

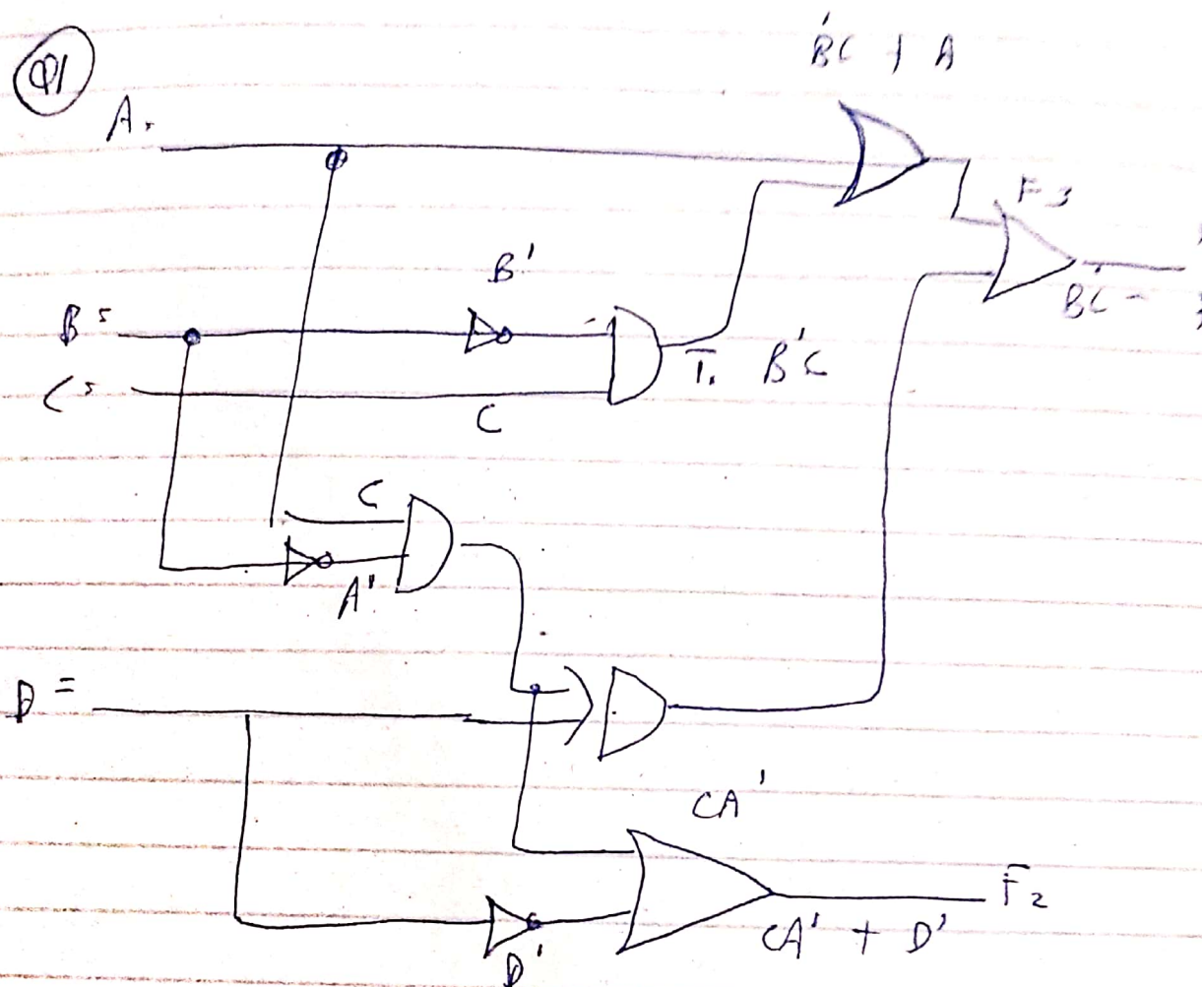
Assignment # 4

HAMMAD - JAVAD

21-1661

(PS-11)

(Q1)



$$(b) T_1 = B'C, T_2 = A'B$$

$$T_3 = A + B'C, T_4 = D \oplus T_2$$

$$= A'BD + D(A + B')$$

$$A'BD' + AD + B'D$$

$$F_1 = T_3 + T_4 \Rightarrow A + B'C + A'BD' + AD$$

$$\text{with } A \times AD = A$$

$$A + A'BD = A + BD'$$

$$\text{also } F_1 = A + CD' + BD' + B'D$$

(a)

