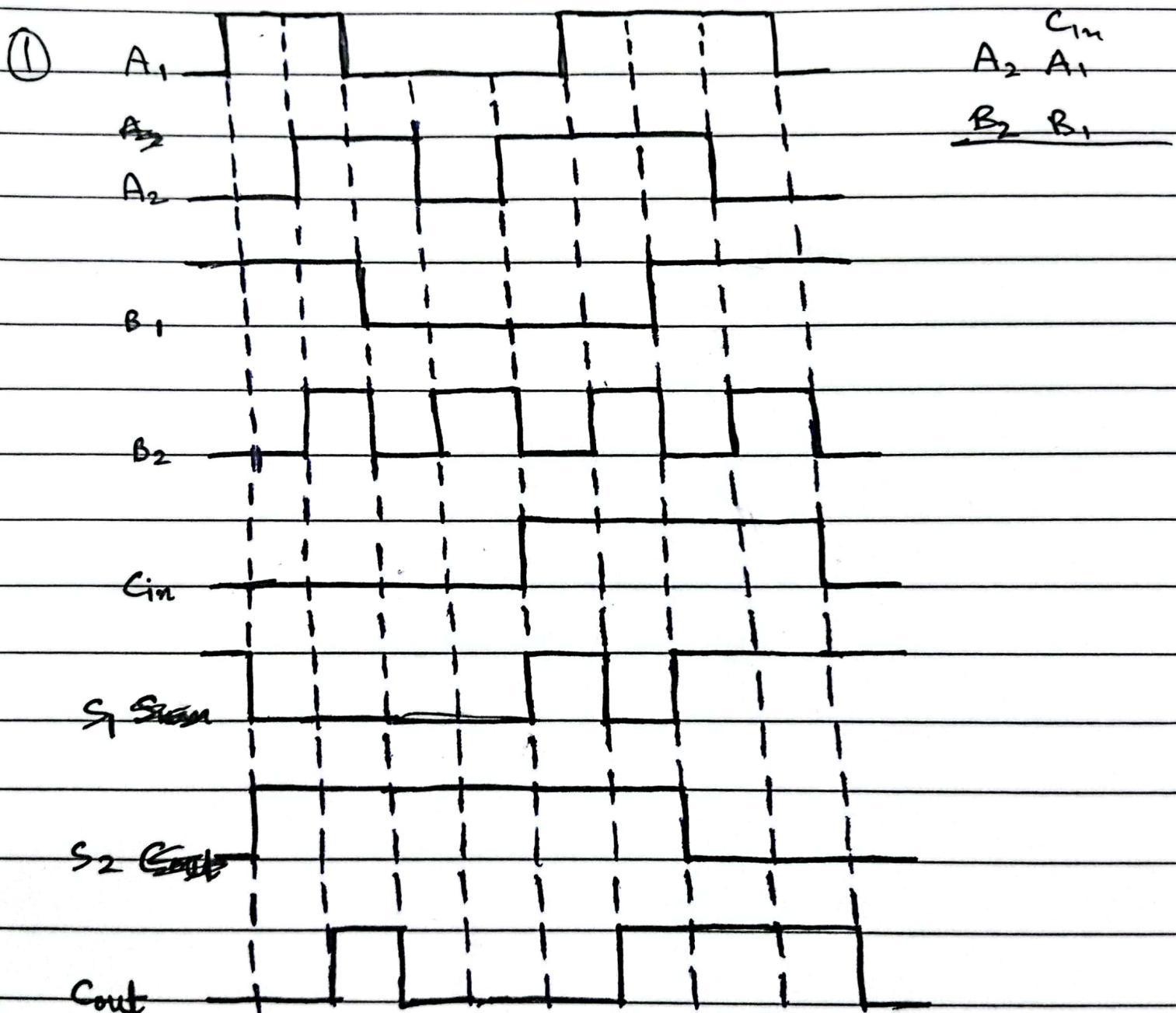


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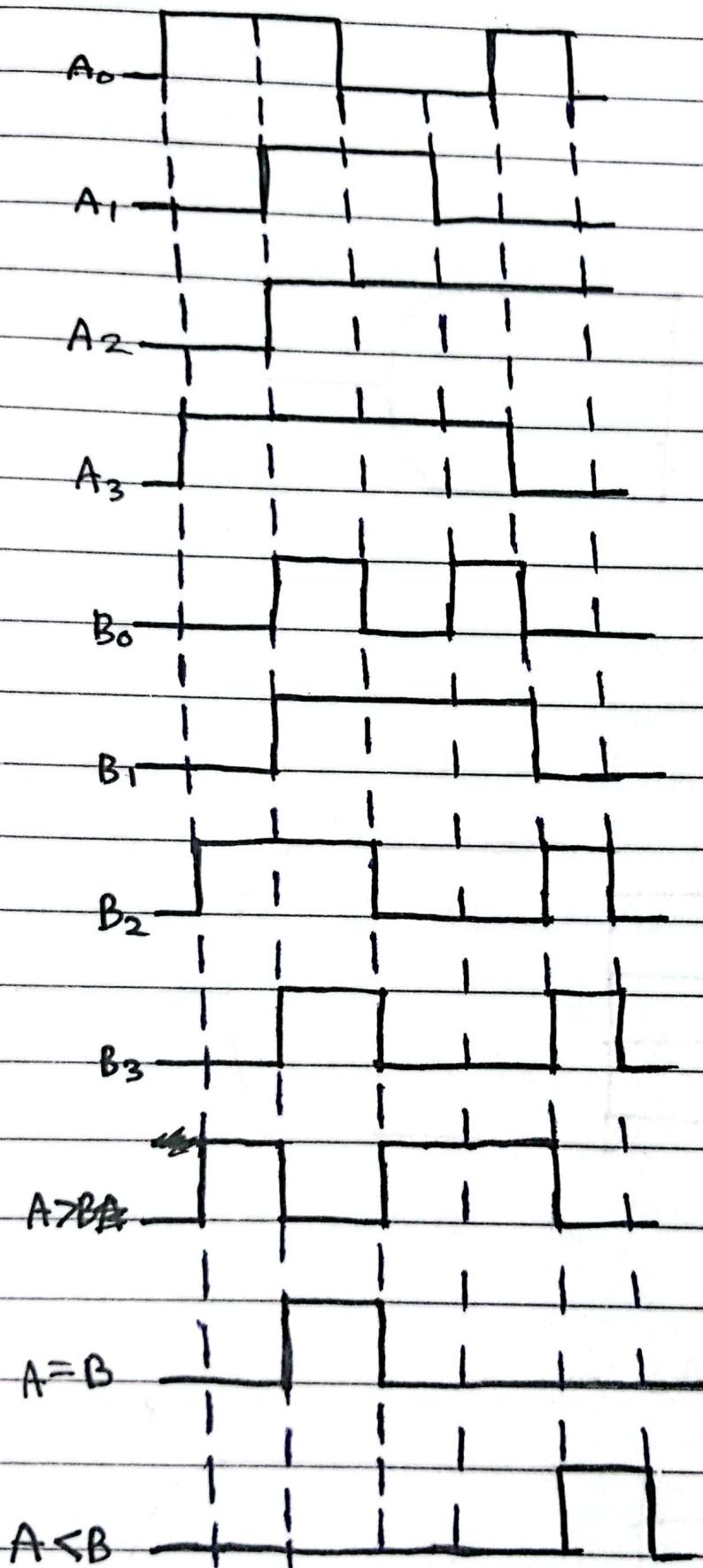
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DLD Assignment - 2

Sun Mon Tue Wed Th

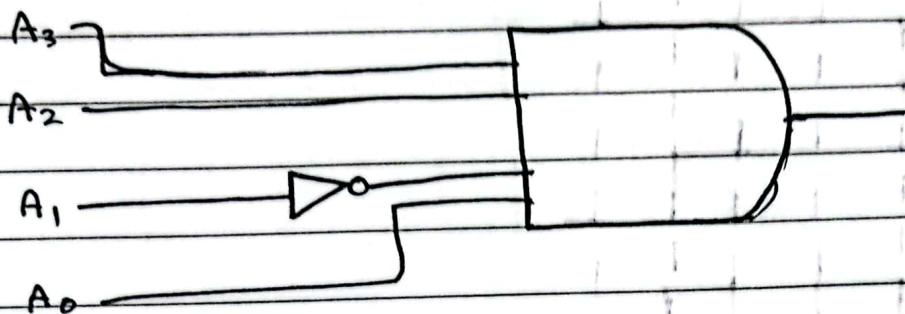


(Q2)



