1 convert $(86)_{10}$ into binary.

2	86
2	43 - 0
2	21 - 1
2	10 - 1
2	5 - 0
2	2 - 1
	1 - 0

Ans:-

$(86)_{10}$ into binary is $(1010110)_2$

2. convert $(92.625)_{10}$ to binary.

2	92
2	46 - 0
2	23 - 0
2	11 - 1
2	5 - 1
2	2 - 1
	1 - 0

0.625

$0.625 \times 2 = 1.250 \longrightarrow 1$

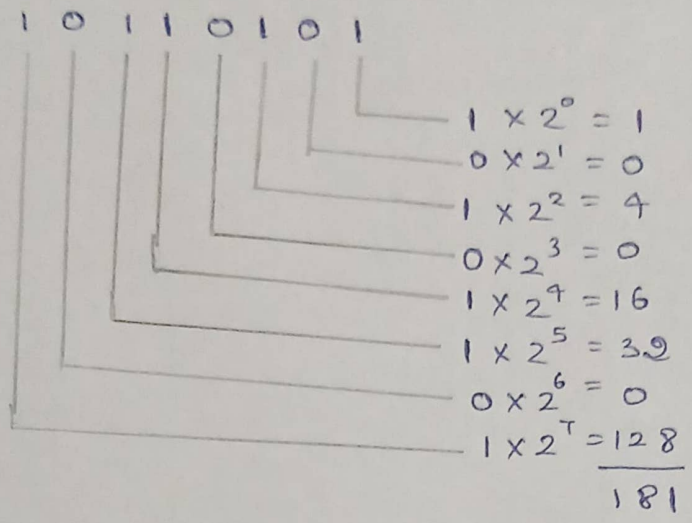
$0.250 \times 2 = 0.500 \longrightarrow 0$

$0.500 \times 2 = 1.000 \longrightarrow 1$

Ans:-

$(96.625)_{10}$ to binary is $(1011100.101)_2$

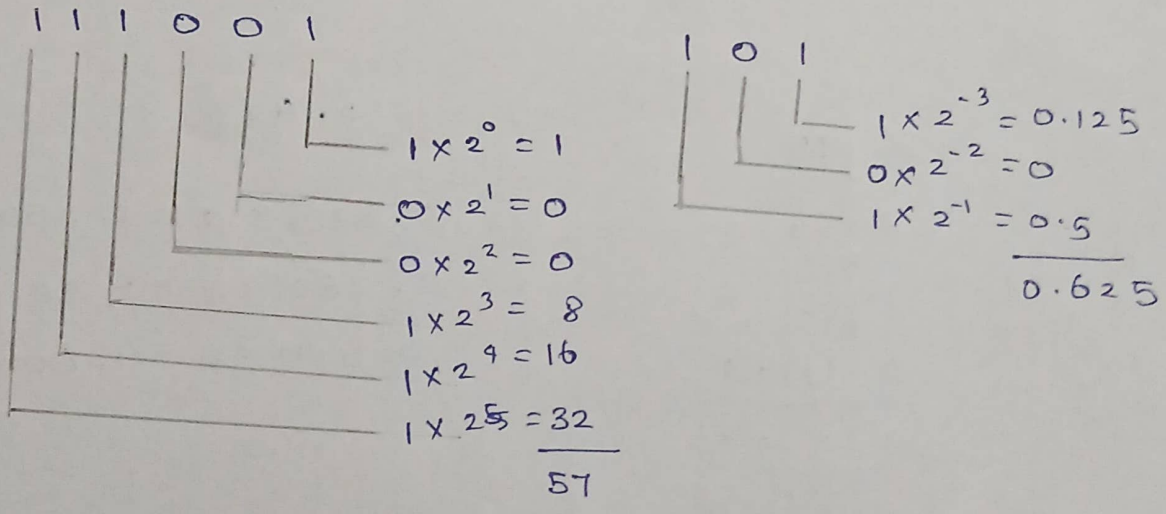
3. Convert $(10110101)_2$ into decimal



Ans :-

$(10110101)_2$ into decimal is $(181)_{10}$

4. $(111001.101)_2$ into decimal.



Ans :-

$(111001.101)_2$ into decimal is $(57.625)_{10}$

5. Convert $(572)_8$ into decimal

5 7 2

$2 \times 8^0 = 2$

$7 \times 8^1 = 56$

$5 \times 8^2 = 320$

378

Ans :- $(572)_8$ into decimal is $(378)_{10}$

6. Convert $(TC)_{16}$ into decimal

T C

$12 \times 16^0 = 12$

$7 \times 16^1 = 112$

124

Ans :- $(TC)_{16}$ into decimal is $(124)_{10}$

7. Convert $(11011101.101)_2$ into octal and hexadecimal.

Octal :-

011 011 101 . 101

3 3 5 . 5

Ans :-

(335.5).

Hexadecimal :-

1101 1101 . 1010

13 13 . 10 $\longrightarrow$ DD.A

Ans :- DD.A

$(11011101.101)_2$ into octal and hexadecimal is (335.5) and $(DD.A)$

8. find the 1's and 2's complement of 11010101.

