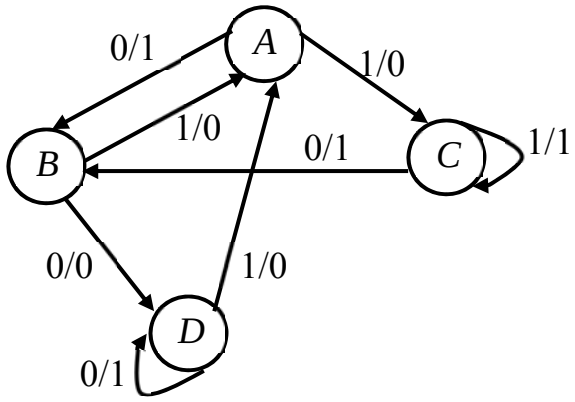
Q1: Implement the following Boolean functions using 8x4 ROM

W(a,b,c)=∑(0, 1, 3, 5, 7), X(a,b,c)=∑(0, 2, 4, 5), Y(a,b,c)=∑(1, 2, 4, 7),

Z(a,b,c)=∑(0, 3, 5, 6, 7). (4 Marks)

Q2: Implement a Full Adder, using **two** 4x1 Multiplexers (connect **x** and **y** as Selection lines). (6 Marks)

Q3: For the following state diagram use this state assignments, design a system using ***D*** flip flops. (10 Marks)



q	q_1	q_2
A	0	0
B	1	1
C	1	0
D	0	1

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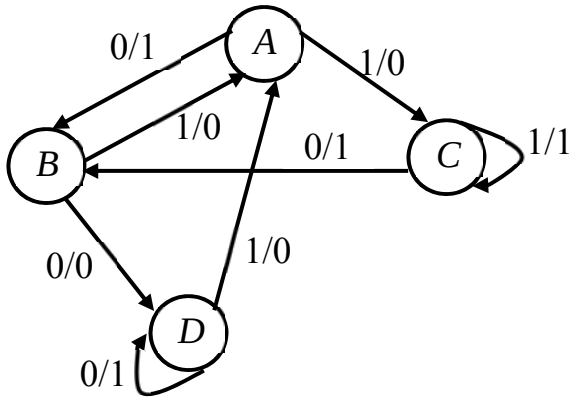

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A	0	0
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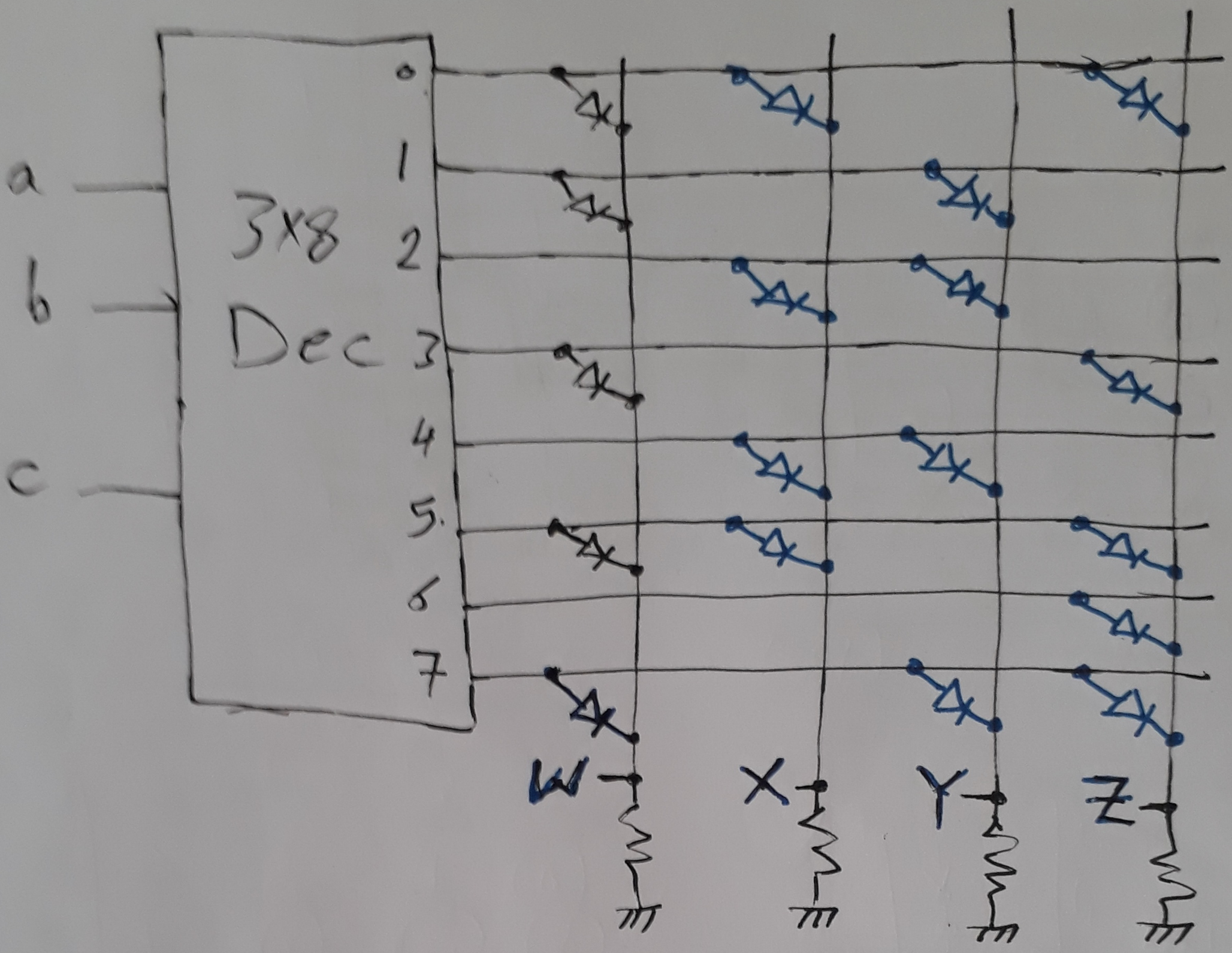
Q1:



