

مسئله ۲-

الف) $F(a, b, c, d) = \prod M(2, 7, 8, 10, 11, 12, 13) \cdot D(3, 15)$

$= \sum m(0, 1, 4, 5, 6, 9, 14) \cdot D(3, 15)$

| ab \ cd | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00 | 1 | 1 | — | |
| 01 | 1 | 1 | | 1 |
| 11 | | | — | 1 |
| 10 | | 1 | | |

6 PI

$\bar{a} \bar{c}$

$\bar{a} b \bar{d}$ +4

$\bar{b} \bar{c} d$

$a \bar{b} d$

-1 for missed PI

6 EPI

$\bar{a} \bar{c}$

$\bar{a} b \bar{d}$

$a \bar{b} d$

+1.5

+0.5 for surplus EPI

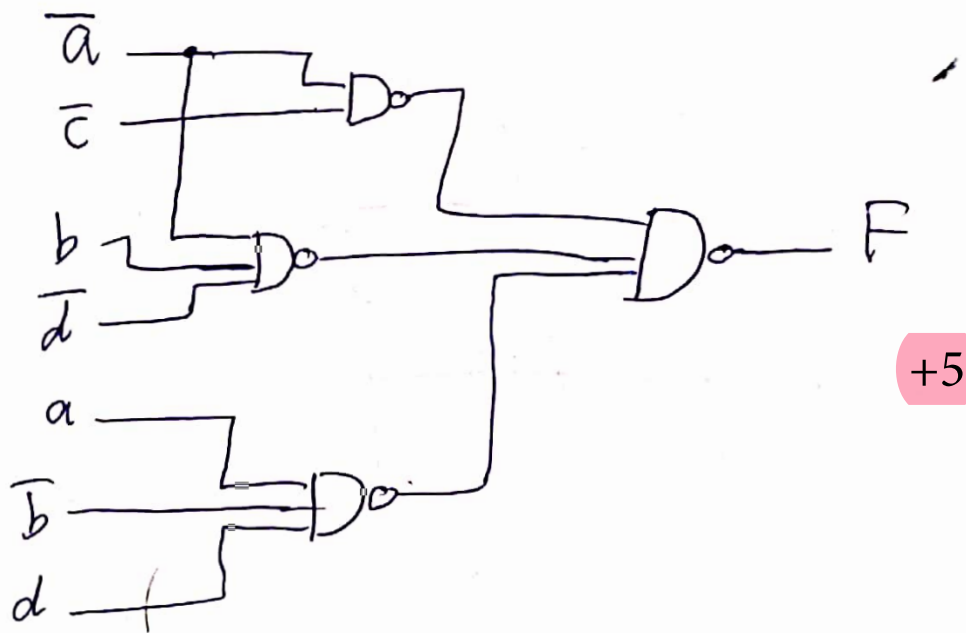
$F(a, b, c, d) = \bar{a} \bar{c} + \bar{a} b \bar{d} + a \bar{b} d$ +4

سوال ۲:

(ب)

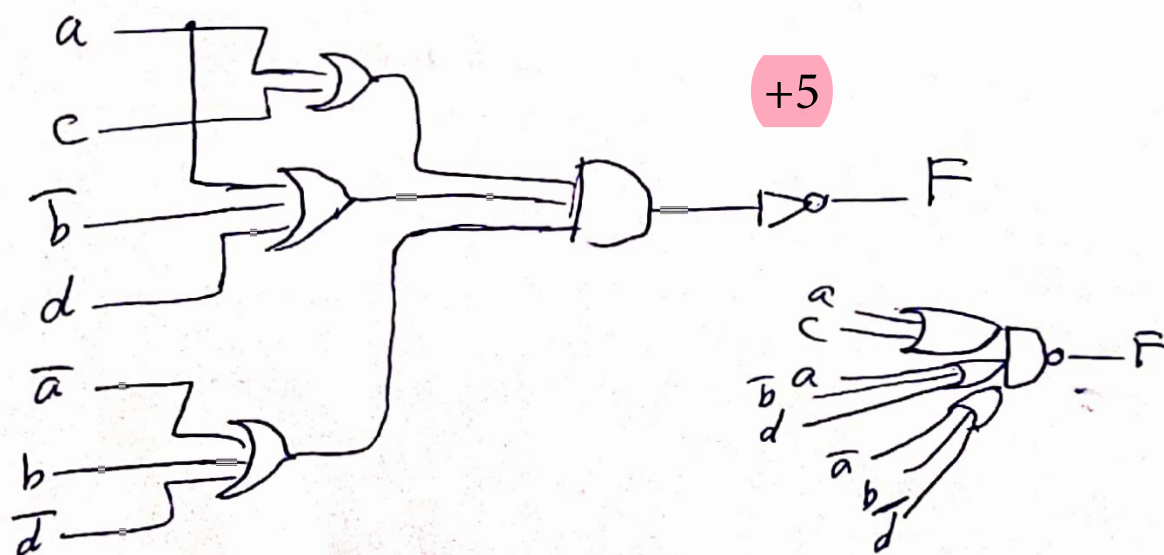
$$F(a, b, c, d) = \bar{a}\bar{c} + \bar{a}bd + a\bar{b}d$$

: NAND



: OR-AND-Inv

$$\overline{F(a, b, c, d)} = \overline{(a+c) \cdot (a+\bar{b}+d) \cdot (\bar{a}+b+d)}$$