1's complement → 11010101 → is → 00101010

2's complement → 11010101 is → 00101010
+ 1
00101011

1's complement → 00101010

2's complement → 00101011

9. subtract $(110101)_2 - (011011)_2$ using 2's complement

A → 110101

B → 011011

100100
+ 1
100101

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

Ans :-

$(011010)_2$

10. find the 9's and 10's complement of 4837.

9's complement → 9-4, 9-8, 9-3, 9-7

5 1 6 2 → 5162

10's complement → 9-4, 9-8, 9-3, 9-7 and add +1

5 1 6 2
+ 1
5 1 6 3 → 5163

the 9's and 10's complement is 5162, 5163.

11. Represent -47 using 8-bit sign magnitude, 1's complement and 2's complement.

sign magnitude :-

-47

2	47	
2	23	-1
2	11	-1
2	5	-1
2	2	-1
	1	-0

101111 change into 8 bit

ANS :- 10101111

1's complement →

00101111 change into 1's complement is

11010000

2's complement →

11010000 → 11010000
+ 1
11010001

sign magnitude → 10101111

1'st complement → 11010000

2's complement → 11010001

12. Convert Decimal 73 into BCD.

7 -> 0111

3 -> 0011

Ans:-

01110011 -> BCD

13. Convert Decimal 96 into Excess-3.

9 -> 1100

6 -> 1001

9 -> 1001
0011 -> 3
1100

6 -> 1001
0011 -> 3
1001

Ans:-

11001001

14. Convert Binary into Gray code -> 1010111

1 -> 0 -> 1 -> 0 -> 1 -> 1 -> 1

↓

1 1 1 1 1 0 0

Ans:-

$(1010111)_2$ into Gray code is 1111100

15. Convert Gray code into binary -> 10110110

1 0 1 1 0 1 1 0

↓ ↓ ↓ ↓ ↓ ↓ ↓

1 1 0 1 1 0 1 1

Ans:-

10110110 Gray code into binary is 11011011

16. simplify using Boolean laws:-

a) $A B + A \bar{B} + A C$

$F = AB + A\bar{B} + \bar{A}C$

$F = A(B + \bar{B}) + \bar{A}C$

$F = A(1) + \bar{A}C$

$F = A + \bar{A}C$

Apply Absorption law

$A + \bar{A}C = A + C$

Ans :- $A + C$

b) $A + A\bar{B} + \bar{A}BC$

$F = A + A\bar{B} + \bar{A}BC$

Apply absorbtion law.

$A + A\bar{B} = A$

so $\rightarrow$ $A + \bar{A}BC$

$A + \bar{A}BC = A + BC$

$\therefore$ $A + BC$

Ans :- $A + BC$

17. Convert truth table to sop and pos form.

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	0

Sop :-

A	B	Y	pos
0	0	1	$\bar{A}\bar{B}$
0	1	1	$\bar{A}B$
1	0	0	$A\bar{B}$
1	1	0	AB

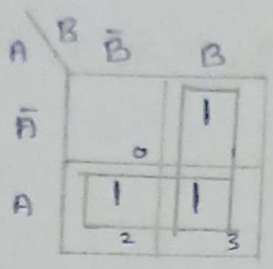
$Y = \bar{A}\bar{B} + \bar{A}B$

Pos :-

A	B	Y	sop
0	0	1	$A+B$
0	1	1	$A+\bar{B}$
1	0	0	$\bar{A}+B$
1	1	0	$\bar{A}+\bar{B}$

$Y = (\bar{A} + B) \cdot (\bar{A} + \bar{B})$

18 simplify using K-maps: $F(A,B) = \Sigma(1,2,3)$.