(3)

The Data at address 2 is 0 1 1 0

" " " 6 is 0 0 0 1

(1)

Q2:

x	y	z	S	C
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

(1)

For S (sum) $= \sum (1, 2, 4, 7)$

$I_0 = \bar{x}\bar{y}$, $I_1 = \bar{x}y$

$I_2 = x\bar{y}$, $I_3 = xy$

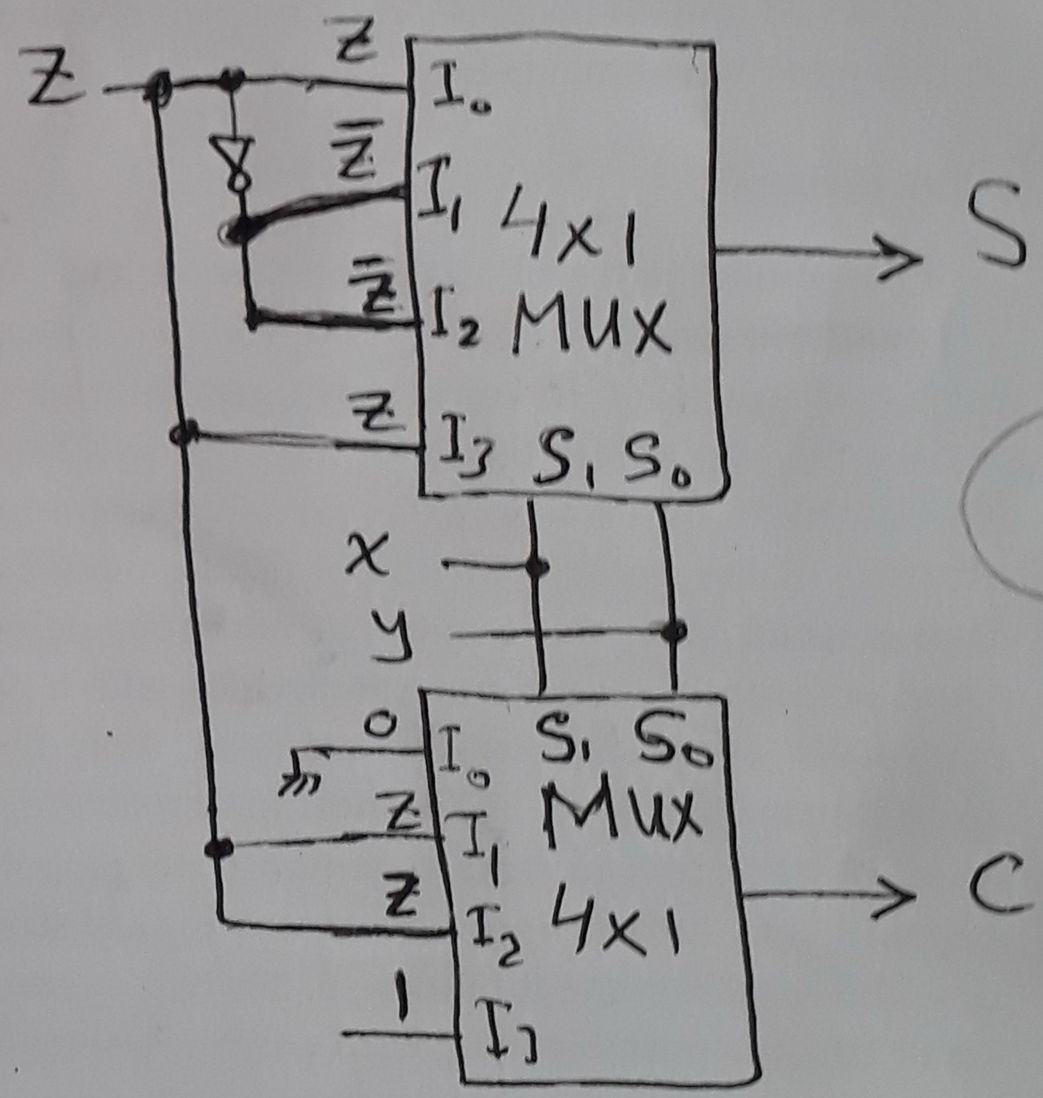
	I_0	I_1	I_2	I_3
$\bar{z}$	0	(2)	(4)	6
z	(1)	3	5	(7)
	z	$\bar{z}$	$\bar{z}$	z