سؤال ۲ -

ج) راجع کویس - یک کسک

$$F(a, b, c, d) = \sum m(0, 1, 4, 5, 6, 9, 14). D(3, 15)$$

| | | |
|------|------------|---------------------|
| ✓ 0 | (0, 1) 1 | (0, 4, 1, 5) (4, 1) |
| ✓ 1 | ✓ (0, 4) 4 | |
| ✓ 4 | ✓ (1, 5) 4 | |
| ✓ 5 | (1, 9) 8 | |
| ✓ 6 | (6, 14) 8 | |
| ✓ 9 | | |
| ✓ 14 | (14, 15) 1 | |
| ✓ 15 | | |

+3

-2 for wrong PIS

$$\begin{aligned} 000\bar{1} &\xrightarrow{1} \bar{a}\bar{b}\bar{c} \\ \bar{1}001 &\xrightarrow{8} \bar{b}\bar{c}d \\ \bar{1}10 &\xrightarrow{8} b\bar{c}\bar{d} \\ 11\bar{1} &\xrightarrow{1} abc \\ 0\bar{1}0\bar{1} &\xrightarrow{4,1} \bar{a}\bar{c} \end{aligned}$$

+4

-5 for missed "3" in first col and not complete calculation

| 6 PI | 0 | 1 | 4 | 5 | 6 | 9 | 14 |
|-------------------------|---|---|---|---|---|---|----|
| $\bar{a}\bar{b}\bar{c}$ | x | x | | | | | |
| $\bar{b}\bar{c}d$ | | x | | | | x | |
| $b\bar{c}\bar{d}$ | | | | x | | | x |
| abc | | | | | | | x |
| $\bar{a}\bar{c}$ | x | x | x | x | | | |
| | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |

-6

$$F(a, b, c, d) = \bar{a}\bar{c} + b\bar{c}\bar{d} + \bar{b}\bar{c}d$$

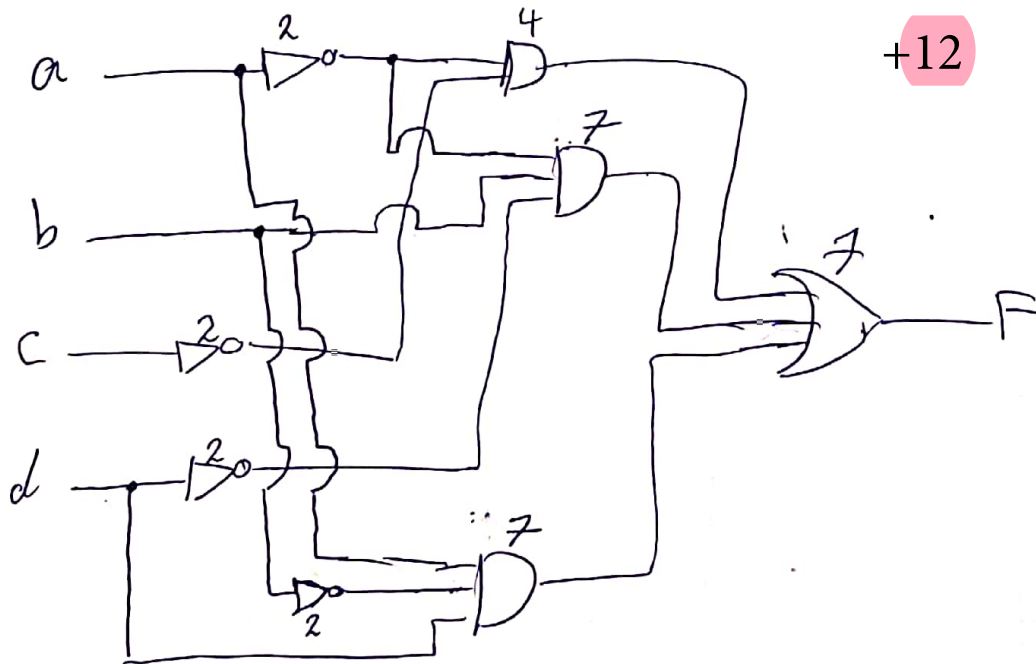
شماره دانشجویی: ۹۸۴۶۳۱۵۳

نام دانشجو: محمد خدایی

سوالات دوم مدارهای منطقی

جواب سؤال ۲:

(۵)



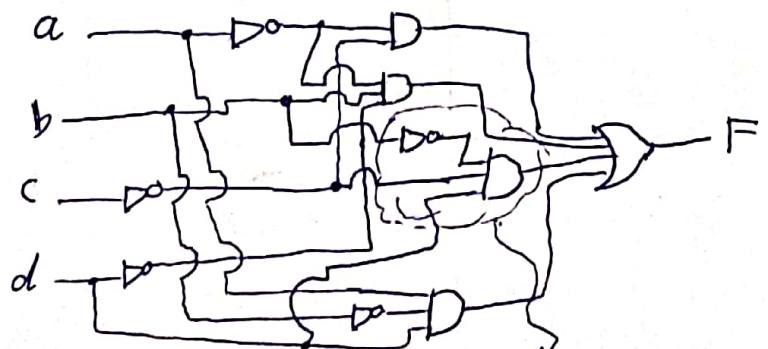
+12

$$\begin{array}{c} abcd \\ 13: 0001 \end{array} \quad \begin{array}{c} abcd \\ 14: 1001 \end{array}$$

Glitch = 14 - 13 = 1 ns

(۵) گیت های منطقی به رفع مازادها:

| ab \ cd | 00 | 01 | 11 | 10 |
|---------|----|----|----|----|
| 00 | 1 | 1 | - | - |
| 01 | 1 | 1 | - | 1 |
| 11 | - | - | - | 1 |
| 10 | - | 1 | - | - |



$$F(a, b, c, d) = \bar{a}\bar{c} + \bar{a}b\bar{d} + \bar{a}b\bar{d} + \bar{b}\bar{c}d$$

+6

5