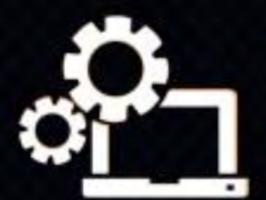
CS & IT



ENGINEERING

Digital Logic Logic Gate



Lecture No. 6



By- CHANDAN SIR



TOPICS TO BE COVERED 02 XOR GATE

03 X-NOR GATE

04 Discussion

Case (1)

A.B.C.D.E.F.G

$$NAND = (2n-2)+k$$
 $NOR = (3n-3)-k$

(0se(2)



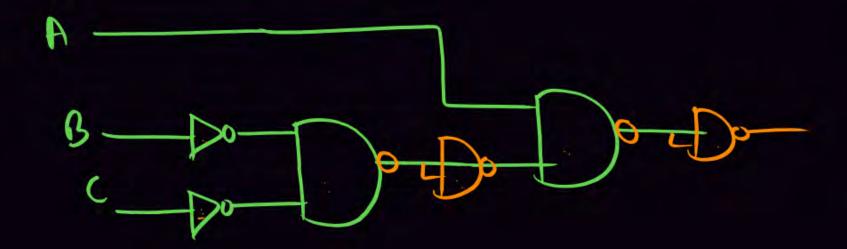
$$A+B+C+D+E+\cdots$$

$$NAND = (3n-3)-k$$
 $NOR = (2n-2)+k$



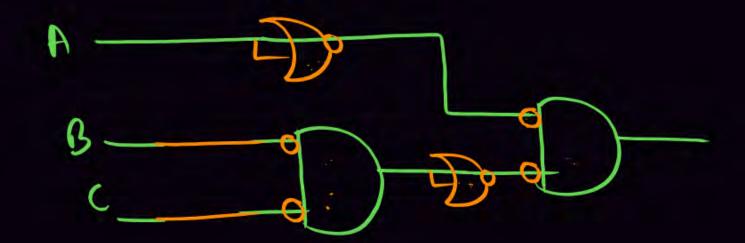
