# CSE260

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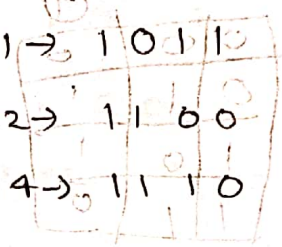
Section :- 10

## Ans to the ques no:- 1

Given function:-

$$F(A,B,C,D) = \sum(0,2,7,11,12,14) + d(3,4,5,6)$$

Here,
0 → 0000
2 → 0010
3 → 0011
4 → 0100
5 → 0101
6 → 0110
7 → 0111
11 → 1011
12 → 1100
14 → 1110



Now, grouping,

(0) → 0000
(2) → 0010
(4) → 0100
(3) → 0011
(5) → 0101
(6) → 0110
(12) → 1100
(7) → 0111
(11) → 1011
(14) → 1110

(0,2) → 00_0
(0,4) → 0_00
(2,3) → 001_
(2,6) → 0_10
(4,5) → 010_
(4,6) → 01_0
(4,12) → _100
(3,7) → 0_11
(3,11) → _011
(5,7) → 01_1
(6,7) → 011_
(6,14) → _110
(12,14) → 11_0

(0,2,4,6) → 0__0
(0,4,2,6) → 0__0
(2,3,6,7) → 0_1_
(2,6,3,7) → 0_1_
(4,5,6,7) → 01__
(4,6,5,7) → 01__
(4,6,12,14) → _1_0
(4,12,6,14) → _1_0

