

① الف)  $xy + x'z + yz \xrightarrow{\text{dual}} (x+y) \cdot (x'+z) \cdot (y+z)$

ب)  $z'(xy')(y'x'z) \xrightarrow{\text{dual}} z' + (x+y')(y'+x'+z)$

ج)  $zx' + xy(z+w'+x') + xyw \xrightarrow{\text{dual}} (z+x') \cdot ((x+y)(zw'x')) \cdot (x+y+w)$

② الف)  $x'y'w' + wz + yz + xz \xrightarrow{\text{complement}} (x'y'zw')' \cdot (wz)' \cdot (yz)' \cdot (xz)'$   
 $= (x+y+w) \cdot (w'+z') \cdot (y'+z') \cdot (x'+z')$

ب)  $xyz + yw' + xyw'z' + wz \xrightarrow{\text{complement}} (xyz)' \cdot (yw')' \cdot (xyw'z')' \cdot (wz)'$   
 $= (x'+y'+z')(y+w)(x'+y'+w+z)(w'z')$

ج)  $(x+w+z)(z+w+y)(zywz') \xrightarrow{\text{complement}} (x+w+z)' + (z+w+y)' + (zywz')'$   
 $= (x'w'z') + (z'w'y') + (z'y'w'+z)$

③ الف)  $x'y(z+xy') + x'z \xrightarrow{\text{distributive}} x'(y(z+xy') + z) \xrightarrow{\text{distributive}} x'(yz + yxy' + z) \xrightarrow{\text{complement idempotent}} x'(yz + z) \xrightarrow{\text{distributive covering}} x'z$

ب)  $(x+y)(x'+z)(y+z) \xrightarrow{\text{distributive}} (xx' + xz + yx' + yz)(y+z) \xrightarrow{\text{distributive complement}} xzy + xzz + yx'y + yx'z + yzy + yzz \xrightarrow{\text{complement}} xyz + xz + x'y + x'yz$   
 $+ yz + yz \xrightarrow{\text{consensus}} xyz + xz + x'y + x'yz \xrightarrow{\text{complement}} xz + x'y$   
 $\xrightarrow{\text{consensus}} xz + x'y$



$$2) ny' + n(n'z) + ny + ny'z + (ny' + z)(z + n' + y + n'z') \xrightarrow{\text{distribution}}$$

$$ny' + (nn' + nz) + ny + ny'z + (ny'z + ny'n' + ny'y + ny'n'z') + (z.z + z.n' + zy + zn'y)$$

$$\xrightarrow[\text{idempotent}]{\text{complement}} ny' + \underline{nz} + \underline{ny} + \underline{ny'z} + \underline{ny'z} + \underline{z} + \underline{zn'} + \underline{zy} \xrightarrow[\text{idempotent}]{\text{distribution}}$$

$$\xrightarrow{\text{covering}} \underline{n(y' + y)} + \underline{z(n + n')} + \underline{ny'z} + \underline{z} + \underline{zy}$$

$$\underline{n + z}$$

$$3) (n+y)(n+z)(n+w) + (y' + z')' \xrightarrow[\text{distribution}]{\text{de Morgan}} (nn + nz) + (ny + yz)(n+w) +$$

$$(y.z) \xrightarrow[\text{idempotent}]{\text{distribution}} (n + nz + ny + yz)(n+w) + (y.z) \xrightarrow{\text{covering}}$$

$$(n + yz)(n+w) + (y.z) \xrightarrow{\text{distribution}} \underline{nn} + \underline{nw} + \underline{nyz} + \underline{wyz} + \underline{yz}$$

$$\xrightarrow[\text{covering}]{\text{idempotent}} \underline{n + yz}$$

$$4) n'y(z' + w'z) + y(n + n'wz) \xrightarrow{\text{distribution}} n'yz' + wn'y + ny + n'ywz$$

$$\xrightarrow{\text{distribution}} y(n'z' + n) + (w + w')(n'y) \xrightarrow[\text{complement}]{\text{covering}} y(n + z') + n'yz$$