$$Q = f = ABC$$

MAND



NAND= 6 (
$$2n-2$$
)+K ($2X3-2$)+2 ($4+2=6$)AN

$$Q = f = ABC$$



$$(3n-3)-k$$
 $(3x3-3)-2$
 $(-2=9)$



Pw

$$Q = f = \overline{A} + B + \overline{c} + \overline{D}$$

A+B+ C+D

Atro = 6

$$(3n-3)-k$$

$$(3X4-3)-3$$

Pw

 $Q = f = \overline{A} + B + \overline{c} + \overline{D}$

MOR

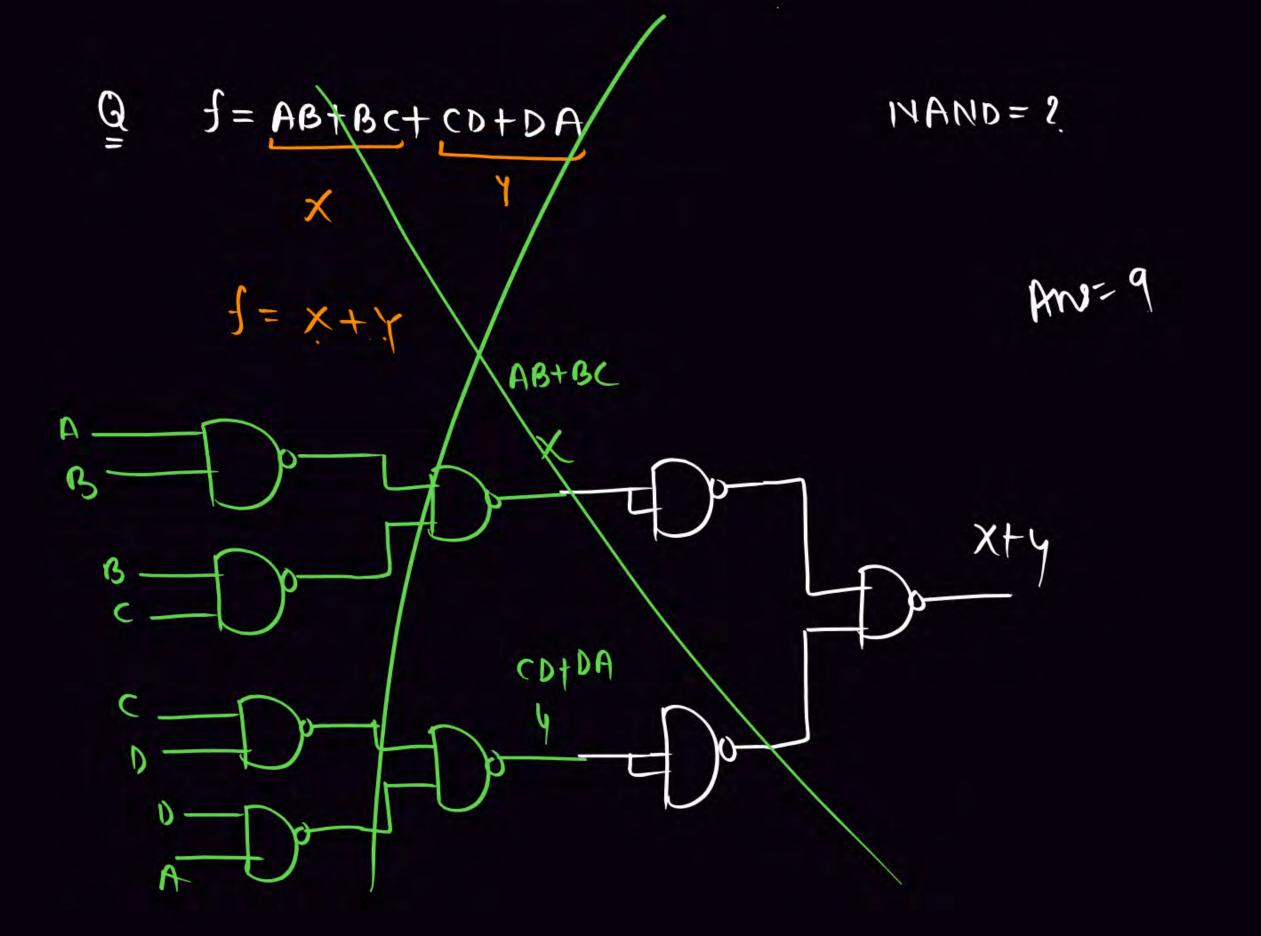
A
$$\frac{1}{6}$$
 $\frac{1}{6}$ $\frac{$

