exercise 1

سؤال 1) الف -

a) $(2A58)_{16} + (71D0)_{16} = (?)_{16}$

$$\begin{array}{r} {\scriptstyle 1\ \ \ \ \ \ } \\ (2A58)_{16} \\ +\ (71D0)_{16} \\ \hline (9C28)_{16} \end{array} \Longrightarrow (2A58)_{16} + (71D0)_{16} = (9C28)_{16}$$

b) $(101101)_2 + (010111)_2 = (?)_2$

$$\begin{array}{r} {\scriptstyle 11111\ \ } \\ (101101)_2 \\ +\ (010111)_2 \\ \hline (1000100)_2 \end{array} \Longrightarrow (101101)_2 + (010111)_2 = (1000100)_2$$

c) $(276)_8 + (357)_8 = (?)_8$

$$\begin{array}{r} {\scriptstyle 11\ \ \ } \\ (276)_8 \\ +\ (357)_8 \\ \hline (655)_8 \end{array} \Longrightarrow (276)_8 + (357)_8 = (655)_8$$

d) $(5C2A)_{16} \times (71D0)_{16} = (?)_{16}$

$$\begin{array}{r} (5C2A)_{16} \\ \times\ (71D0)_{16} \\ \hline 0\ \ 0\ \ 0\ \ 0 \\ 4\ A\ E\ 2\ 2 \\ 5\ C\ 2\ A \\ 2\ 8\ 5\ 2\ 6 \\ \hline (28F96C20)_{16} \end{array} \Longrightarrow (5C2A)_{16} \times (71D0)_{16} = (28F96C20)_{16}$$

e) $(45)_8 \times (64)_8 = (?)_8$

$$\begin{array}{r} (45)_8 \\ \times\ (64)_8 \\ \hline 2\ 2\ 4 \\ 2\ 3\ 6 \\ \hline (36.4)_8 \end{array} \Longrightarrow (45)_8 \times (64)_8 = (36.4)_8$$

ب -

a) $(67)_{10} \xrightarrow{BCD} (0110\ 0111)_{BCD}$

b) $(127)_{10} \xrightarrow{BCD} (0001\ 0010\ 0111)_{BCD}$

c) $(0110\ 0100\ 1000\ 0000)_2 =$

$= (32768)_{10} = (0011\ \ 0010\ \ 0111\ \ 0110)_{BCD}$

سوال 2) الف -

$(x+y)(y+z)(x'+z) = (x+y)(x'+z)$

$(x+y)(y+z)(x'+z) = (xy+xz+y+yz)(x'+z)$

$= xx'y + xyz + xx'z + xz + yx' + yz + yz + yx'z$

$= xyz + xz + yx' + yz + yx'z = xz + yx' + yz = (x+y)(x'+z)$

ب -

a) $A'BC + A'B'C' + AB'C' + AB'C + ABC$

$= A'BC + ABC + A'B'C' + AB'C' + AB'C$

$= BC(A+A') + B'C'(A+A') + AB'C$

$= BC + B'C' + AB'C = BC + B'(AC + C')$

b) $AB + AC + ABC = AB(1+C) + AC = AB + AC$

$AB + AC = A(B+C)$

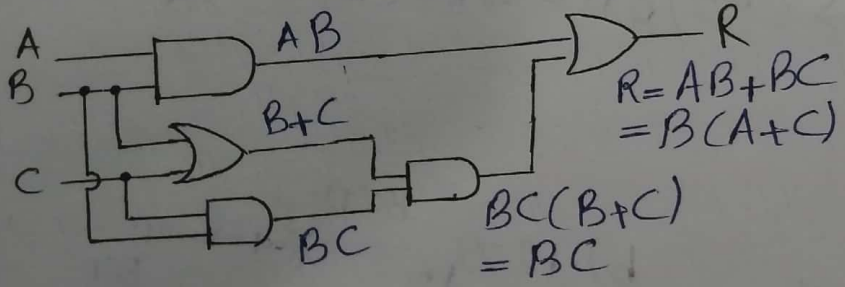
c) $(BC' + A'D)(AB' + CD')$

$= \underbrace{BB'AC'}_{=0} + \underbrace{BCC'D'}_{=0} + \underbrace{AA'B'D}_{=0} + \underbrace{A'DD'C}_{=0} = 0$

d) $xy + x(wz + wz') = xy + xw(z+z')$

$= xy + xw = x(y+w)$

سوال 3)