∴ Prime implecants :-

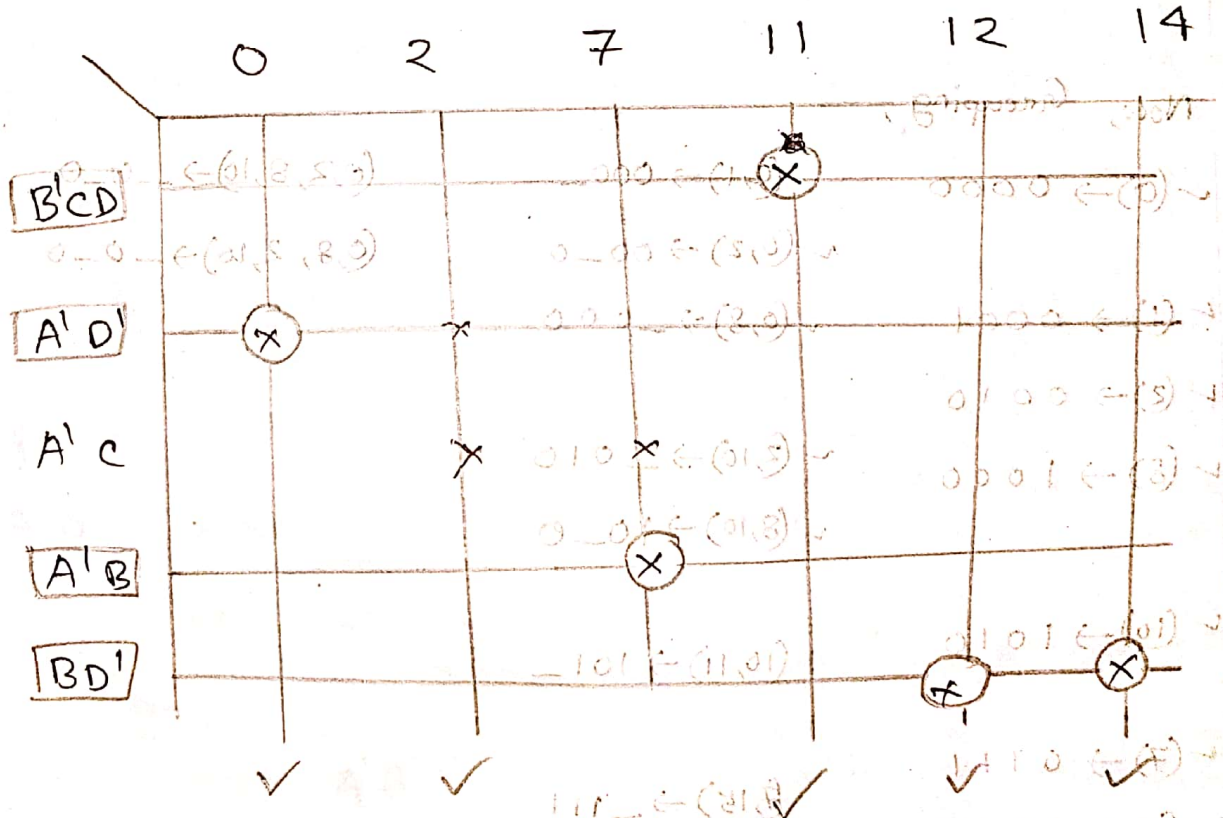
(3, 11) → _ 011 → $B'CD$

(0, 2, 9, 6) → 0 _ _ 0 → $A'D'$

(2, 3, 6, 7) → 0 _ 1 _ → $A'C$

(4, 5, 6, 7) → 0 1 _ _ → $A'B$

(4, 6, 12, 14) → _ 1 _ 0 → $BD'$




∴ $F(A,B,C,D) = B'CD + A'D' + A'B + BD'$

## Ans to the ques no:- 2

Given function:-

$$F(A,B,C,D) = \sum(0, 1, 2, 7, 8, 10, 11, 13, 15)$$

Here,

0 → 0000
1 → 0001
2 → 0010
7 → 0111
8 → 1000
10 → 1010
11 → 1011
13 → 1101
15 → 1111

Now, Grouping,

(0) → 0000
(1) → 0001
(2) → 0010
(8) → 1000
(10) → 1010
(7) → 0111
(11) → 1011
(13) → 1101
(15) → 1111

(0,1) → 000_
(0,2) → 00_0
(0,8) → _000
(2,10) → _010
(8,10) → 10_0
(10,11) → 101_
(7,15) → _111
(11,15) → 1_11
(13,15) → 11_1

