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SYLL	ABUS -	UNIT 1

Logic Families: CMOS Logic, CMOS Dynamic Electrical behaviour

Bipolar Logic: Diode Logic, Transister Logic Invector,

TTL Logic, NMOS, CMOS/TTL Interface, ECL

Minimization Techniques and Logic gates:

Minimization Techniques: Boolean pastulates and Laws - De Morgan Theorem - Principle of Duality-Boolean expressions - Minimization of Boolean Expressions - Minimization Maxterins Sum of Products (SOP), (Product of SUMS (POS), Karnaugh met minimization.

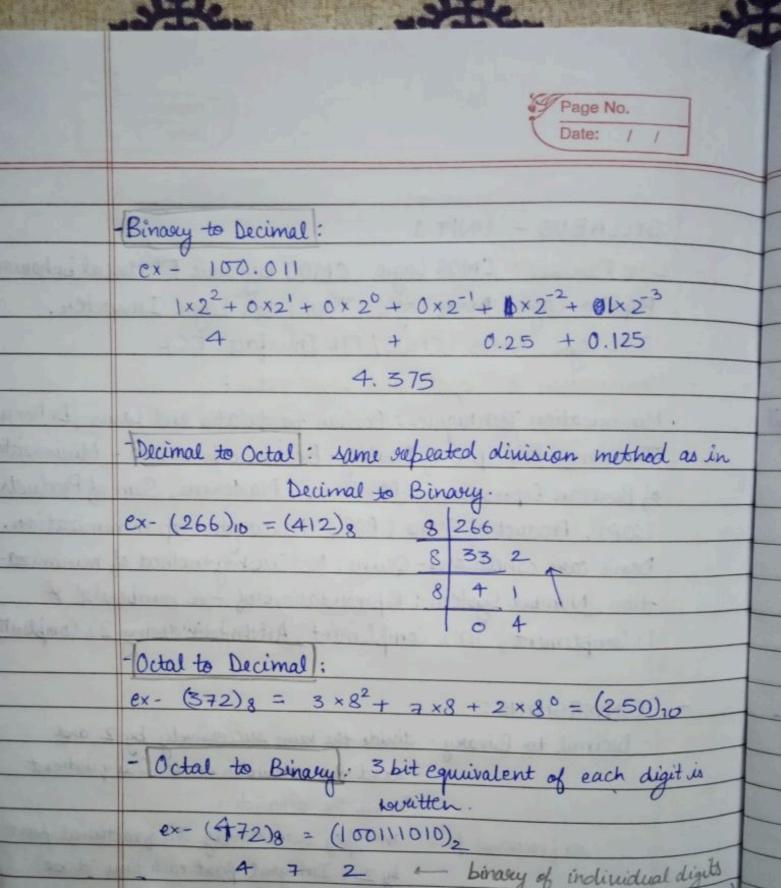
Don't care conditions-, Quine, Mc Cluskey method of minimization, Number System: Representation of -ve numbers of the first complement. (Is complement) as the first complement. (Arithmetic Using 2's Complement)

CONVERSIONS :

- Decimal to Binary - divide the num successively by 2 and sucord the romainder curtil Oas quotient Reverse the remainders.

for fractional part: multiply successively the practional part by 2. Integral part each time 'd be digits of binary.

ex - 4.47 2 + 0 $0.47 \times 2 = 0 + 0.94$ 0 $2 = 0 + 0.94 \times 2 = 1 + 0.88 + 0.88 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.88 \times 2 = 1 + 0.75 + 0.88 \times 2 = 1 + 0.88 \times 2 = 1 + 0.75 + 0.88 \times 2 = 1 + 0$