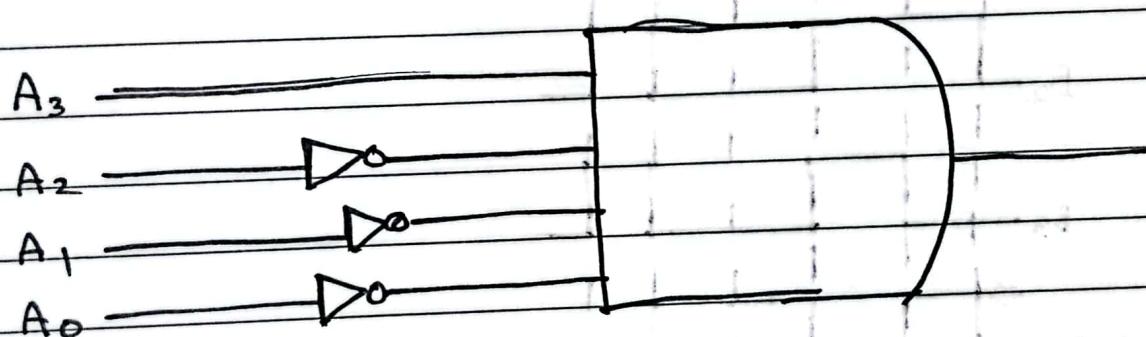
(Q3)

a) 1 1 0 1

 A_3, A_2, \bar{A}_1, A_0 

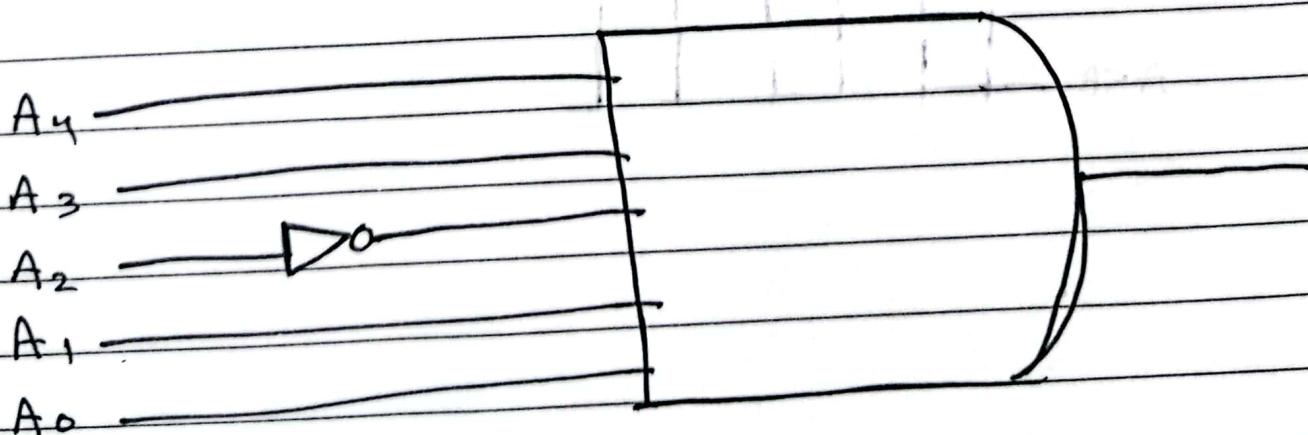
(b)

1 0 0 0

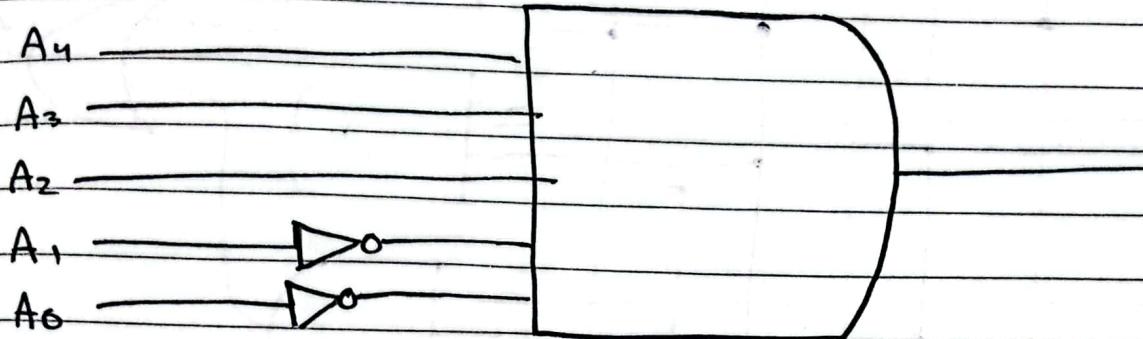
 $A_3, \bar{A}_2, \bar{A}_1, \bar{A}_0$ 

(c)