case(3)
$$f = AB+cD$$

a

$$(A+B)$$

$$(3n-3)-k$$
 $(3r2-3)-1-(2)$



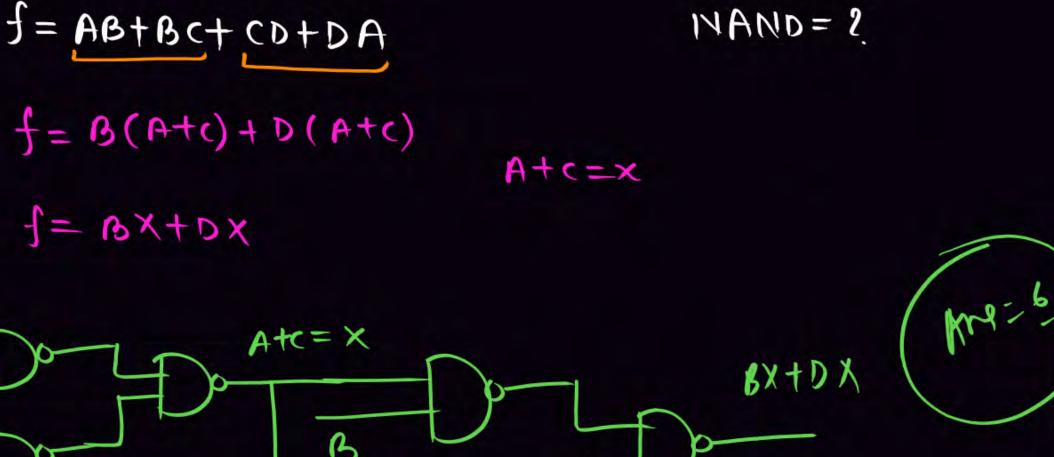






$$Q = f = AB+BC+CD+DA$$

$$f = B(A+C)+D(A+C)$$

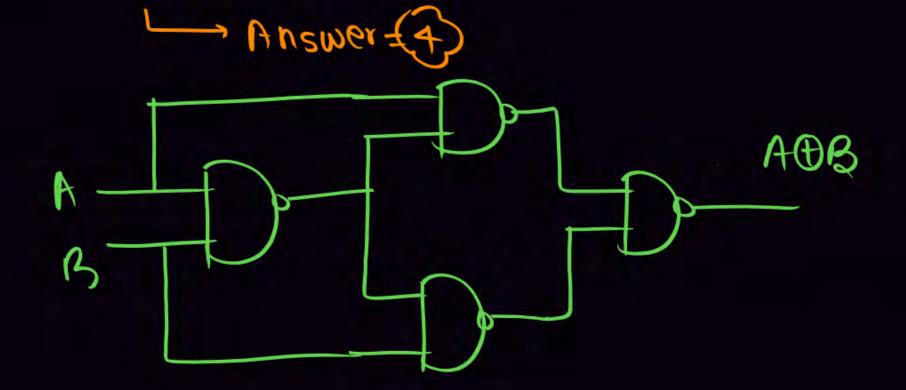






Case 4 Most IMPORTANT [HEIIAR Concept]

AB+AB X-OR





Cose(E)
$$f = (A+B) \cdot (C+D)$$
 pos form

NoR = ?

OR — AND

NOR — AND

NOR — NOR





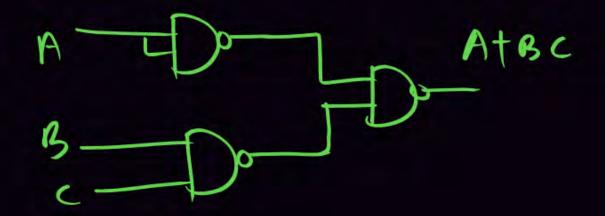
MOTE: > Whenever minimum number of NOR CHATE are asked

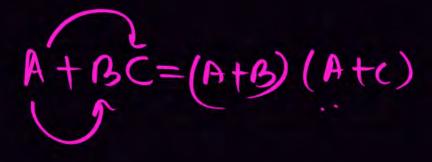
Write the function in POS form and Implement by using

[AND-OR-INVERTER] AOI Which is OR-AND Implementation which is

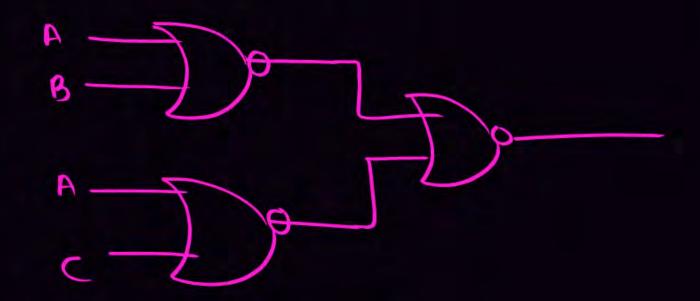
exectly equal to NOR-NOR Implementation.