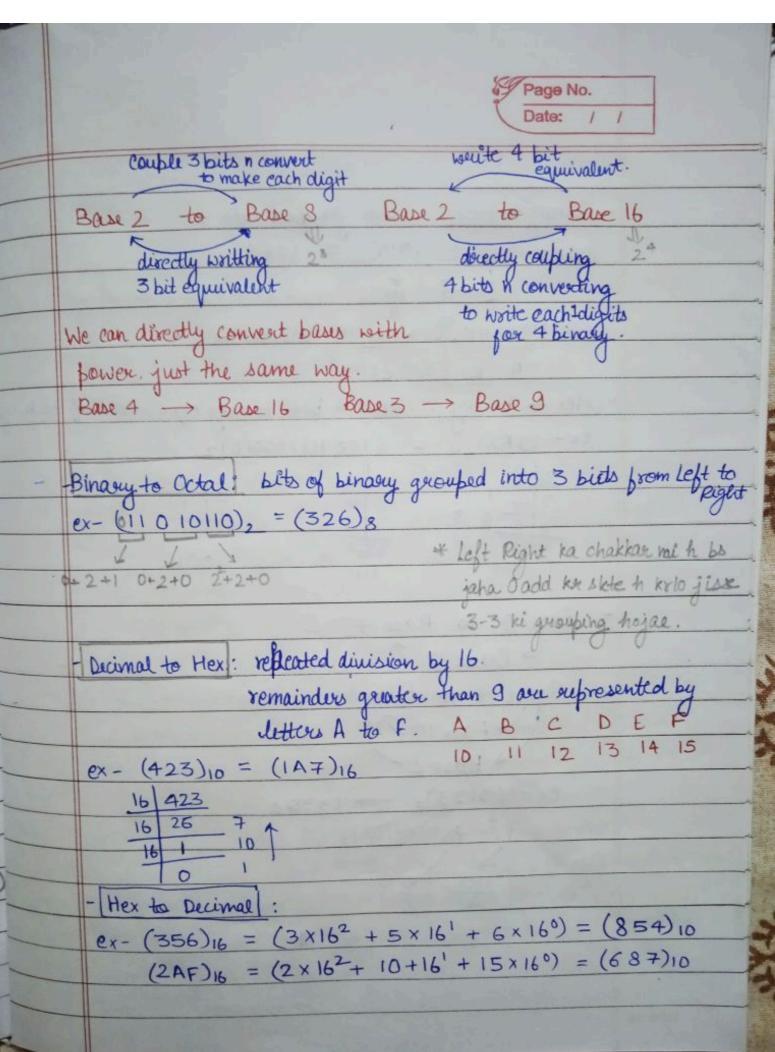
4 7 2 - binary of individual digits

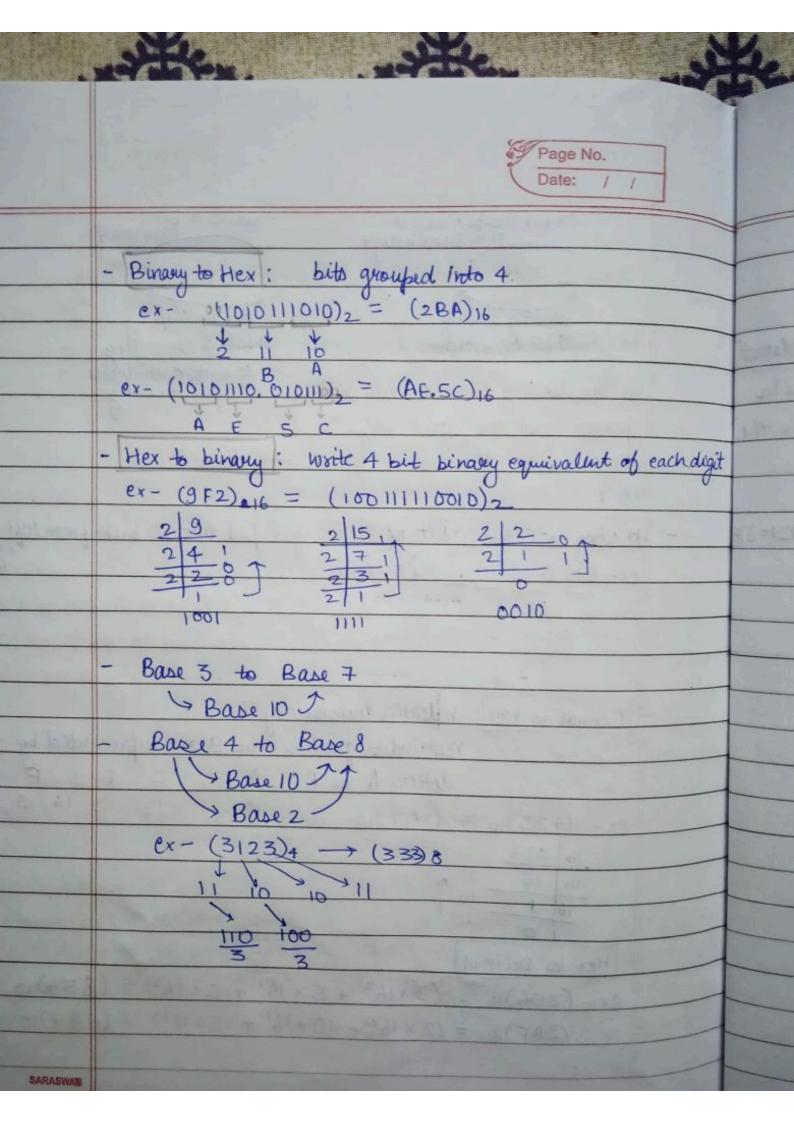
1 1 1 (using 3 bits of each actal digits)

100 111 010 2 4 27 212

2 2 0 133 # 211 07

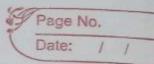
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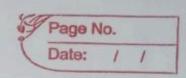
=	
-	
-	COMPLEMENT .
	- 1's complement - 2's complement.
	* Complements are to supresent -ve number
53/	for 1's complement, "reverse each bit!"
	ex- 100101 - 1's complements 011010
	2's complement -> 1's complement +1
	trick ex- 100101 2's complet 011011
	reverse each 011010
	1 - 1 1 1St 1 11
,	Hasting from LtoR 0101 Samblest
	11101011
	reversing + 1 after this 1 11101100
	- Substraction using 2's Complement
	[A - B = A + 2's complement of B]
	If carry's there, > Ans is +ve
	Towards the end - For result, ignore the casery.
	If carry not there > Ans is -ve
	for result, obtain the 2's complement of the
	Ans, that'd be the final result.
	ex-, A= 11001 B= 10110 find A-B,