1 1 0 11

 $A_4, A_3, \bar{A}_2, A_1, A_0$ 

(D) 11100

 $A_4 A_3 A_2 \bar{A}_1 \bar{A}_0$ 

(Q4)

$$1010 = A_3 \bar{A}_2 A_1 \bar{A}_0$$

$$1\cancel{1}00 = A_3 A_2 \bar{A}_1 \bar{A}_0$$

$$0001 = \bar{A}_3 \bar{A}_2 \bar{A}_1 A_0$$

$$101\cancel{1} = A_3 \bar{A}_2 \bar{A}_1 A_0$$

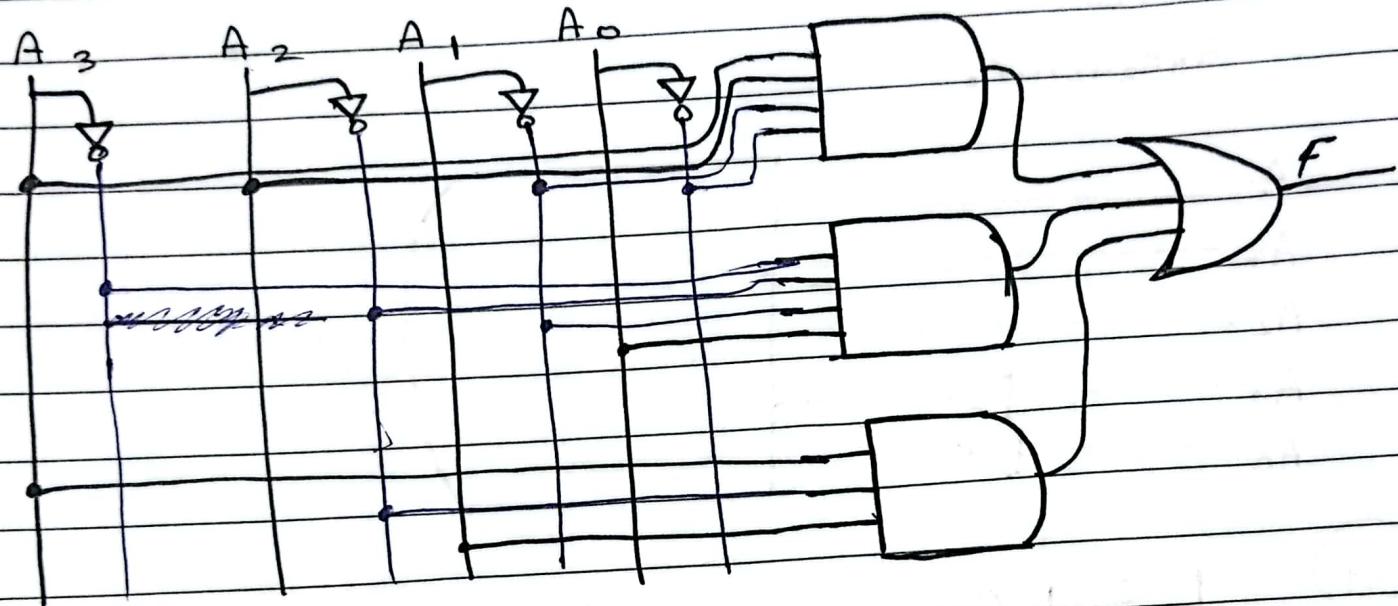
$$\begin{aligned} F &= A_3 \bar{A}_2 A_1 \bar{A}_0 + A_3 A_2 A_1 \bar{A}_0 + \bar{A}_3 \bar{A}_2 \bar{A}_1 A_0 + A_3 \bar{A}_2 \bar{A}_1 A_0 \\ &= A_3 \bar{A}_2 A_1 (A_0 + \bar{A}_0) + A_3 A_2 \bar{A}_1 \bar{A}_0 + \bar{A}_3 \bar{A}_2 \bar{A}_1 A_0 \\ &= A_3 \bar{A}_2 A_1 + \end{aligned}$$

