

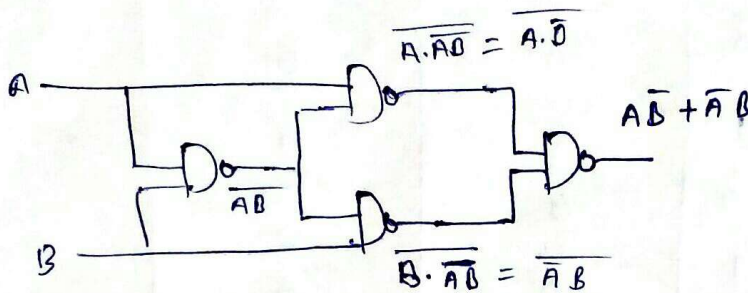
Q.1 minimize using k-map

$$m \Sigma (0, 2, 8, 10, 13) + d \Sigma (5, 7, 12, 14)$$

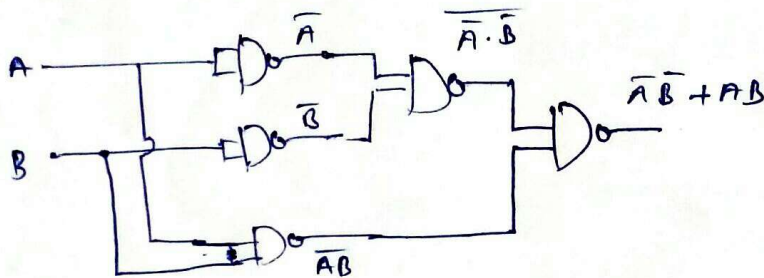
Q.2 Draw Exor and ExNOR gates using minimum no. of NAND gates.

Q.3 Explain demorgans Theorem with example?

Ans. 2 Ex-or gate using NAND gate.



EX-NOR gate using NAND GATE



Ans. 1

	$\bar{C}\bar{D}$	$\bar{C}D$	$C\bar{D}$	$CD$
$\bar{A}\bar{B}$	1	1	1	1
$\bar{A}B$		X	X	
$A\bar{B}$	X			X
$AB$	1			1

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

Ans. 3 The Complement of the product of two or more variables is equal to the sum of the complements of the variables.

for two variables A and B these theorems are written in Boolean notation as follows

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

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

Ex.  $\Rightarrow$  Prove the following De-Morgan's theorem :

$$\overline{A+B+C} = \bar{A} \cdot \bar{B} \cdot \bar{C}$$

Proof

A	B	C	$\overline{A+B+C}$	$\bar{A} \cdot \bar{B} \cdot \bar{C}$
0	0	0	1	1
0	0	1	0	0
0	1	0	0	0
0	1	1	0	0
1	0	0	0	0
1	0	1	0	0
1	1	0	0	0
1	1	1	0	0