

پانچ عمری سری اول مارنفلت (سیستم ریالی 1)

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الف.

$$(3F5A2)_{16} = ( )_{10} \rightarrow 3 \times (16)^2 + 15 \times (16)^1 + 5 \times (16)^0 + 10 \times (16)^{-1} + 2 \times (16)^{-2} = 1013.63_{10}$$

$$(1101101.01)_2 = ( )_{10} \rightarrow 2^5 + 2^3 + 2^2 + 2^0 + 2^{-2} = 45.25_{10}$$

$$(1345)_{10} = ( )_8 \rightarrow \begin{array}{r} 1345 \div 8 = 168 \text{ R } 1 \\ 168 \div 8 = 21 \text{ R } 0 \\ 21 \div 8 = 2 \text{ R } 5 \\ 2 \div 8 = 0 \text{ R } 2 \end{array} \rightarrow 2501_8$$

$$(763.245)_8 = ( )_{16} \xrightarrow{\text{بناں 2}} \begin{array}{ccccccc} 1 & 1 & 1 & 1 & 1 & 0 & 1 \\ 7 & 6 & 3 & 2 & 4 & 5 & \end{array} \xrightarrow{\text{بناں 16}} 1F3.528_{16}$$

کمیت کبیت  
قبل اشارہ ازبیت  
بعد اشارہ ازبیت

$$(4.375)_{10} = ( )_2 \xrightarrow{\text{تیم جمع}} \begin{array}{r} 4 \div 2 = 2 \text{ R } 0 \\ 2 \div 2 = 1 \text{ R } 0 \\ 1 \div 2 = 0 \text{ R } 1 \end{array} \xrightarrow{\text{تیم تار}} \begin{array}{l} 0.375 \times 2 = 0.75 \\ 0.75 \times 2 = 1.5 \\ 0.5 \times 2 = 1 \end{array}$$

$$\rightarrow 100.011_2$$

$$\begin{array}{r} 1010100 \\ - 1000011 \\ \hline \end{array} \xrightarrow{\text{۲ مکمل}} \begin{array}{r} 1111 \\ 1010100 \\ + 0111101 \\ \hline 10010001 \end{array}$$

$$\xrightarrow{\text{رقم مطلق}} \begin{array}{r} 10001 \end{array}$$

$$\begin{array}{r} 1101000.010 \\ + 1001111.101 \\ \hline 10110111.111 \end{array}$$

$$\begin{array}{r} 1100101010 \\ - 10100101101 \\ \hline \end{array} \xrightarrow{\text{۱ مکمل}} \begin{array}{r} 1100101010 \\ + 01011010010 \\ \hline 10111111100 \end{array}$$

$$\xrightarrow{\text{رقم مطلق نداریم}} \begin{array}{r} 1000000011 \end{array}$$

(ج)  $357 \xrightarrow{\text{BCD}} 001101010111$  تبدیل اعداد ده گانه به BCD و در هر رقم ۴ بیت

$784 \xrightarrow{\text{excess-3}} 101010110111$  به هر رقم ۳ واحد اضافه و در BCD عمل کنیم

$101100 \xrightarrow{\text{Gray}} 110111$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 0 | 0 |
| ↓ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ |
| 1 | 1 | 0 | 1 | 1 | 1 |

تبدیل باینری به گری

$$D_0 = 1 \oplus a_0$$

$$D_1 = a_0 \oplus a_1$$

$$D_2 = a_0 a_1 \oplus a_2$$

$$D_3 = a_0 a_1 a_2 \oplus a_3$$

$$\Rightarrow A+1$$

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(الف)

$$(bc + \bar{c}\bar{d}) \odot (a+b)$$

(ب)

$$(\bar{a}b + a) + (a+b) \cdot (a+\bar{b}+c) = \underline{a+b}$$

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(الف)

$$f(A, B, C) = \overline{A\bar{B}C + AB + \overline{A\bar{B}C} + A\bar{C} + AB\bar{C}}$$

$$= (\bar{A} + B + \bar{C}) \cdot (\bar{A} + \bar{B}) \cdot ABC \cdot (\bar{A} + C) \cdot (\bar{A} + \bar{B} + C) = 0$$