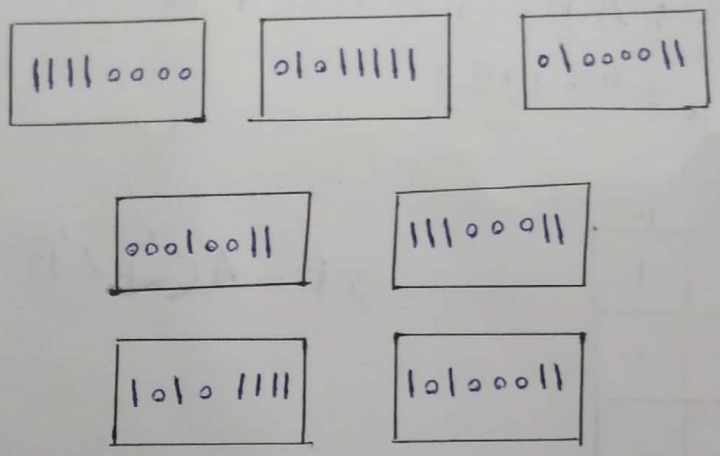


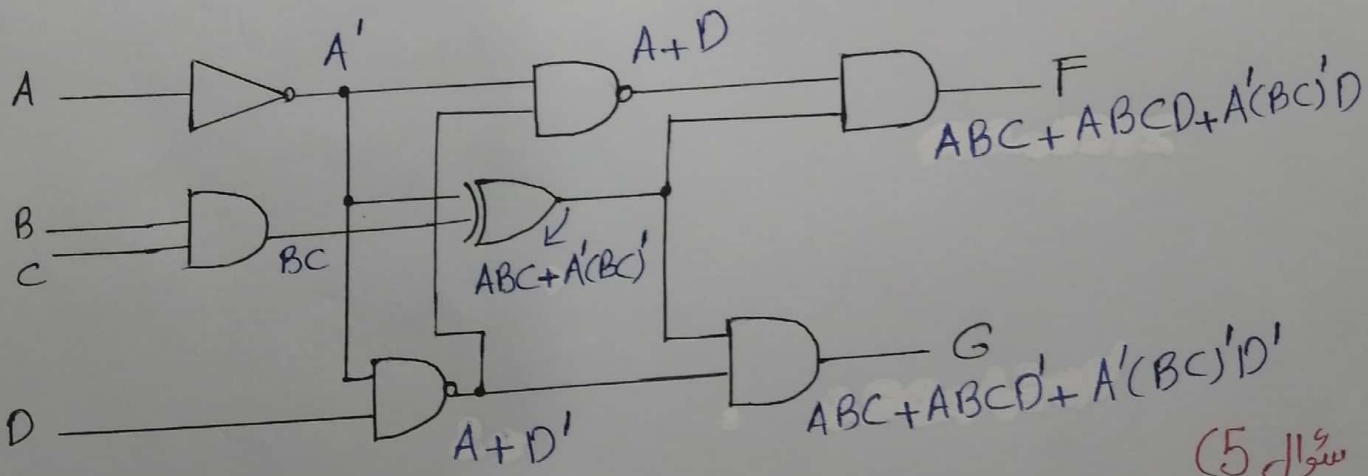
جدول درستی ⟹

A	B	C	R
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

CamScanner

سؤال 4) ترتیب باکس ها به همان صورتی است که در شکل می باشد (ترتیب آن ها از راست به چپ و از بالا به پایین به همان صورتی است که در شکل می باشد).





سؤال 5)

