TC0507

Assignment: Digital communication

Year's : III years

Dept : Electronics communication Engineering.

9/10

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Properties of PN sequence:

* Balance property
* Run property.
* Correlation property.

Balance property:

No. of ones = 1 + Number of zeros.

8 = 1 + 7

8 = 8

Run property:

A run is defined as a sequence of a single type of binary digit. the length of a run is the number of digit in the run.

$$\text{Run} = \frac{N+1}{2}$$

$$= \frac{15+1}{2} \quad = \frac{16}{2} \quad = 8.$$

Run of length $n = \frac{1}{2^n}$ (Total Run)

if $n=1$

Run of length $1 = \frac{1}{2^1}$ (8)

$= 8/2 = 4$

Run of length 2 = $\frac{1}{2^2}(8)$

$= \frac{1}{4}(8)$

$= 2$

Run of length 3 = $\frac{1}{2^3}(8)$

$= \frac{1}{8}(8)$

$= 1$

Correlation property:

* If a period of a sequence is compared term by term with any cyclic shift of itself, it is best if the number disagreement differs from number disagreement by not known. by on agreement.

$$Re(\alpha) = \frac{Na - Nd}{N} = -\frac{1}{P}$$

$$R(d) = \frac{1}{N} \sum_{n=0} c(n)\,c(n-d)$$

PN = 0 0 0 1 0 0 1 1 0 1 0 1 1 1 1

c(n) = -1 -1 -1 1 -1 -1 1 1 -1 1 -1 1 1 1

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If delay $d=0$