(ب)

$$F(A, B, C, D) = \bar{A}B(\bar{D} + \bar{C}D) + B(A + \bar{A}CD)$$

$$= \bar{A}B\bar{D} + \bar{A}B\bar{C}D + BA + B\bar{A}CD = B(\bar{A}\bar{D} + \bar{A}\bar{C}D + A + \bar{A}CD)$$

$$= B(\bar{D} + \bar{C}D + CD + A)$$

$$\bar{D} + \bar{C} + CD + A$$

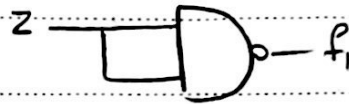
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Date : / /

Subject : .....

| Ques    | Ans                                          | 5 |
|---------|----------------------------------------------|---|
| w x y z | f <sub>1</sub> f <sub>2</sub> f <sub>3</sub> |   |
| 0 0 0 0 | 1 1 1                                        |   |
| 0 0 0 1 | 0 0 0                                        |   |
| 0 0 1 0 | 1 0 0                                        |   |
| 0 0 1 1 | 0 1 0                                        |   |
| 0 1 0 0 | 1 0 1                                        |   |
| 0 1 0 1 | 0 0 0                                        |   |
| 0 1 1 0 | 1 1 0                                        |   |
| 0 1 1 1 | 0 0 0                                        |   |
| 1 0 0 0 | 1 0 1                                        |   |
| 1 0 0 1 | 0 1 0                                        |   |
| 1 0 1 0 | n n n                                        |   |
| 1 0 1 1 | n n n                                        |   |
| 1 1 0 0 | n n n                                        |   |
| 1 1 0 1 | n n n                                        |   |
| 1 1 1 0 | n n n                                        |   |
| 1 1 1 1 | n n n                                        |   |

| $\frac{w}{y}z$ | 00 | 01 | 11 | 10 |
|----------------|----|----|----|----|
| 00             | 1  |    |    | 1  |
| 01             | 1  |    |    | 1  |
| 11             | x  | x  | x  | x  |
| 10             | 1  |    | x  | x  |

NAND-NAND  $f_1$ 

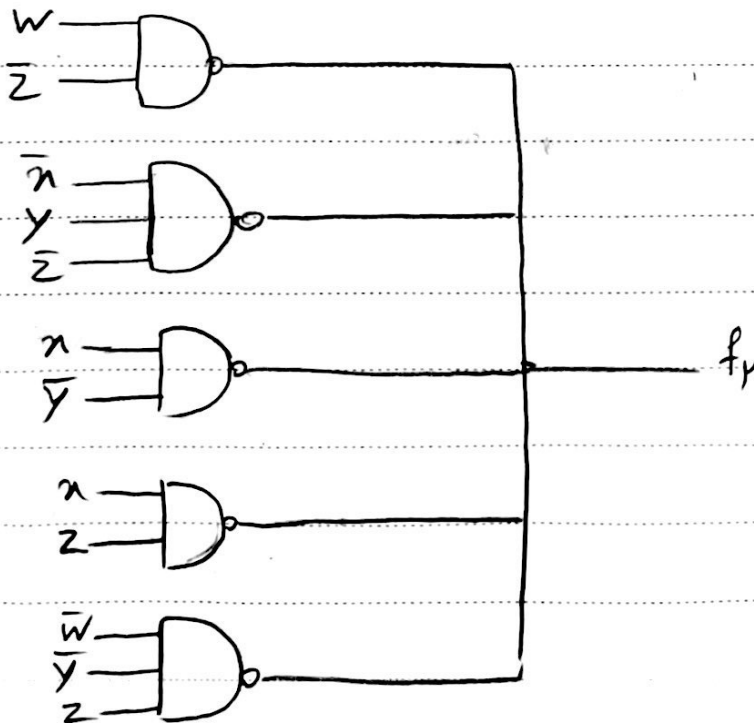
$$f_1 = \bar{z}$$

NAND-NAND  $f_1$ 

| $\frac{w}{y}z$ | 00 | 01 | 11 | 10 |
|----------------|----|----|----|----|
| 00             |    | 1  |    | 1  |
| 01             | 1  | 1  | 1  |    |
| 11             | x  | x  | x  | x  |
| 10             | 1  |    | x  | x  |