(0,2,8,10) → _0_0
(0,8,2,10) → _0_0

∴ Prime implicants:-

(0,1,8) ⟶ 000_ ⟶ $A'B'C'$

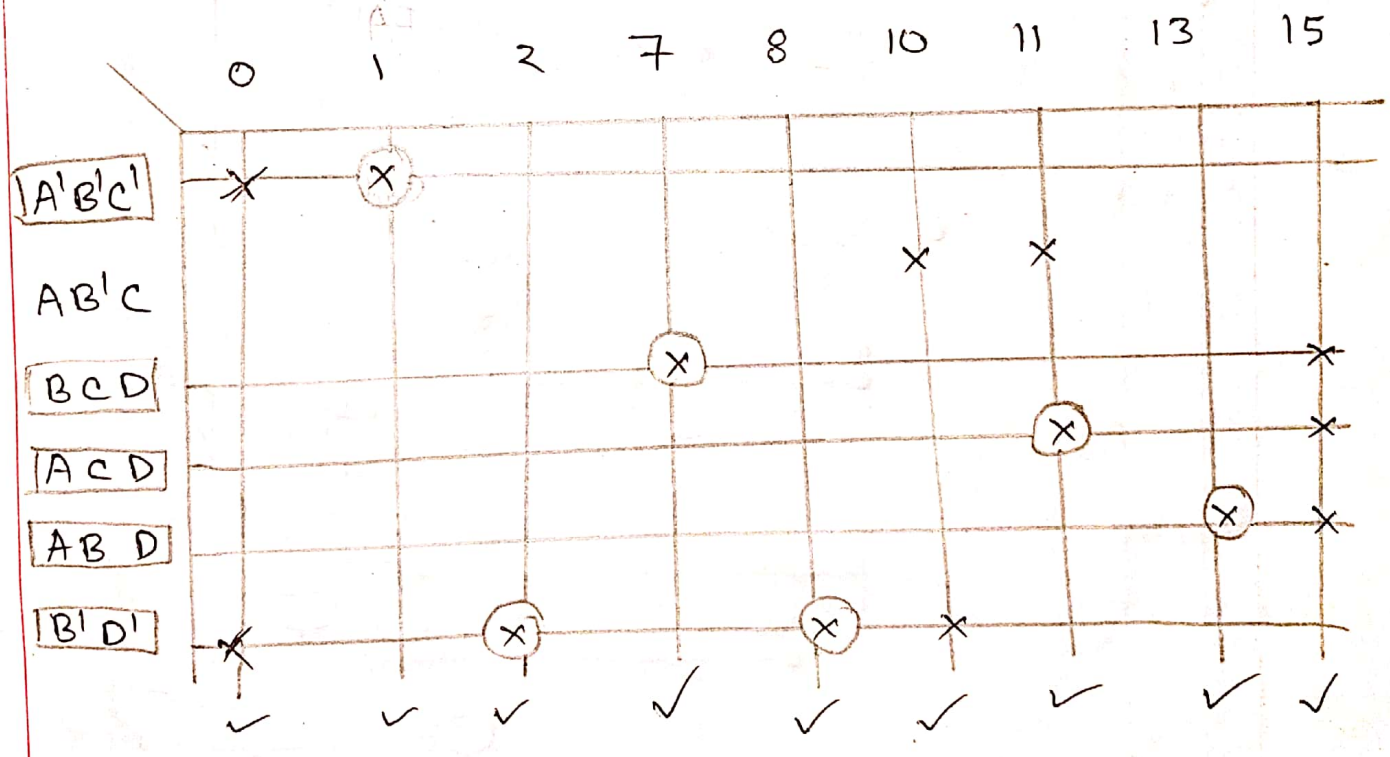
(10,11) ⟶ 101_ ⟶ $AB'C$

(7,15) ⟶ _111 ⟶ $BCD$

(11,15) ⟶ 1_11 ⟶ $ACD$

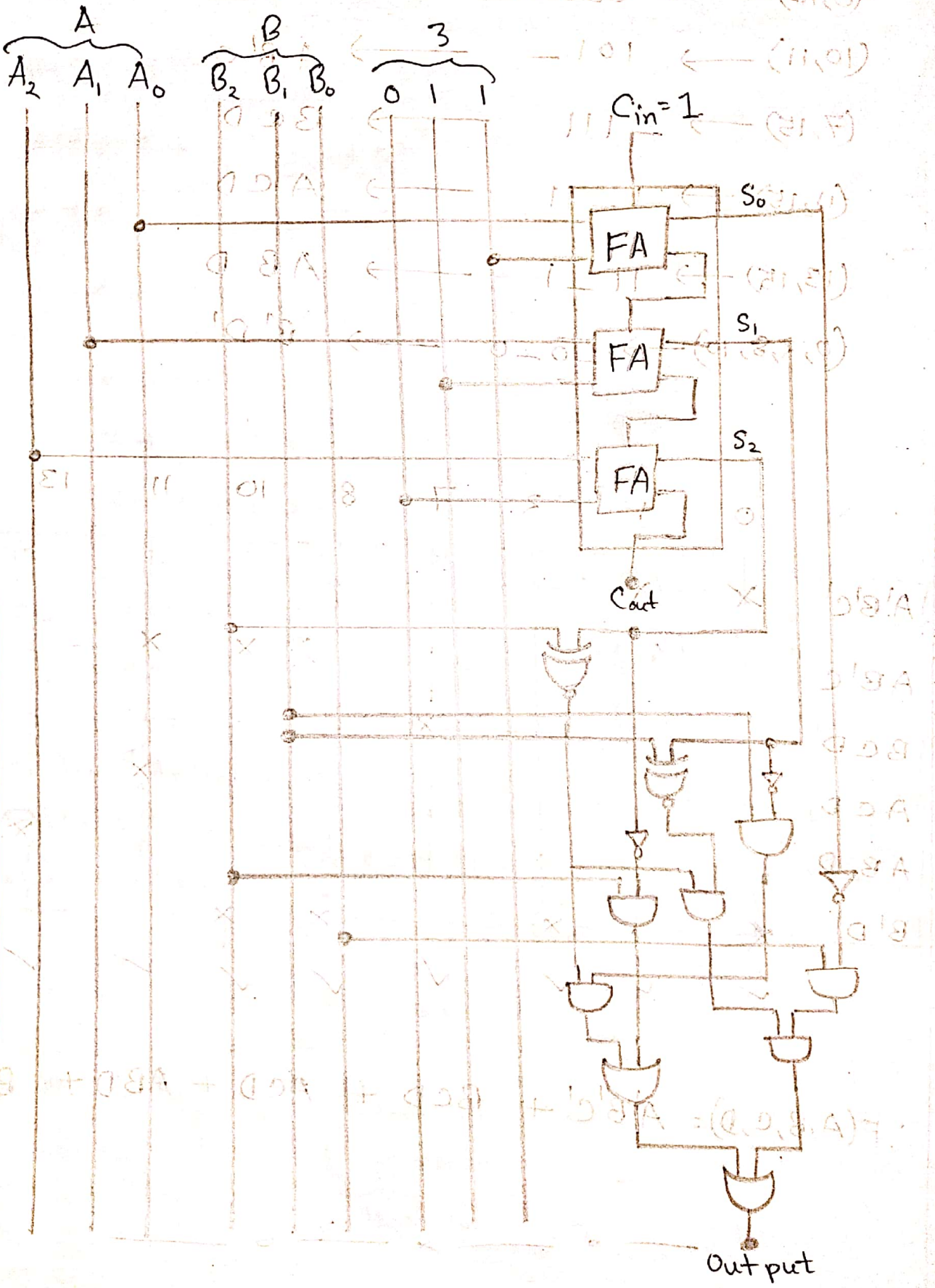
(13,15) ⟶ 11_1 ⟶ $ABD$

(0,2,8,10) ⟶ _0_0 ⟶ $B'D'$




∴ $F(A,B,C,D) = A'B'C' + BCD + ACD + ABD + B'D'$

## Ans to the ques no: 3



Here, A-3 is implemented by an adder cum subtractor. Then the output is implemented with B in the equation →

$S_2' B_2 + (S_2 \odot B_2) S_1' B_1 + (S_2 \odot B_2)(S_1 \odot B_1) S_0' B_0$

to see if A-3 < B. The output is 1 for the condition and 0 otherwise.