(2)

For C (carry) $= \sum (3, 5, 6, 7)$

	I_0	I_1	I_2	I_3
$\bar{z}$	0	2	4	(6)
z	1	(3)	(5)	(7)
	0	z	z	1

(2)



(1)

C

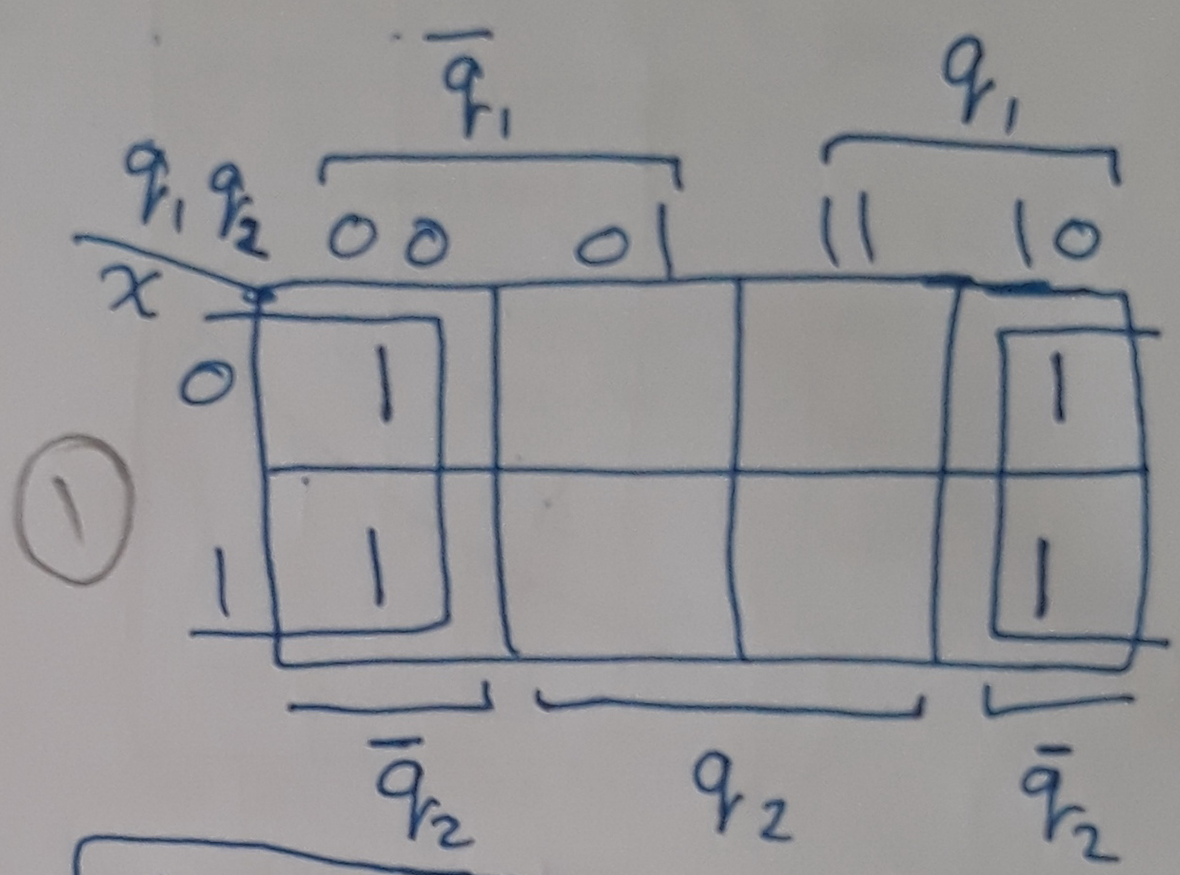
Q3:

P.S	N.S		O/P Z	
	x=0	x=1	x=0	x=1
A	B	C	1	0
B	D	A	0	0
C	B	C	1	1
D	D	A	1	0

(2)

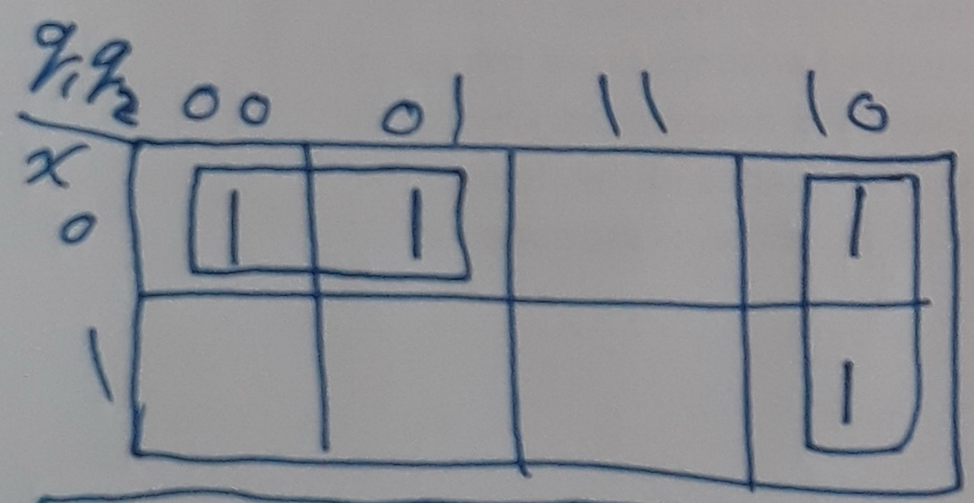
P.S		Exp	N.S		O/P
q_1	q_2	x	q_1	q_2	Z
A 0	0	0	1	1	1
0	0	1	1	0	0
D 0	1	0	0	1	1
0	1	1	0	0	0
C 1	0	0	1	1	1
1	0	1	1	0	1
B 1	1	0	0	1	0
1	1	1	0	0	0

(1)

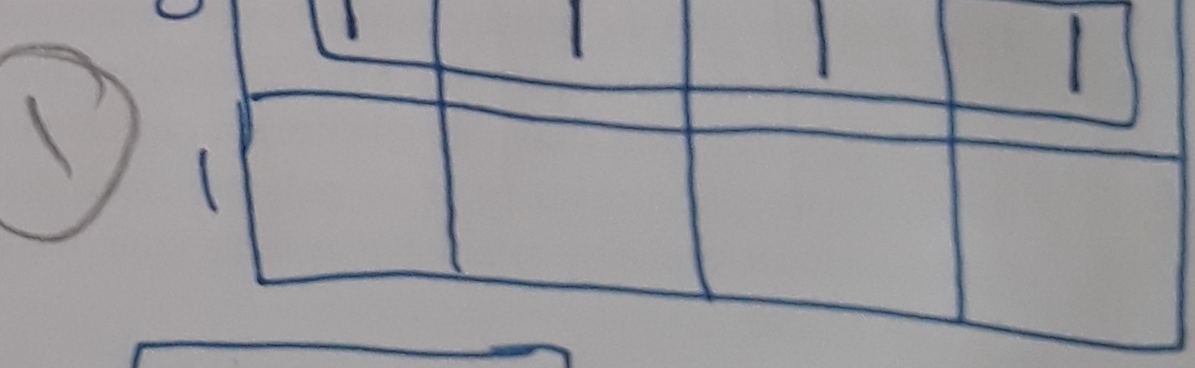


(1)

$D_1 = \bar{q}_2$



$Z = q_1\bar{q}_2 + \bar{q}_1\bar{x}$ (1)



(1)

$D_2 = \bar{x}$

(1)