MAND





 $\frac{MOR}{f = (A+B)(A+c)}$

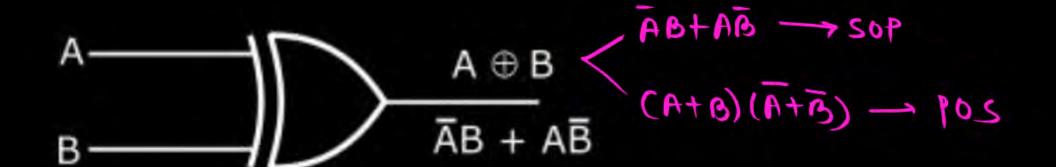


XOR GATE, X-NOR GATE



XOR GATE

Symbol

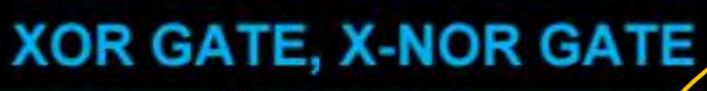


Truth Table

$$A = B \qquad J = 0$$

$$A = \overline{B} \qquad J = 1$$

A	В	Y = A ⊕ B
0	0	0
0	1	1
1	0	1
1	1	0

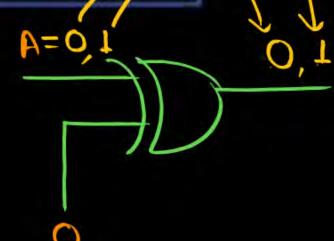


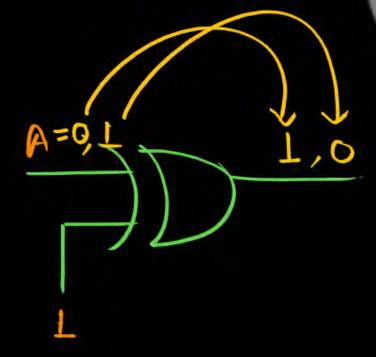


$$A = O \oplus A$$

$$A \oplus \overline{A} = 1$$







INVERTER

XOR GATE, X-NOR GATE



XOR GATE

$$A \oplus A = 0$$

$$A \oplus A \oplus A = A$$

$$A \oplus A \oplus A \oplus A = 0$$

$$A \oplus A \oplus A \dots \oplus A = \bullet$$

For Even no of A





$$Q = 1 + A$$

$$= 1$$

$$L = A \Theta A$$

$$A = L \oplus A$$



$$I \oplus A = K$$

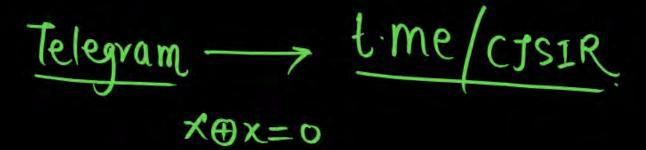
$$I \oplus A = K$$

$$I \oplus A = K$$

$$A \oplus A = T$$

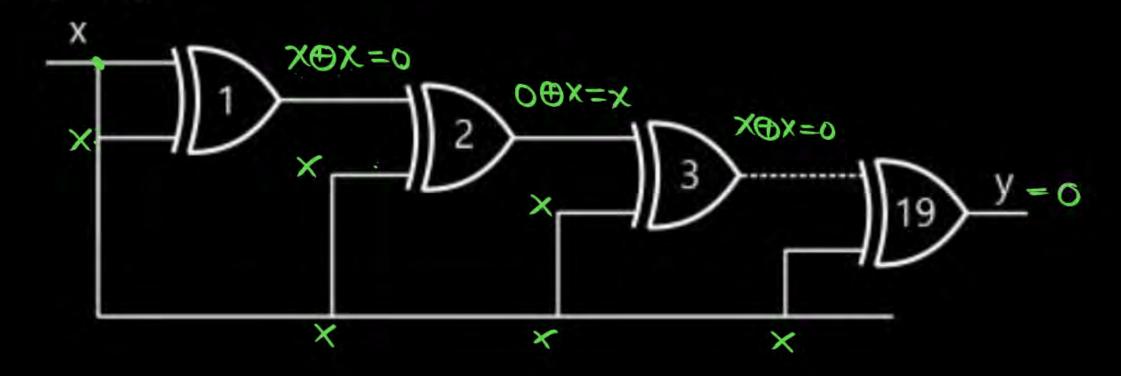
$$A = L \oplus A$$

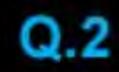
Q.1





Find the output y.