A	B	C	D	T ₁	T ₂	T ₃	T ₄	F ₁	F ₂
0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1	1	1
0	0	1	0	1	0	1	0	1	0
0	0	1	1	1	0	1	1	1	1
0	1	0	0	0	1	0	1	1	1
0	1	0	1	0	1	0	0	0	1
0	1	1	0	0	1	0	1	1	1
0	1	1	1	0	1	0	0	0	1
1	0	0	0	0	0	1	0	1	0
1	0	0	1	0	0	1	1	1	1
1	0	1	0	1	0	1	0	1	0
1	0	1	1	1	0	1	1	1	1
1	1	0	0	0	0	1	0	1	0
1	1	0	1	0	0	1	1	1	1
1	1	1	0	0	0	1	0	1	0
1	1	1	1	0	0	1	1	1	1

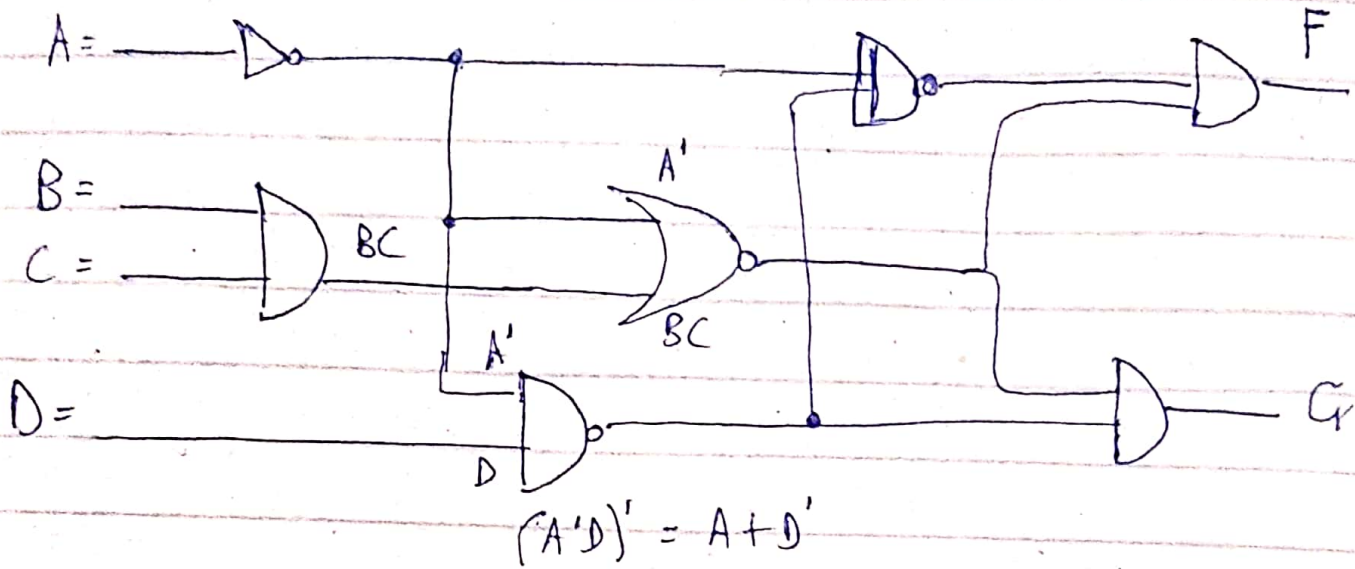
AB \ C	00	01	11	10
00	0	1	1	1
01	1	0	0	1
11	1	1	1	1
10	1	1	1	1

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

$$F_1 = A + CD' + B'D + BD'$$

$$F_2 = A'B + D$$

Q3



$$F = (A + D)(A' + BC) = A'D + ABC + DBC$$

$$= A'D + ABC$$

$$G = (A + D')(A' + BC) = A'D' + ABC + ABC + BCD'$$

$$= A'D' + ABC$$

		C			
		00	01	11	10
A	00		1	1	
	01		1	1	
	11			1	1
	10				

		C			
		00	01	11	10
A	00	1			1
	01	1			1
	11			1	1
	10				

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Q4

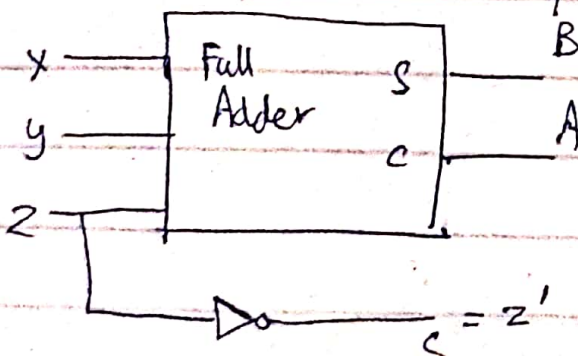
X	Y	Z	A	B	C
0	0	0	0	0	1
0	0	1	0	1	0
0	1	0	0	1	1
0	1	1	1	0	0
1	0	0	0	1	1
1	0	1	1	0	0
1	1	0	1	0	1
1	1	1	1	1	0