$$R(0) = \frac{1}{15} \sum_{n=0}^{15} c(n)\, c(n-0)$$

$$= \frac{1}{15} [1+1+1+1+1+1+1+1+1+1+1+1+1+1+1+1]$$

$$= \frac{1}{15}(15)$$

$$= 1$$

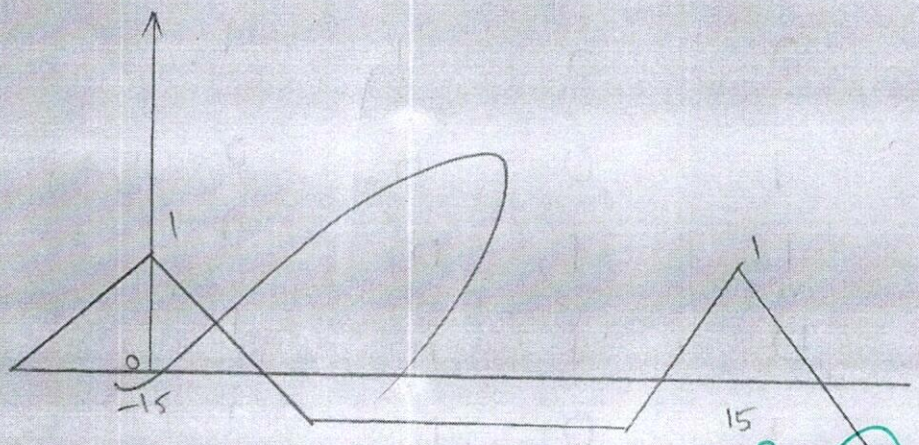
If delay $d=1$

$$c(n-1) = 1\ -1\ -1\ -1\ 1\ -1\ -1\ 1\ 1\ -1\ 1\ -1\ 1\ 1\ 1$$

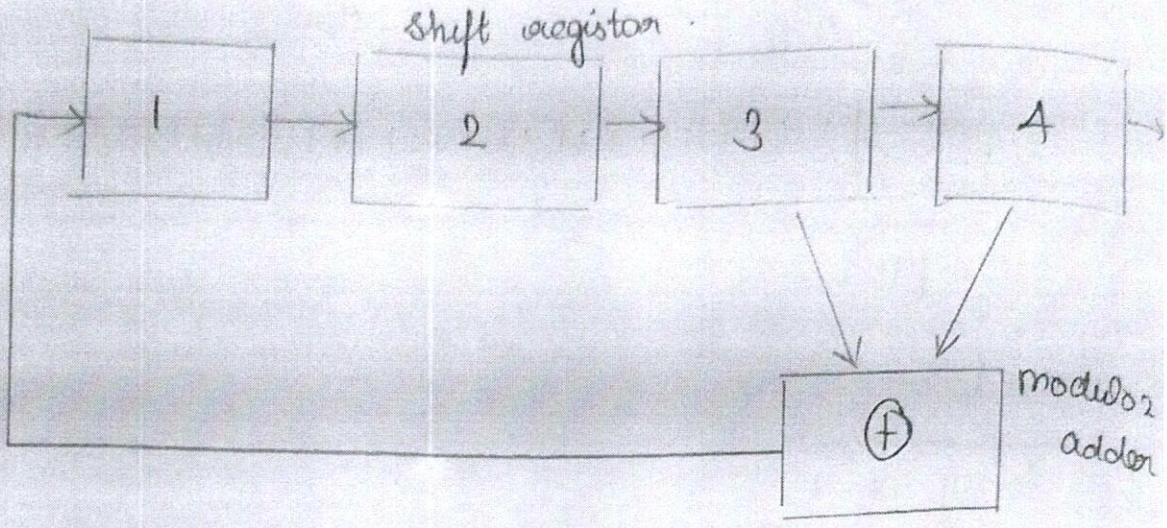
$$R(1) = \frac{1}{15} \sum_{n=0}^{15} c(n)\, c(n-1)$$

$$= \frac{1}{15} [-1+1+1-1-1+1-1+1-1-1-1-1+1+1+1]$$

$$= -\frac{1}{15}$$



PN sequence generator.



Initial state of the shift register in 1000

1	2	3	4	O/P
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
1	0	0	1	1
1	1	0	0	0
0	1	1	0	0
1	0	1	1	1
0	1	0	1	1
0	0	1	0	0
1	0	0	1	1
1	1	0	0	0
1	1	1	0	0
1	1	1	1	1
0	1	1	1	1
0	0	1	1	1

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1	1	1	1	1
0	1	1	1	1
0	0	1	1	1
0	0	0	1	1
1	0	0	0	0

PN seq = 000100110101111

Direct sequence spread spectrum:

* A techque in which a baseband message signal is multiplied with a psuds random code which as large chip rate & small chip duration that bit duration. to generate a white band continuous time baseband sequence.

* Bandwidth of baseband message signal is increase with a help of large chip rate pseudo random code.

m(t) = 1011

p(t) = 10110100

c(t) = m(t) * p(t)