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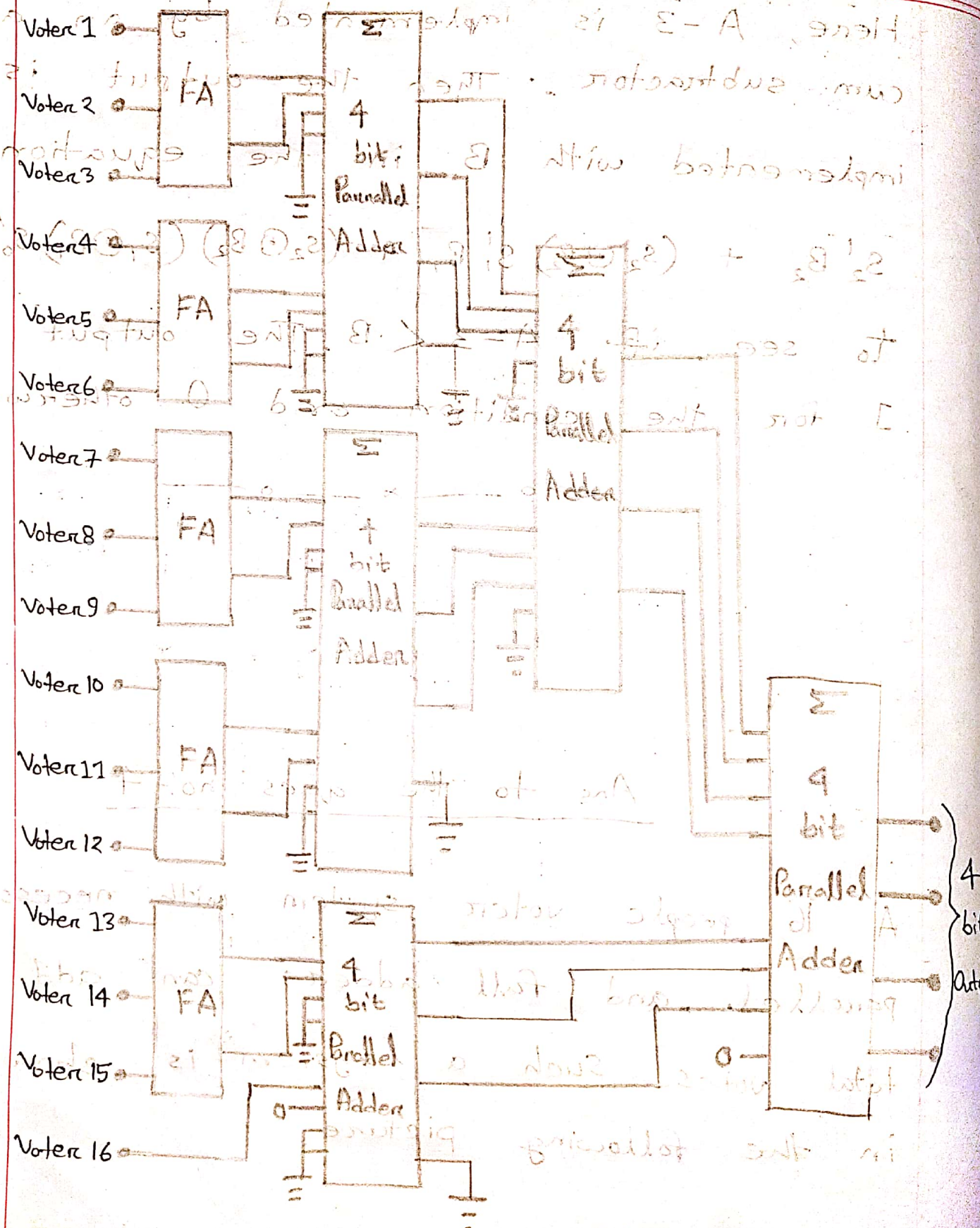
## Ans to the ques no:-4

A 16 people voter system with necessary parallel and full adders can add the total votes. Such a system is showed in the following picture.


Voter 1
Voter 2
Voter 3
Voter 4
Voter 5
Voter 6
Voter 7
Voter 8
Voter 9
Voter 10
Voter 11
Voter 12
Voter 13
Voter 14
Voter 15
Voter 16
FA
FA
FA
FA
4 bit Parallel Adder
4 bit Parallel Adder
4 bit Parallel Adder
4 bit Parallel Adder
0
0
4 bit

## Ans to the ques no:- 5

BCD to Excess-5 system conversion can be stated as, BCD + 5 = Excess-5. We will need a 4 bit parallel adder for this, as both the number systems are of 4 bits.