Y \ Z	00	01	11
0			1
1		1	1

$$A = xy + xz$$

X \ YZ	00	01	11	10
0		1		1
1	1		1	

$$B = x \oplus y \oplus z$$



Q5

Let 2 numbers be A & B

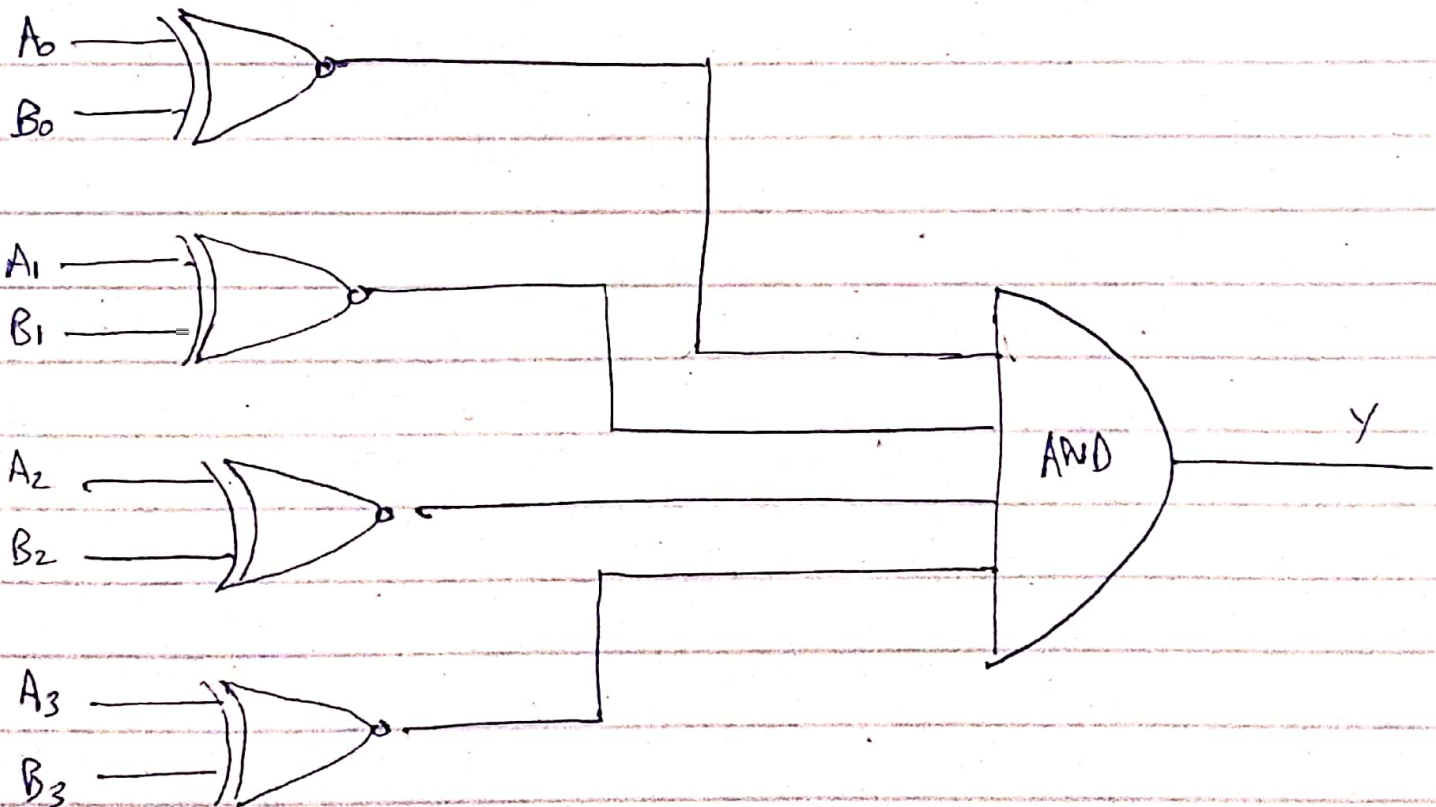
ie $A = A_3 A_2 A_1 A_0$ $B = B_3 B_2 B_1 B_0$

The 2 numbers will be equal only when bits are equal.