a) $F = m_3 + m_8 + m_9 + m_{12} + m_{13}$

AB \ CD	00	01	11	10
00	0	0	1	1
01	0	0	0	0
11	1	0	1	0
10	1	0	0	0

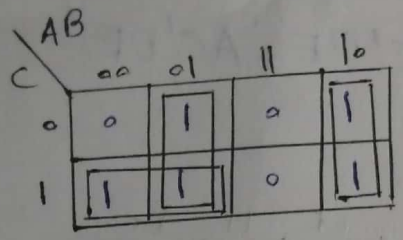
$F = A'B'C + AC'D' + ABCD$

b) $F = A'C + B'C + AB'C' + A'B$

$= A'BC + A'B'C + AB'C + A'B'C + AB'C' + A'BC + A'BC'$

$= A'BC + A'B'C + AB'C + AB'C' + A'BC'$

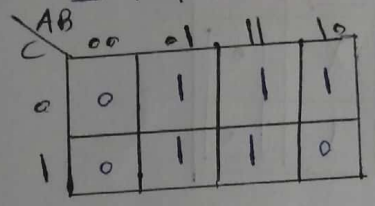
$= m_1 + m_2 + m_3 + m_6 + m_7$



$\Longrightarrow F = A'B + A'C + AB'$

c) $F = (A' + B + C')(A + B + C)(A + B + C') = M_3 M_0 M_1$

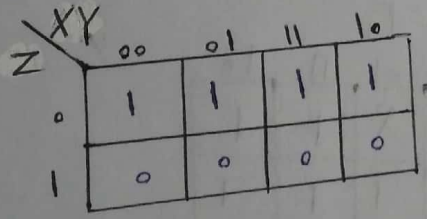
$= m_2 + m_3 + m_4 + m_5 + m_7$



$\Longrightarrow F = B + AC'$

d) $F = X'Y'Z' + X'YZ' + XY'Z' + X'Y'Z' + XYZ'$

$= m_0 + m_2 + m_4 + m_5$



$\Longrightarrow F = Z'$

سؤال 6 الفقرة

m_3 ✓ — m_3, m_7 (2) ✓ — m_0, m_1, m_2, m_3 (1,2) PI_2

m_6 ✓ — m_3, m_7, m_1, m_5 (2,4) ✓ — m_3, m_7, m_1, m_5 (2,4) PI_1

m_0 ✓ — m_2, m_6 (4) PI_5 — ~~m_0, m_2, m_1, m_3 (2,1)~~

m_7 ✓ — m_0, m_1 (1) ✓ — ~~m_3, m_1, m_7, m_5 (4,2)~~

m_5 ✓ — m_0, m_2 (2) ✓

m_1 ✓ — m_7, m_{15} (8) ✓

m_2 ✓ — m_3, m_{11} (8) PI_4

m_4 ✓ — m_1, m_5 (4) ✓

m_3 ✓ — m_1, m_9 (8) PI_3

m_5 ✓ — m_2, m_3 (1) ✓

m_7 ✓

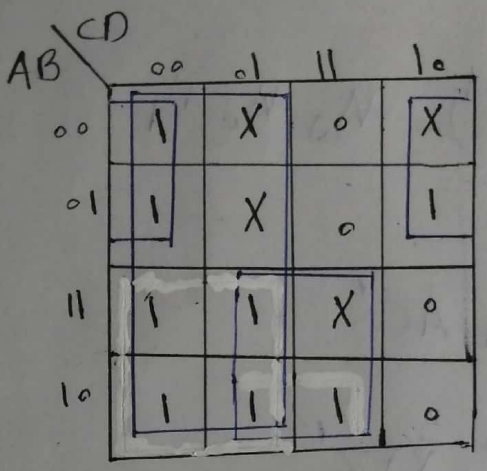
m_9 ✓

PI Table

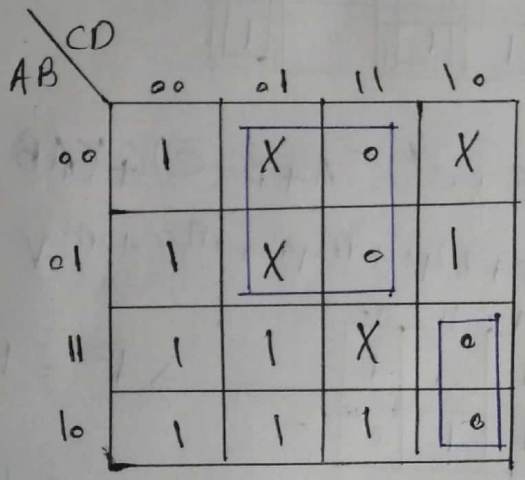
		۵	۷	۱۱	۱۲	۲۷	۲۹
Don't cares only	۰, ۱, ۲, ۳						
EPI	۵, ۷, ۲۱, ۲۳	X	X				
EPI	۱۲, ۱۴			X			
EPI	۱۱, ۲۷				X	X	
EPI	۲۱, ۲۹						X

$$= B'CE + A'BC'E' + BC'DE + AC'DE'$$

ب -



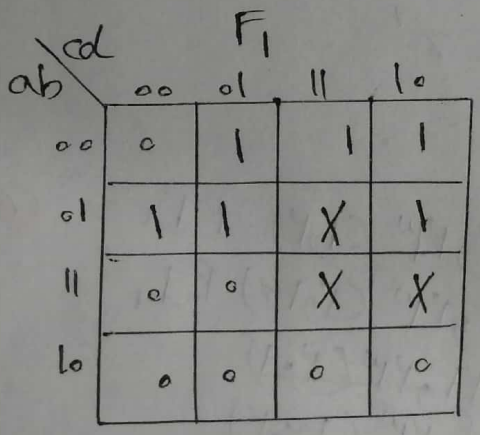
$$F = C' + A'D' + AD$$



$$F' = A'D + ACD'$$

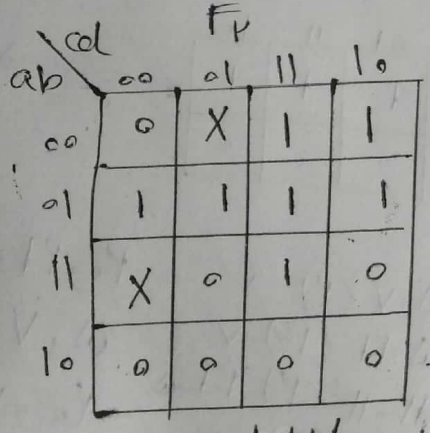
$$\rightarrow F = (A + D')(A' + C' + D)$$

سؤال ٧



$$F_1' = b'c'd' + a$$

$$F_1 = (b'c'd' + a)'$$



$$F_4' = b'c'd' + ab' + ac' + ad'$$

$$F_4 = (b + c + d)(a' + b)(a' + c)(a' + d)$$