$$\xrightarrow{\text{distribution}} ny + yz' + n'yz \xrightarrow{\text{distribution}} ny + y(z' + zn') \xrightarrow[\text{distribution}]{\text{covering}} y(n + z' + n')$$

$$\xrightarrow{\text{complement}} \underline{y}$$

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$$(f) i) (y+z')(w'+n'+z)(w+n'+y') = \text{scribbled out}$$

$$(w'y + n'y + yz + w'z' + n'z' + z'z')(w+n'+y') =$$

$$ww'y + wn'y + wyz + ww'z' + wn'z' + w'n'y + \overset{n'y}{n'n'y} + n'yz + w'n'z' + \overset{n'z'}{n'n'z'}$$

$$+ \cancel{w'y'y} + \cancel{n'y'y'} + \cancel{yy'z} + w'y'z' + n'y'z' =$$

$$wn'y + wyz + wn'z' + wn'y + w'n'y + n'y + n'yz + w'n'z' + n'z'$$

$$+ w'y'z' + n'y'z'$$

$$\rightarrow) (n'+y+z')(n+z)(n'y+y'z') = \underbrace{(nn' + ny + nz' + n'z + yz + zz')}_1 (n'y + y'z')$$

$$= n'y + y'z'$$

~~scribble~~

② الف)  $n \quad y \quad z \quad w \quad nz \quad yw' \quad f$

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 | 0 | 1 |

مجموعه مinterms:  $n'y'z'w' + n'y'zw' + ny'z'w + ny'zw + nyz'w' + nyzw' + nyzw$

عبارت ساده شده:  $(n' + y' + z' + w')(n' + y' + z' + w)(n' + y' + z + w')(n' + y' + z + w)(n' + y + z' + w) \cdot (n' + y + z + w)(n + y' + z' + w')(n + y' + z' + w)(n + y + z' + w)$

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ب) 

| $x$ | $y$ | $z$ | $xz$ | $x'y$ | $-x'y'z$ | $xyz'$ | $L'$ | $L$ |
|-----|-----|-----|------|-------|----------|--------|------|-----|
| 0   | 0   | 0   | 0    | 0     | 0        | 0      | 0    | 1   |
| 0   | 0   | 1   | 0    | 0     | 1        | 0      | 1    | 0   |
| 0   | 1   | 0   | 0    | 1     | 0        | 0      | 1    | 0   |
| 0   | 1   | 1   | 0    | 1     | 0        | 0      | 1    | 0   |
| 1   | 0   | 0   | 0    | 0     | 0        | 0      | 0    | 1   |
| 1   | 0   | 1   | 1    | 0     | 0        | 0      | 1    | 0   |
| 1   | 1   | 0   | 0    | 0     | 0        | 1      | 1    | 0   |
| 1   | 1   | 1   | 1    | 0     | 0        | 0      | 1    | 0   |