	11001
	01010 hence Ans -> 00011
	(1)00011

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1111	In every base, We can define 2 complements.
	Base Y -> Y's complement [Radix complement]
	(Y-1)'s complement [Diminished Radix complement]
	$(Y-1)$'s complement $\rightarrow (Y^n-1)-N$ n is no of digits in given questions (Y) 's complement $\rightarrow Y^n-N$ N is no given in the Substraction doesn't exist in computer. Question.
	Substraction doesn't exist in computer. question. ignored
	ex- 7-3 can be written as 7-3+10=1.4
	$9'$ complement = $(10^3 - 1) - 124 = 875) [10's \rightarrow 10^3 - 12 + 876]$
-	BOOLEAN ALGEBRA:
	basic operations -> OR AND NOT
	Gloswie Brokerty. (answers should be in set)
	- Boolean postulates as theorem:
	• $\chi.1 = \chi$ • $A + \overline{AB} = (A+\overline{A})(A+B) = A+B$
	(X+1) = 1 $(A.(B+c) = A.B + A.C(A.(B+c) = A.B + A.C$
	17 (B,C) = (A+B). (A+C)
la de stand	
	- De Morgan's Law: $(\overline{A+B}) = \overline{A}.\overline{B}$
	(10)
HALL A	
	100 lation.