Truth table

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

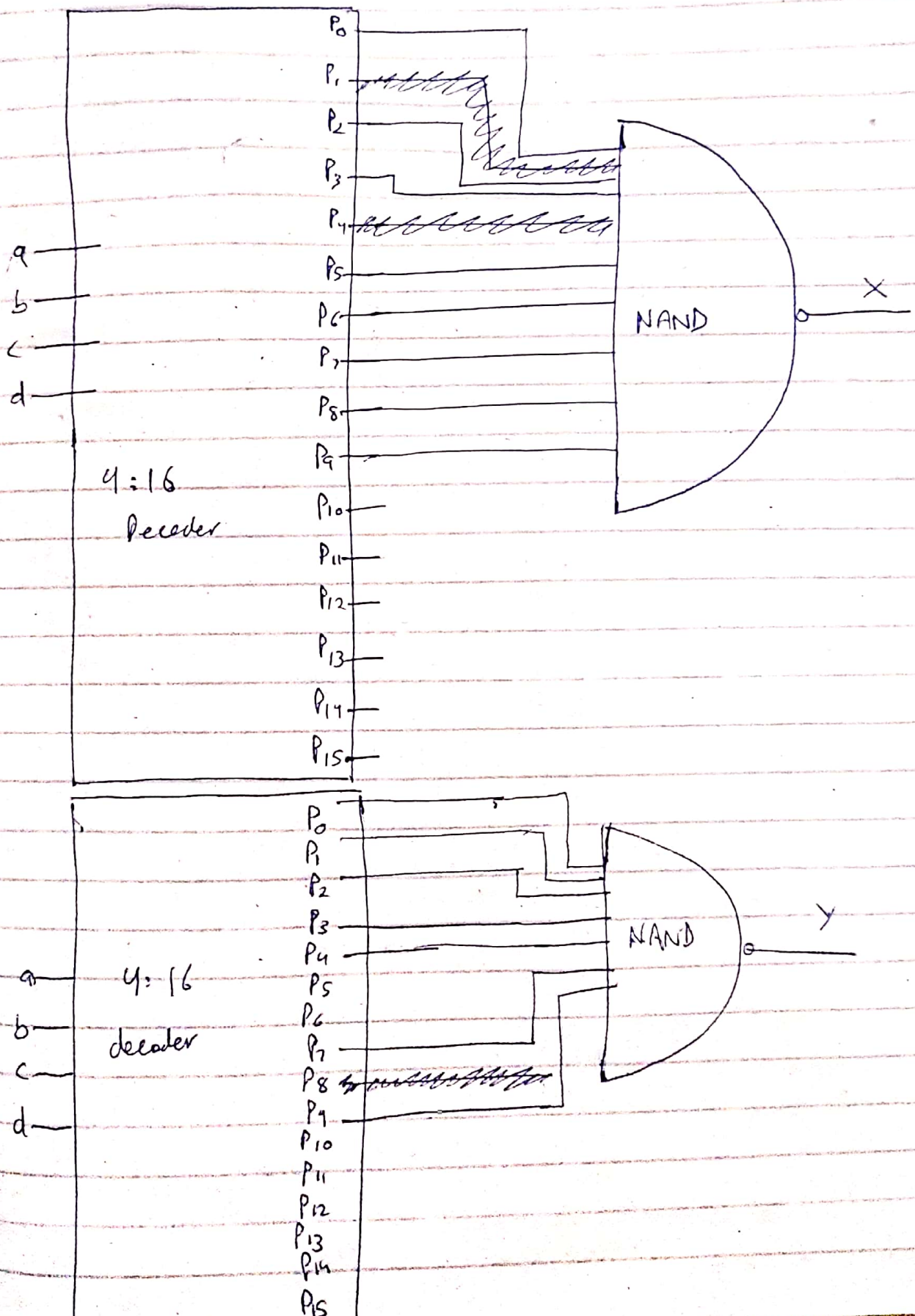
output of XNOR gate



(Q9)

Given $X = \sum (0, 2, 3, 5, 6, 7, 8, 9)$
 $Y = \sum (0, 1, 2, 3, 4, 7, 9)$

Size of decoder :- 4×16 (decoder)



* Using active high decoder

$$Z = \sum (0, 1, 3, 4, 5, 6, 7, 8, 9)$$

→ Can be implemented by using 4:16 decoder & OR gate.