$F(A,B)$ pair 1 = B

pair 2 = A

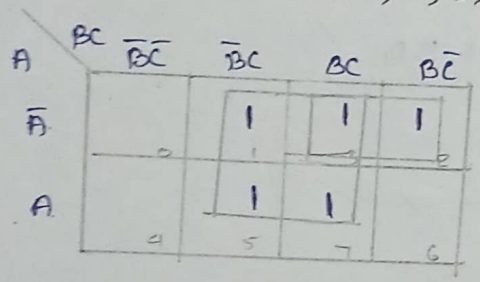
$F(A,B) = A+B$

Ans :-

$F(A,B) = A+B$

19. simplify using K-Maps and draw logic circuits

$F(A,B,C) = \Sigma(1,2,3,5,7)$



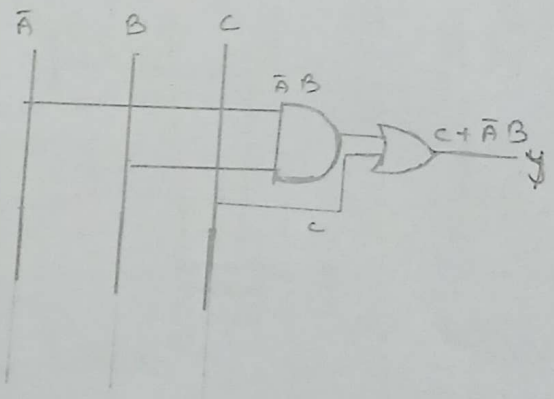
Quad = C

pair = $\bar{A}B$

Ans :-

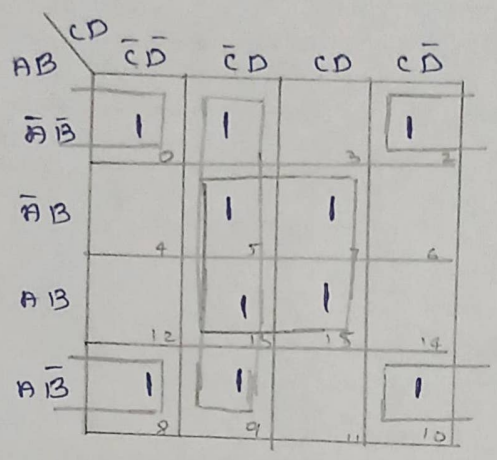
$F(A,B,C) = C + \bar{A}B$

logic circuit :-



20. simplify using K-Maps and draw logic circuit?

a) $F(A, B, C, D) = \Sigma(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$

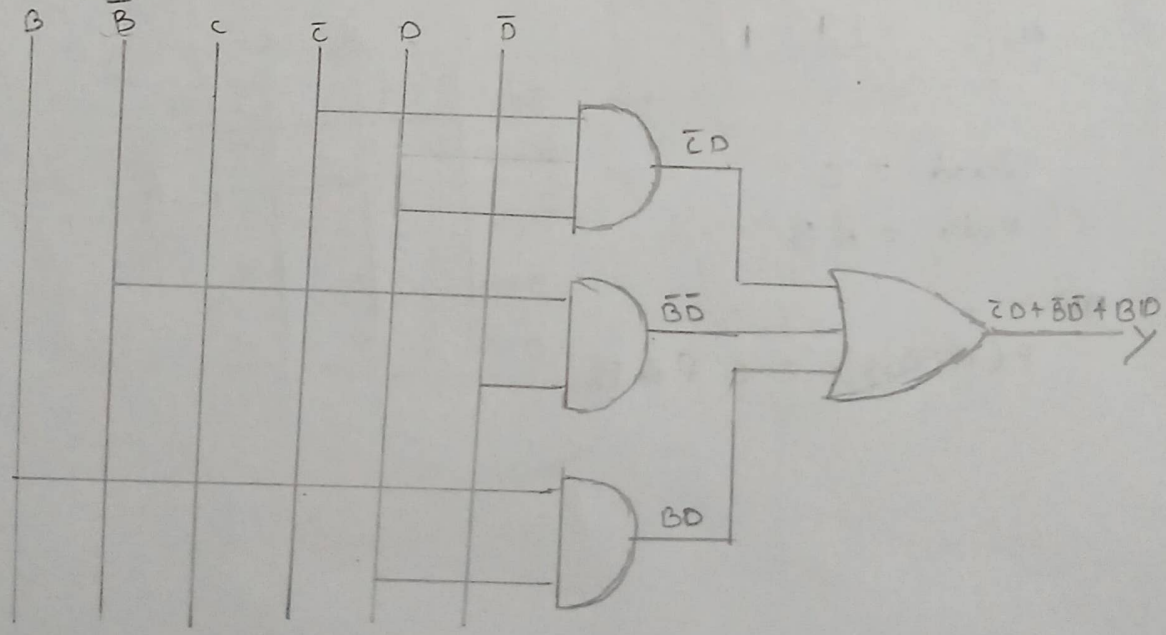


Octas ✗ Quad 1 = $\bar{C}D$

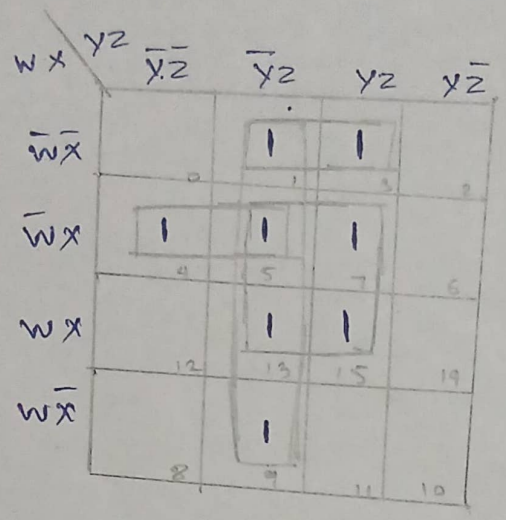
Quad 2 = $\bar{B}\bar{D}$

Quad 3 = BD

$F(A, B, C, D) = \bar{C}D + \bar{B}\bar{D} + BD$



Q0. b) $F(w, x, y, z) = \Sigma(1, 3, 4, 5, 7, 9, 13, 15)$



Quad 1 = $\bar{y}z$

Quad 2 = xz

pair 1 = $\bar{w}\bar{x}z$

pair 2 = $\bar{w}x\bar{y}$

$F(w, x, y, z) = \bar{y}z + xz + \bar{w}\bar{x}z + \bar{w}x\bar{y}$