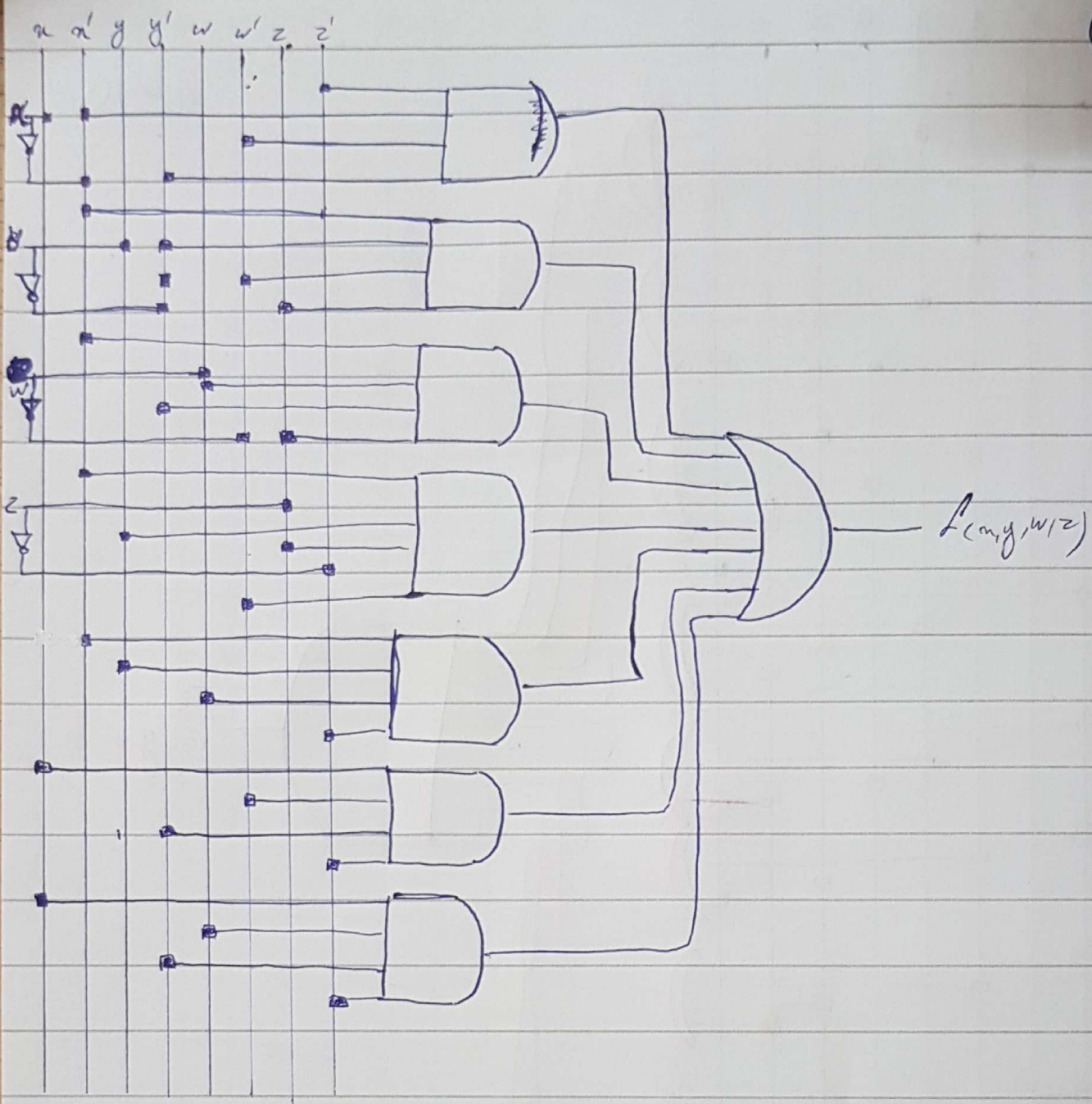
المجموع بينهما:  $x'y'z' + xyz'$

المحور الثالث:  $(x'+y'+z)(x'+y+z')(x'+y+z)(x+y'+z')(x+y'+z)(x+y+z')$   
 $(x+y+z)$

