

LOGIC GATES Problems # 2

1 of 3.

FIG 12.2

A	B	NAND(A, B)	\bar{A}	NOR(\bar{A} , B)	OR(NAND, NOR) = NAND(A, B)
0	0	1	1	0	1
0	1	1	1	0	1
1	0	1	0	1	1
1	1	0	0	0	0

$$\begin{aligned}
 \overline{A \cdot B} + \overline{\bar{A} + B} &= (\bar{A} + \bar{B}) + (\bar{\bar{A}} \cdot \bar{B}) \\
 &= (\bar{A} + \bar{B}) + (A \cdot \bar{B}) \\
 &= \bar{A} + \bar{B} + A \cdot \bar{B} \\
 &= \bar{A} + (\bar{B} + A \cdot \bar{B}) \\
 &= \bar{A} + \bar{B}(1 + A) \\
 &= \bar{A} + \bar{B}(1) \\
 &= \bar{A} + \bar{B} = \overline{A \cdot B}
 \end{aligned}$$

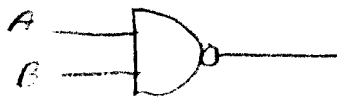
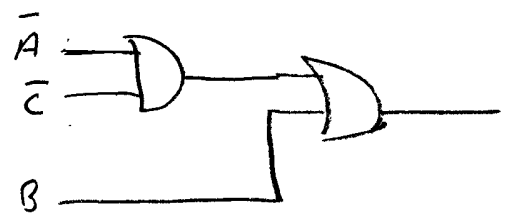


FIG 12.3

A	B	C	\bar{A}	\bar{B}	\bar{C}	AND1(A, B, C)	AND2($\bar{A}, \bar{B}, \bar{C}$)	OR(AND1, AND2, B)
0	0	0	1	1	1	0	1	1
0	0	1	1	1	0	0	0	0
0	1	0	1	0	1	0	0	1
0	1	1	1	0	0	0	0	1
1	0	0	0	1	1	0	0	0
1	0	1	0	1	0	0	0	0
1	1	0	0	0	1	0	0	1
1	1	1	0	0	0	1	0	1

$$(A \cdot B \cdot C) + (\bar{A} \cdot \bar{B} \cdot \bar{C}) + B$$

NOTE: IF B = 1 THEN output = 1
 IF B = 0 THEN output = $\bar{A} \cdot \bar{C}$ } = $B + \bar{A} \cdot \bar{C}$



A	B	C	\bar{A}	\bar{C}	AND(\bar{A}, \bar{C})	OR(AND(\bar{A}, \bar{C}), B)
0	0	0	1	1	1	1
0	0	1	1	0	0	0
0	1	0	1	1	1	1
0	1	1	1	0	0	1
1	0	0	0	1	0	0
1	0	1	0	0	0	0
1	1	0	0	1	0	1
1	1	1	0	0	0	1

FIG 12.4

A	B	\bar{A}	\bar{B}	AND1(A, B)	AND2(\bar{A} , \bar{B})	OR(AND1, AND2)
0	0	1	1	0	1	1
0	1	1	0	0	0	0
1	0	0	1	0	0	0
1	1	0	0	1	0	1

Out put IS NOT XOR (NXOR)

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FIG 12.6

A	B	\bar{A}	\bar{B}	OR1(A, B)	OR2(\bar{A} , \bar{B})	AND(OR1, OR2)
0	0	1	1	0	1	0
0	1	1	0	1	1	1
1	0	0	1	1	1	1
1	1	0	0	1	0	0

Out put IS XOR

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