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DUAL of an expression:

$$A + \Lambda = 1 \Leftrightarrow A.\Lambda = 0$$

+ --> .

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$$ex-A+\overline{A}B=A+B$$

 $1 \longrightarrow 0$ A. $(\overline{A} + B) = A.B$

 $0 \longrightarrow 1$ AB = AB

Ca96944

(Make the Truth table).

n bit variable - 2 " combinations

Teller		G - G		
A	В	A+B	A.B	
0	0	0	0	
0	1	10 1	0	
1	1	10	1	
1	0	1	0	

Design:

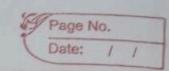
1. Identify the number of inputs and outputs

2. Write OIP for each combination of IIP.

A B S SOP POS 0 0-0 ĀB A+B 0 1-A B A+B SOP= 2 (1,2) 0 = AB+AB A+B 3+ AB 0 2,

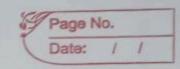
2.7 | 0 | AB $\overline{A}+B$ POS = TT(0,3)sugmencing $0 \rightarrow \overline{A}, \overline{B}$ $0 \rightarrow \overline{A}, \overline{B}$ $= (A+B). (\overline{A}+\overline{B})$ through Gray Code marterums maxtesims

[collect all 13 [collect all Os



=										
				*						
	Biravay	Gray Code	* Gray code 's used be that ex bit u	+						
	0	0	next bit me jaan se siof 1 bit ka	+						
	1	1	change ae. Bade circuits me isse time	+						
	2	3	difference arta h.	t						
	3	2	Each successive member differs just	+						
	NA.	ea ·	by 1 bit	1						
	CANONICA	L FORM- S	STANDARD FORM of an expression.	H						
	ex- Y =	AB+	BC (Standard form) [SOP Case]							
	Ae	3.1	BC (A+A)							
	AB	(c+c)	ABE + ABE							
	$ABC + ABC$ $2^{2}+2+0=6$ $2^{2}+2+0=6$ $2^{2}=2$									
	27241 = 7	2+2 =6	Y= Z (2,6,7)							
		6-14	(Canonical form)							
	ex- (A+	B) (B+C)	(Pos case)							
	A+B+ci	<u>c</u>	A.A + B + C							
	(A+B+C) (A.									
	500 5	0	010110							
-	$Y = \pi(0,1,2,6)$									
-	15 -90E	G. G. CA	SA. I I D. S. F.							
39	the can convert SOP to POS and nice neesa by hexiting cononical									
1	1 0 170	e capicoour	FIRST, THEN Change & to TT on TT-to & as							
-	10000	, much w	I can well the Standard love uning the							
-	converted	canonical fo	esin.							
H		T MAN THE ST	A DA SOLO I							

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ex- Convert AB+BC to POS

AB (C+C) (A+A)BC

ABC + ABC ABC + ABC

Y = E(1,5,6,7) = TT(0,2,3,4)

= (A+B+c). $(A+\overline{B}+c)$. $(\overline{A}+B+\overline{c})$. $(\overline{A}+B+c)$

- COMPLEMENT OF A FUNCTION :