٤) ا)  $L(x, y, z) = xy + x'z + yz = xy + x'z + (x+z)(\frac{1}{2}x'+y)$

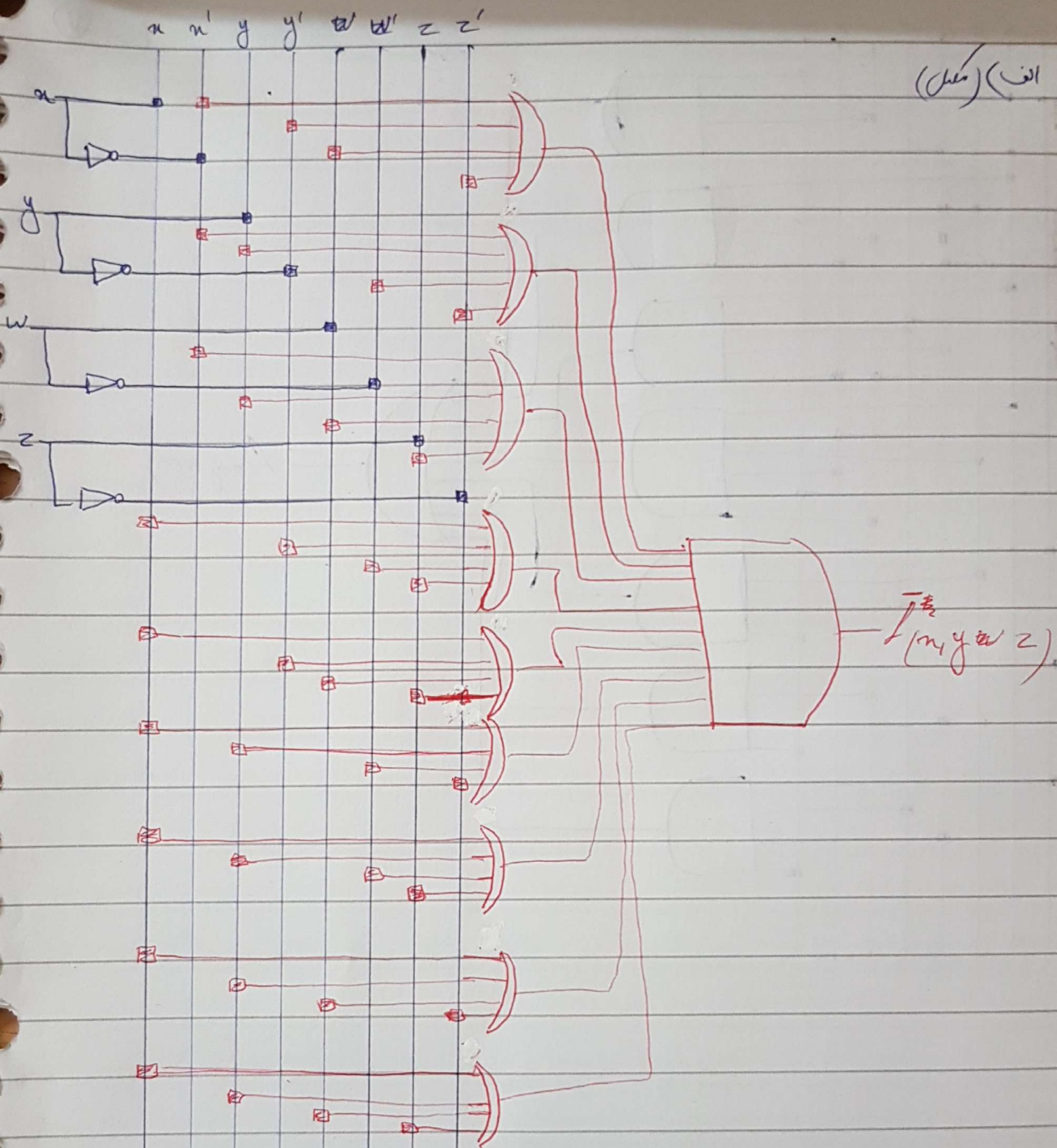
→  $L(x, y, w) = yw' + yw = (yw')(y'+w)$