استفاده از  $f_1$  در  $f_1'$  به صورت SOP  
 و استفاده از NAND-NAND  
 و تبدیل NOT به درختی با استفاده از NAND  
 طبقه بندی به AND و OR و NOT

$$f_1' = w\bar{z} + \bar{x}yz + x\bar{y} + xz + \bar{w}\bar{y}z$$

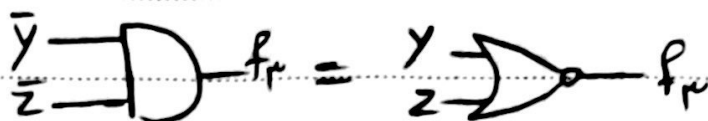


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| yz | 00 | 01 | 11 | 10 |
|----|----|----|----|----|
| 00 |    | 0  | 0  | 0  |
| 01 |    | 0  | 0  | 0  |
| 11 | 1  | 1  | 1  | 1  |
| 10 |    | 0  | 0  | 1  |

NOR-NOR is L  $f_p$



$$f_p = \bar{y}\bar{z}$$

Date : / /

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الف

| منه  | A | B |
|------|---|---|
| 0000 | 1 | 0 |
| 0001 | 0 | 0 |
| 0010 | 1 | 1 |
| 0011 | 0 | 0 |
| 0100 | 1 | 0 |
| 0101 | 0 | 0 |
| 0110 | 1 | 0 |
| 0111 | 0 | 1 |
| 1000 | 1 | 0 |
| 1001 | 0 | 0 |
| 1010 | 1 | 0 |
| 1011 | 0 | 1 |
| 1100 | 0 | 0 |
| 1101 | 0 | 0 |
| 1110 | 0 | 1 |
| 1111 | 0 | 0 |

min term (SOP) (ب)

$$A = \bar{x}_3 \bar{x}_2 \bar{x}_1 \bar{x}_0 + \bar{x}_3 \bar{x}_2 x_1 \bar{x}_0 + \bar{x}_3 x_2 \bar{x}_1 \bar{x}_0 + \bar{x}_3 x_2 x_1 \bar{x}_0 \\ + x_3 \bar{x}_2 \bar{x}_1 \bar{x}_0 + x_3 \bar{x}_2 x_1 \bar{x}_0 = \sum m(0, 2, 4, 6, 8, 10)$$

| $x_3 x_2$ | $x_1 x_0$ 00 | 01 | 11 | 10 |
|-----------|--------------|----|----|----|
| 00        | 1            |    |    | 1  |
| 01        | 1            |    |    | 1  |
| 11        |              |    |    |    |
| 10        | 1            |    |    | 1  |

$$\rightarrow A = \bar{x}_3 \bar{x}_0 + x_3 \bar{x}_2 \bar{x}_0$$

max term (POS) (ج)

$$B = (x_3 + x_2 + \bar{x}_1 + \bar{x}_0)(x_3 + \bar{x}_2 + \bar{x}_1 + \bar{x}_0) \\ (\bar{x}_3 + x_2 + \bar{x}_1 + \bar{x}_0)(\bar{x}_3 + \bar{x}_2 + \bar{x}_1 + x_0) = \prod M(2, 7, 11, 14)$$

| $x_3 x_2$ | $x_1 x_0$ 00 | 01 | 11 | 10 |
|-----------|--------------|----|----|----|
| 00        |              |    |    | 0  |
| 01        |              |    | 0  |    |
| 11        |              |    |    | 0  |
| 10        |              |    | 0  |    |

$$\rightarrow \text{! في 0}$$