ex-X = AB+BC

ime

ical

as

 $\bar{X} = (\bar{A}B + BC) = (\bar{A}B).(\bar{B}C)$

 $= (\overline{A} + \overline{B}), (\overline{B} + \overline{c})$

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

 $ex - x = \leq (1,2,3)$

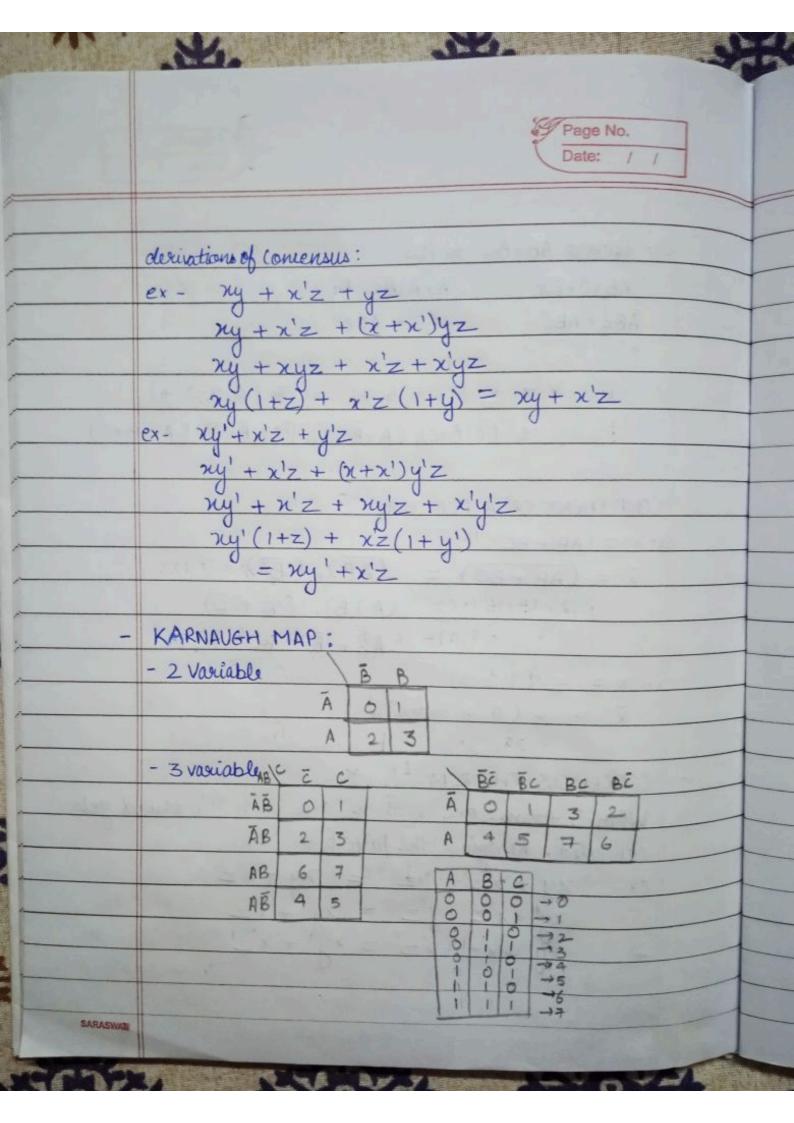
 $\bar{x} = \xi(0,4,5,6,7)$

CONCENSUS THEOREM :

When 3 tours, one with n one with n', third gets

cancelled. Recognise the fattern.

ex - xy + x'z + yz' = xy + x'z xy' + x'z + y'z'' = xy' + x'z xy' + x'z' + y'z'' = xy' + x'z'



#	N.										
	- 4 variables										
	AB CD CD CD CD CD AB										
	ĀB	0	1	3	2		0	4	12_	8	
	AB	4	5	7	6		1	5	13	9	
	AB	12	13	15	14		3	7	15	ID	
	AB	8	9	11	10		2	6	14	11	
4	- 5 variables										
	BC /)F		_	-	BC	-			-	
		0	1	3	2		16	17	19	18	
		4	5	7	6	Malanda	20	21	23	22	
		12	12	5 15	14		28	29	31 3	30	
		8	9	17	10	1 S 1 S 2 C	24	25	27 2	26	ATT LINE
_				=0				A	=1		
-	GROUF	PING	-:			ALD					
-		-			ED/	CD CD	BCD		-0		
-		A.	-	0 1	1)	1 15		To 100			10,11,14,15)
-	707	minute.	B	1	0			1C+	Bc	D+	ABC + ACD
	ABOON THE										
	-Prim			O	0	CPI					
						monahoa il Ha			, ,		
	men	nber	ie	not	the	member if the	grou	b Con	tains	al	least 1
	member ie not the part of any other group.										