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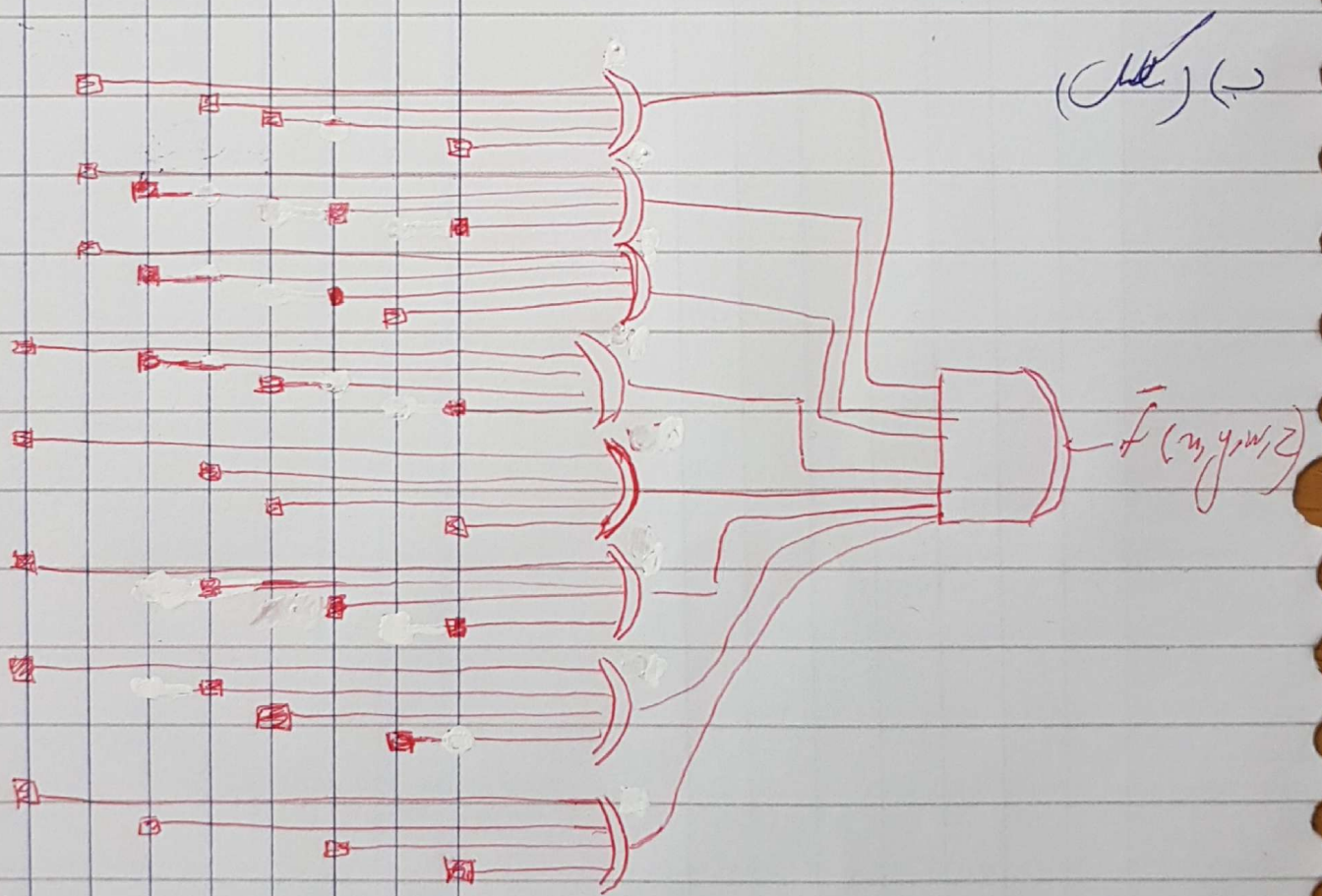
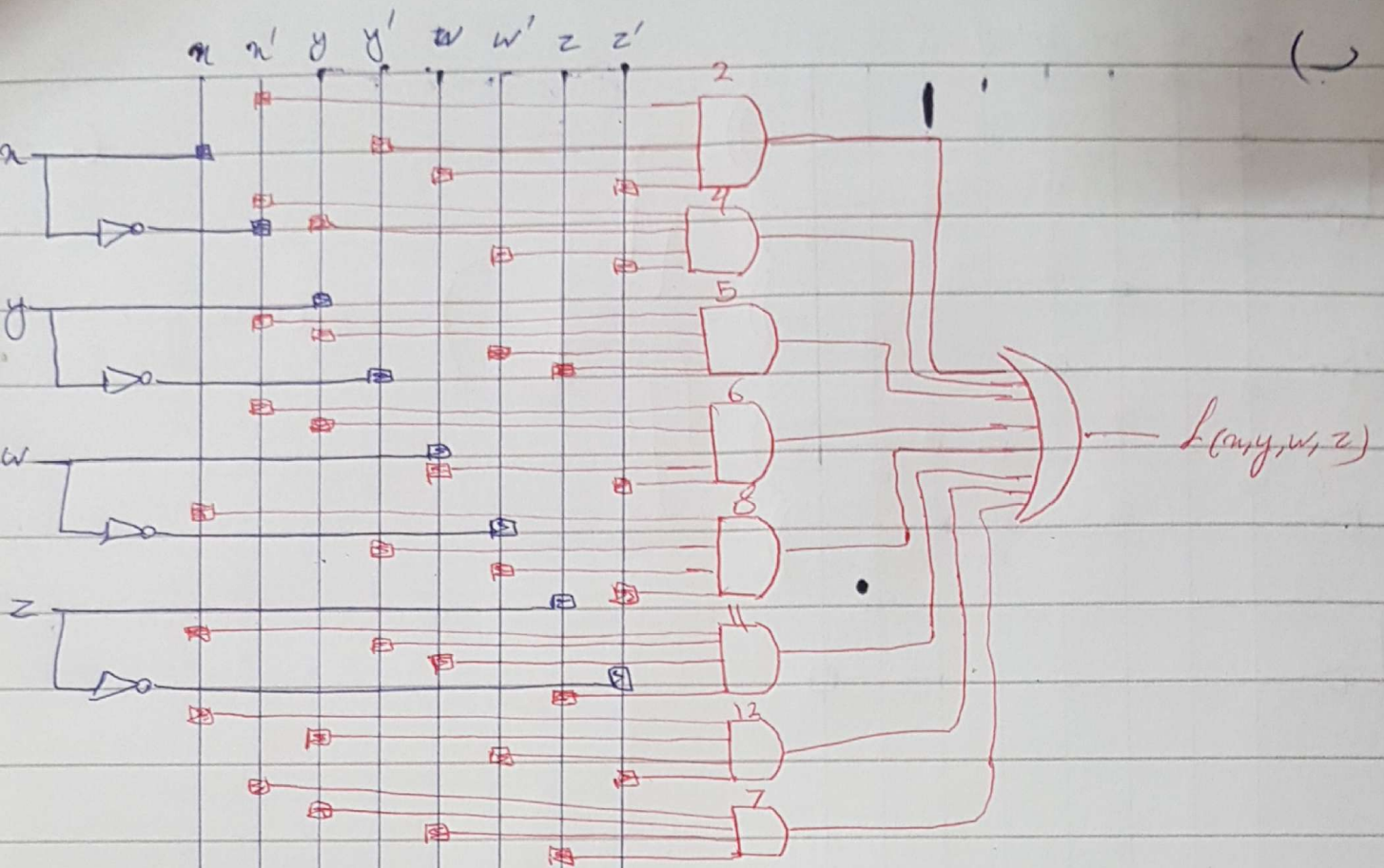