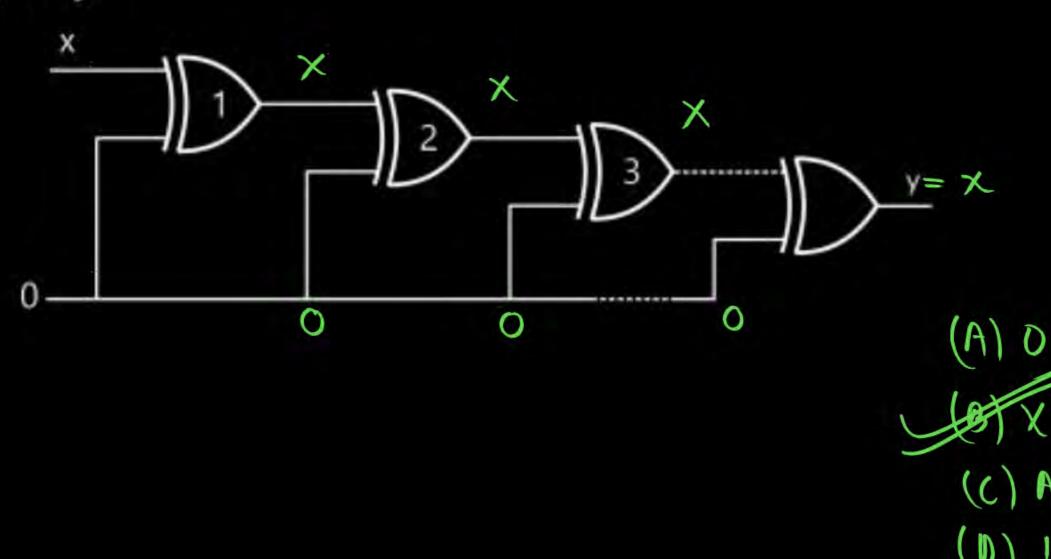


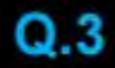




(E) Mai Gajni hu.

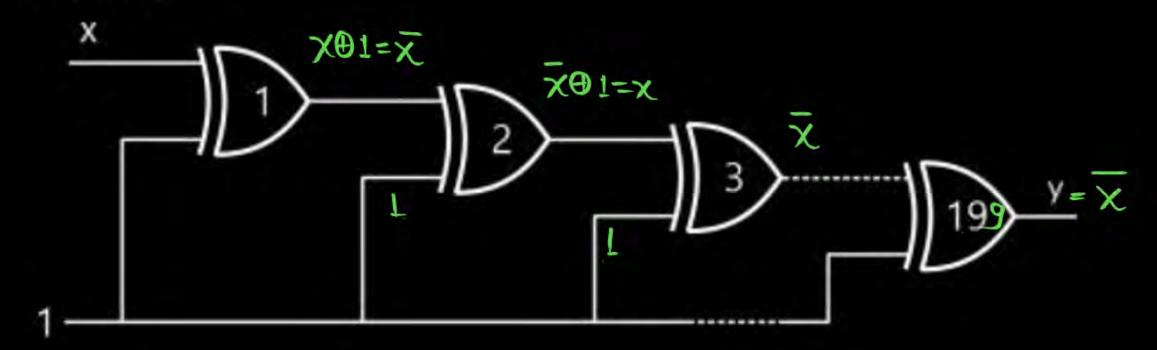
Find the output y.







Find the output y.

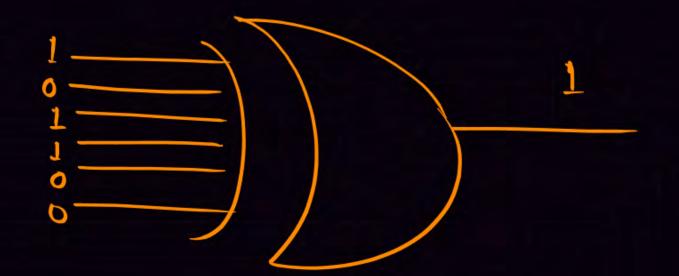




X-or CHATE Of will be high when Go DD number of I's are connected in the inpuls.

Ex at one position = ! 0/b= 1 Three position=L 0/b=T





XOR GATE, X-NOR GATE

XOR GATE

X-OR follows the commutative as well as associative Law

 $A \oplus B = B \oplus A \Rightarrow commutative Law$

 $A \oplus B \oplus C = (A \oplus B) \oplus C$ Associative Law

0000	
(HUBOC:	= Em(1,2,4,7)
~	- "((+)-1,11)
	\sim

	ABC	А⊕В⊕С	(A ⊕ B) ⊕ C
0	000	0	0
Ī	001	1	1 :
2	010	1	1 .
3	011	0	0
4	100	1	J.
5	101	0	0
6	110	0	0
3)	111	1	1

Pw

```
Decimal A B C
 0 -- 0 0 0
 1-001
 2-0 1 0
 3-011
 4-100
 2 - 1 0 1
  6-110
  7-111
```



Thank you

Soldiers!