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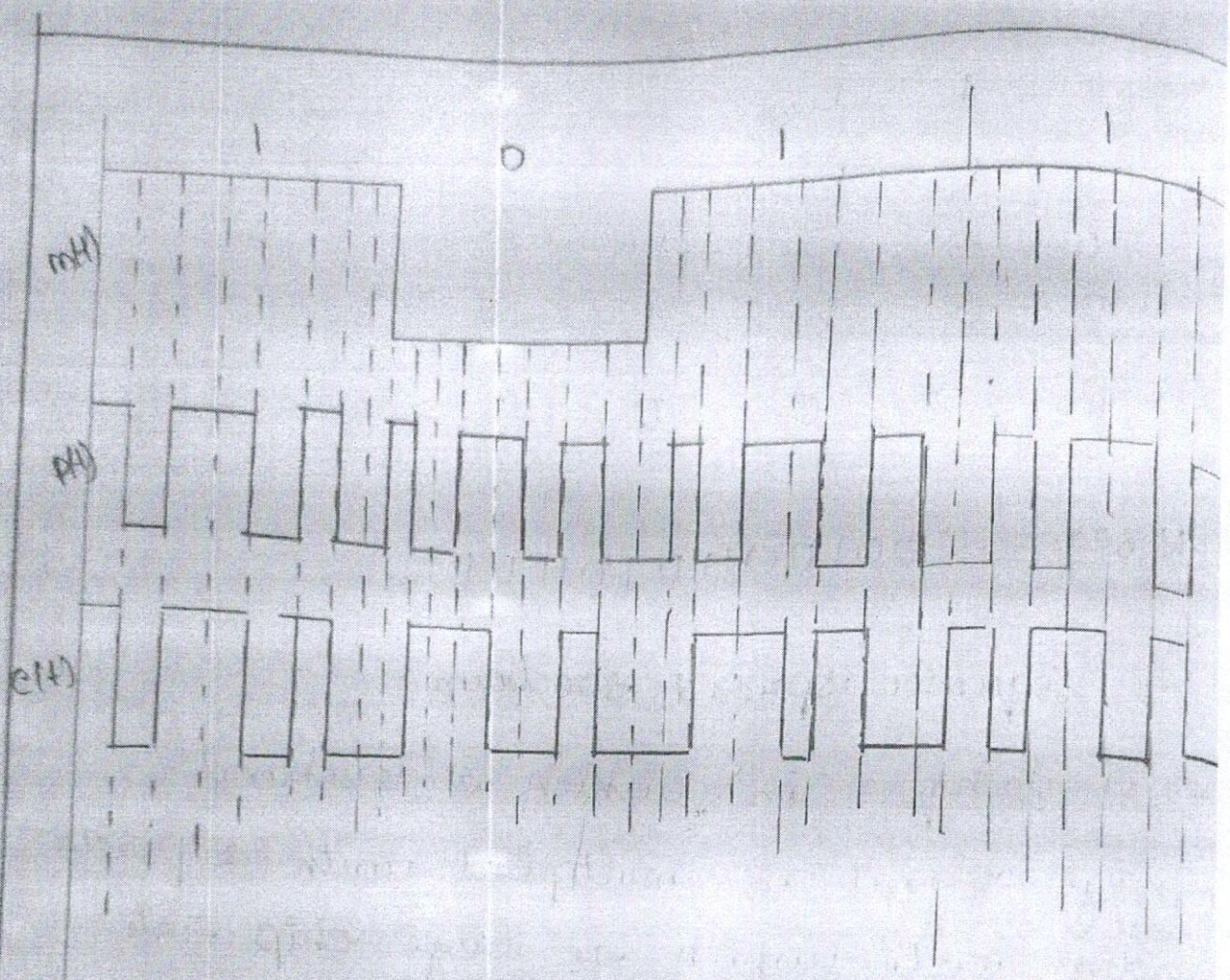
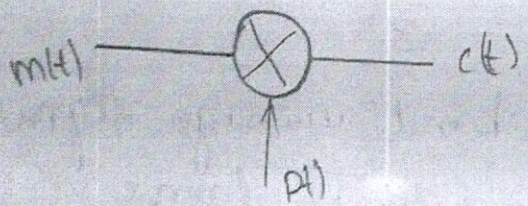
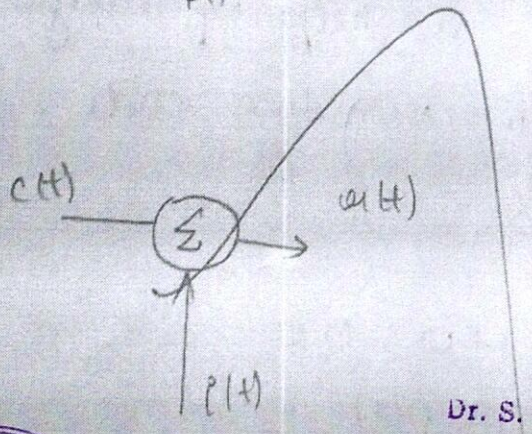


Transmitter



Channel



$a(t) = c(t) + i(t)$

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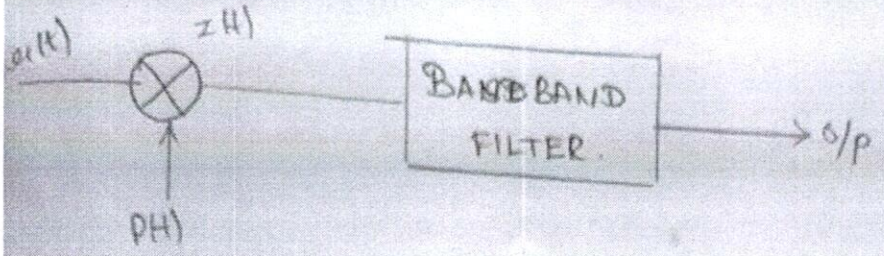
Receiver:



W.K.T

$$x(t) = c(t) + \hat{c}(t)$$

$$= \left[m(t) * p(t) \right] + \hat{c}(t) \Big]^{*} p(t)$$

$$= m(t) * p^2(t) + \hat{c}(t)\, p(t)$$

$\therefore p^2(t) = 1$

$$= m(t) + \hat{c}(t)\, p(t)$$

$m(t)$ → narrow band signal

$\hat{c}(t)\, p(t)$ → wideband signal

This signal is passed thro filter, we get.

$$z(t) = m(t)$$

Name : J. Rajalakshmi

Subject : Digital communication

Reg. No : 20TCL047

Assignment : I

Year's : III year

Department : ECE

8/10

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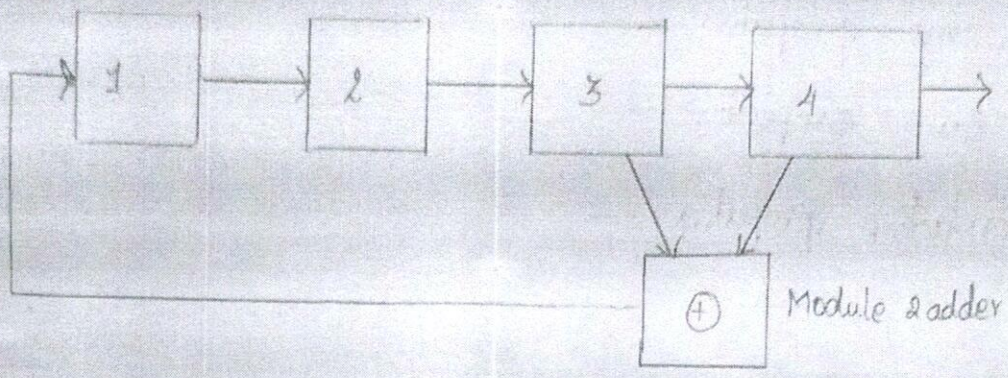
PN Sequence generator



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PN Seq = 000100110101111

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Properties of PN Sequence:

balance propaties

Ran propaties

Corrlaction propaties

Balance properties:

No. of Ones = 1 + Number of zeros

8 = 1+7

8=8

Run properties:

A Ran is defined as a sequence of a signal type of binary digits a length Ran is a number digits in the Run

$$\text{Run} = \frac{n+1}{2}$$

$$= \frac{15+1}{2}$$

$$= 8$$

Run of length $n = \frac{1}{2^n}$ (total Run)

PN = 000 1001101011111

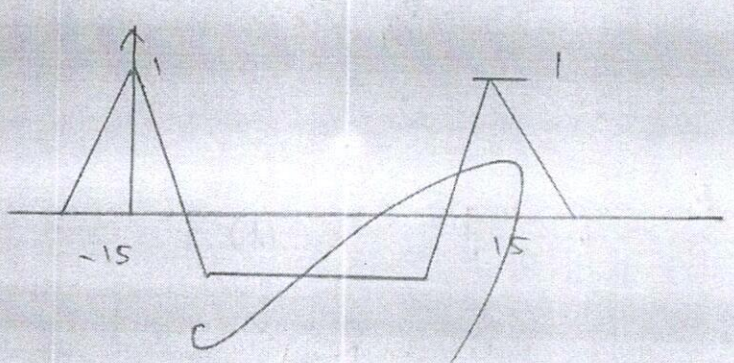
C(n) = -1-1-1 1-1-1 1 1-1 1-1 1111

delay d=0

$$R(0) = \frac{1}{15}\left[1+1+1+1+1+1+1+1+1+1+1+1+1+1+1\right]$$

$$= \frac{1}{15}(15)$$

$$= 1$$



direct Sequence Spread Spectrum:

* The basic on massage signal is multiple with a pseudo massage random pole which as large chip rate (or) small chip duration than bit duration to generator a wideband continuous time base signal

bandwith of based on message signal is increase with the help of large chiprate pseudo random code

help of large chiprate pseudo

if $n=1$

Run of length $1 = \frac{1}{2^1}(8)$

$= 8/2$

$= 4$

Run of length $2 = \frac{1}{2^2}(8)$

$= 8/4$

$= 2$

Run of length $3 = \frac{1}{2^3}(8)$

$= \frac{1}{8}(8)$

Correlation proparty

If a puriod of a sequence is compare term by term with any cycle shift of its self If is best number of argiement different from by no - disagrement by not more than one count

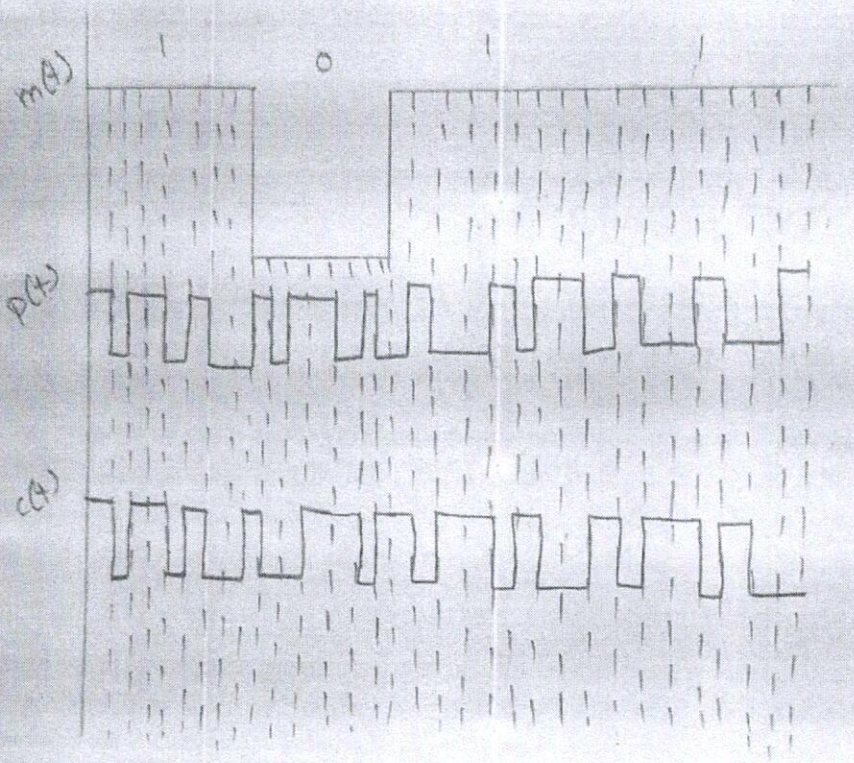
$$Re(x) = \frac{Na - Nd}{N} = -1$$

$$R(d) = \frac{1}{N} \sum_{n=0}^{N} C(n)\, C(n-d)$$

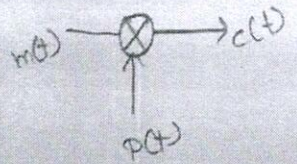
$m(t) = 1011$

$p(t) = 10110100$

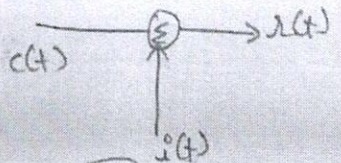
$c(t) = m(t) * p(t)$



Transmitter:



channel



$r(t) = c(t) + i(t)$

Receiver:

W.K.T that

$$x(t) = c(t) + i(t)$$

$$= [(m(t))^* p(t)] + i(t)$$

$$z(t) = x(t)^* p(t)$$

$$= [m(t)^* p(t) + i(t)]^* p(t)$$

$$= m(t)^* p^2(t) + i(t)\, p(t)$$

$$p^2(t) = 1$$

$$m(t) + i(t)\, p(t)$$

↓ narrow band s/g

wide band s/g

This s/g is passed thro filter, we get

$$z(t) = m(t).$$

* ——— *