الف) (مطلوب)



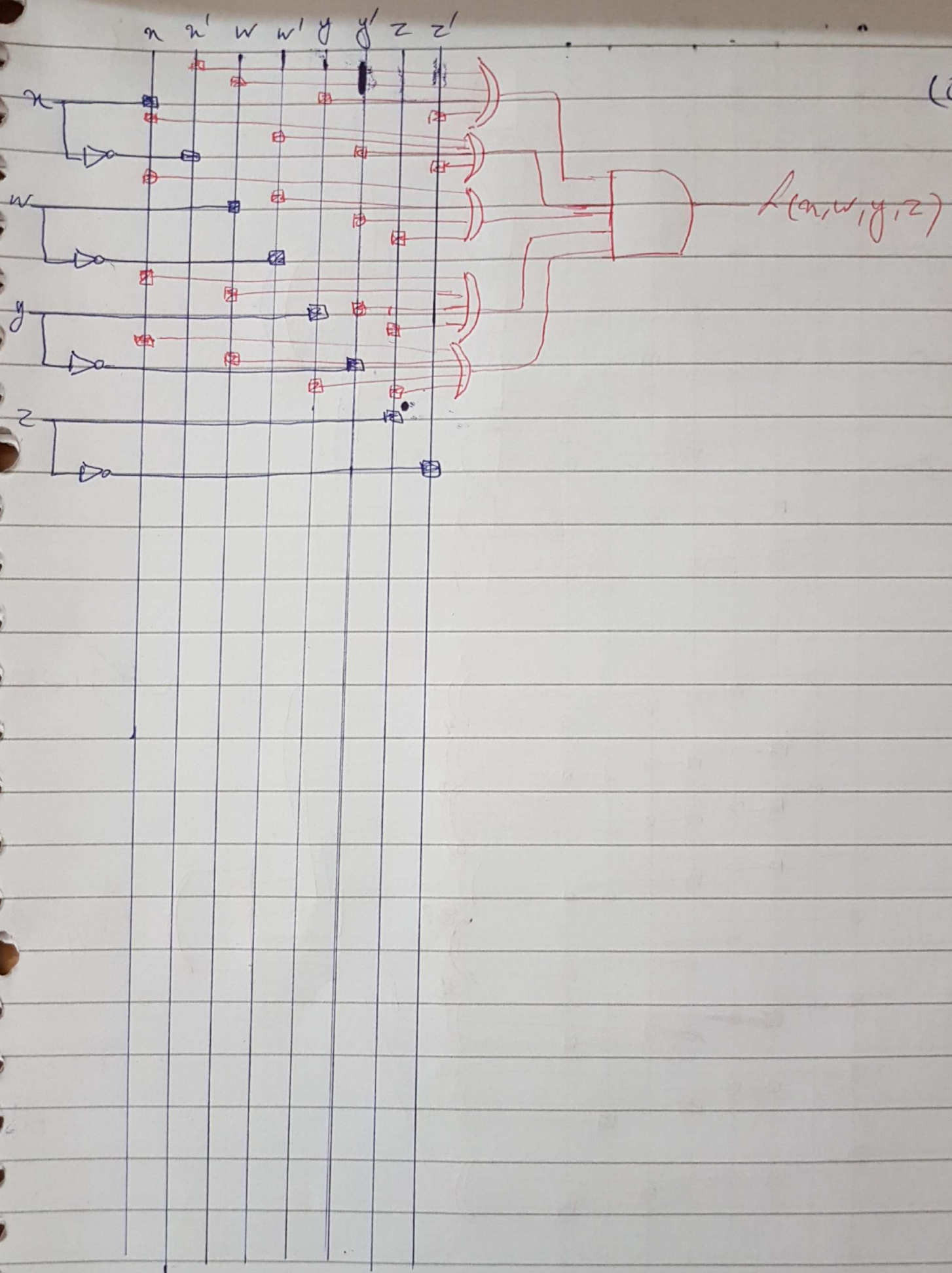




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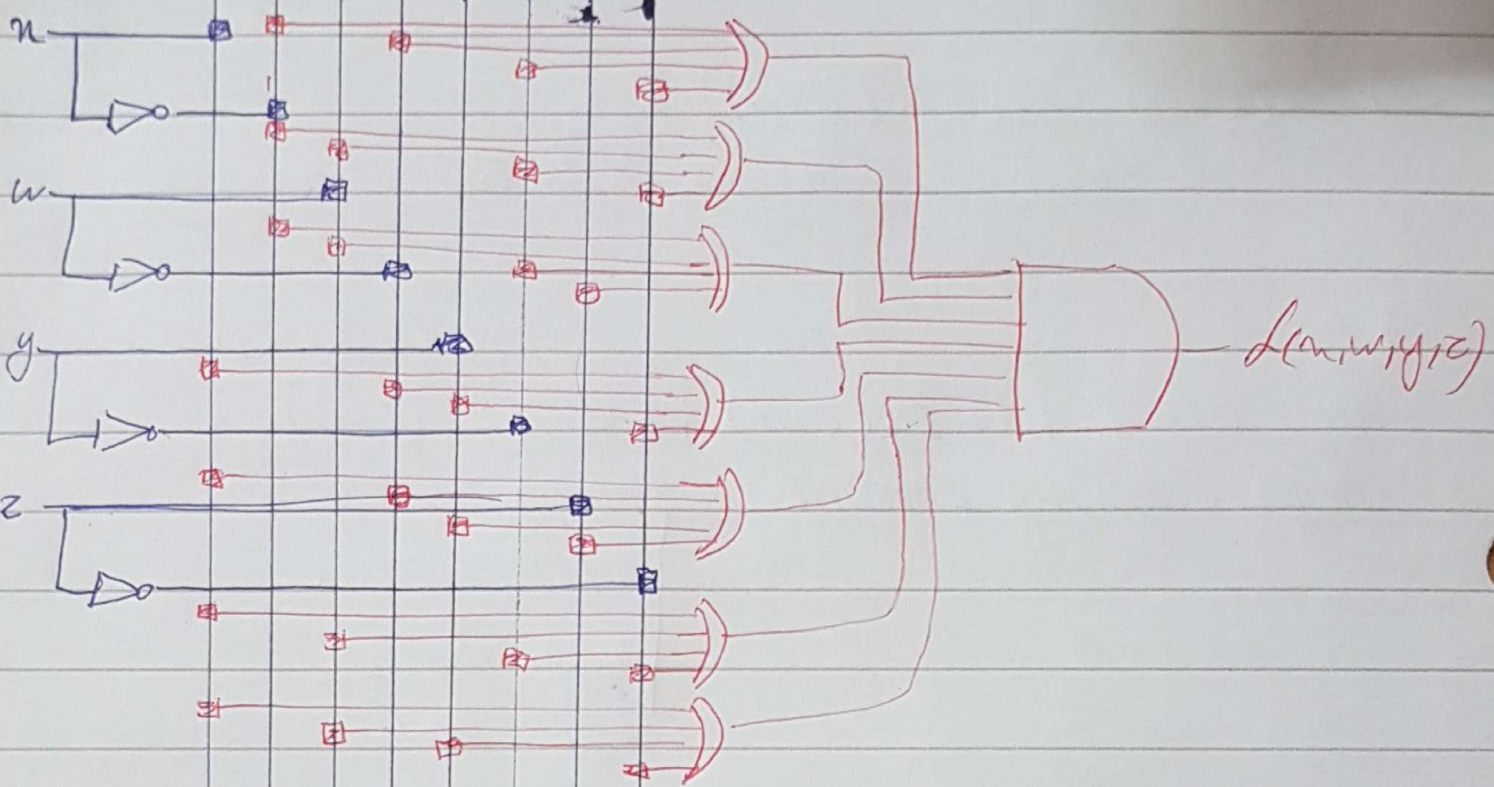


(2)



5

$x \ x' \ w \ w' \ y \ y' \ z \ z'$



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سوال استیلا

الف)  $AB(C+D) \cdot [FG + I \cdot (C+H)] \cdot E$

برای روشن شدن این مسئله به روش حل جدول می‌توانیم به وجود جدولی بپردازیم

ب)

نوع به حالت زیر تغییر شکل می‌دهد

$$ABE (0+0) \cdot [1 + I \cdot (C+H)] = ABED(1 + I \cdot (C+H)) =$$

$$= ABED + ABEDIC + ABEDIH \rightarrow ABED$$

$$ABED + ABEDIC$$

$$ABED + ABEDIH$$

$$ABED + ABEDIC + ABEDIH$$