$A_3 A_2$	00	01	11	10
$A_1 A_0$	00	1		
01				
11	1			
10			1	1

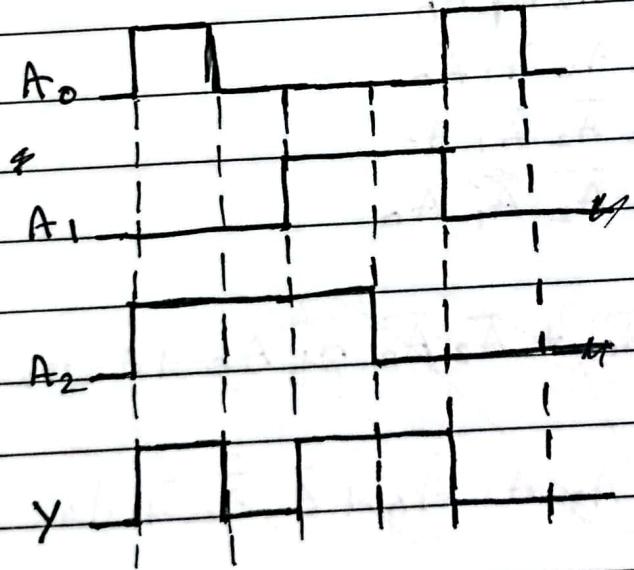
$$F = A_3 \bar{A}_2 A_1 \bar{A}_0 + \bar{A}_3 \bar{A}_2 \bar{A}_1 A_0 + A_3 \bar{A}_2 \bar{A}_1$$

Date:.....

Sun Mon Tue Wed Thu Fri Sat

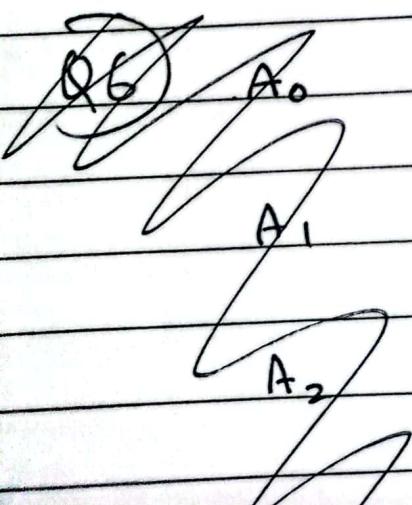


Q5



$$\begin{aligned} Y &= \bar{A}_0 A_1 A_2 + A_0 \bar{A}_1 A_2 + \bar{A}_0 A_1 \bar{A}_2 \\ &= \bar{A}_0 A_1 (A_2 + \bar{A}_2) + A_0 \bar{A}_1 A_2 \\ &= \bar{A}_0 A_1 + A_0 \bar{A}_1 A_2 \end{aligned}$$

Q6



Q6

A₀

A₁

A₂

A₃

0

1

2

3

4

5

6

7

8

9

$$0000 = 0$$

$$1000 = 8$$

$$0100 = 4$$

$$0010 = 2$$

$$0110 = 6$$

$$1001 = 9$$

$$0100 = 4$$

$$0010 = 2$$

$$0110 = 6$$

$$0001 = 1$$

Date:

Sun Mon Tue Wed

Q7 ~~$A_0 = 1 + 3 + 5 + 7 + 9 = 1 + 3 + 7 + 9$~~

$$A_0 = \underbrace{1 + 3}_{H} + 5 + 7 + \underbrace{9}_{H}, A_0 = 1$$

$$A_1 = \underbrace{2 + 3}_{H} + 6 + 7, A_1 = 1$$

$$A_2 = 4 + 5 + 6 + 7, A_2 = 0 \cancel{\text{xx}}$$

$$A_3 = 8 + \underbrace{9}_{H}, A_3 = 1$$

~~possible combinations~~

~~$A_3 A_2 A_1 A_0$~~

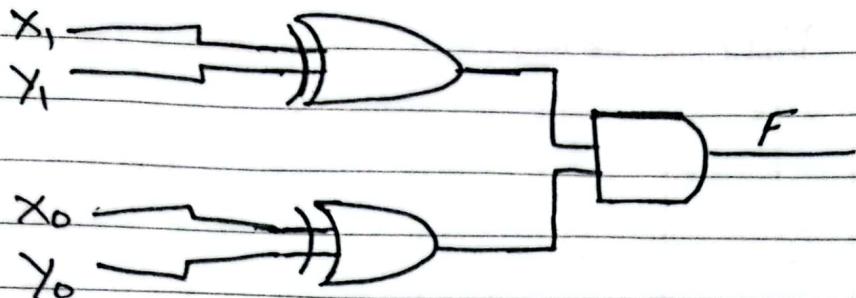
$$\begin{array}{l} 1011 \\ 1111 \\ 1111 \\ 1011 \\ 2^3 + 1 = 11 \\ 2^3 + 2^2 + 2 + 1 = 15 \end{array}$$

[ans] It is not valid BCD code as ~~at~~ the maximum binary ~~can~~ in BCD is 1001 (9) but in this circuit ~~the possibility~~ is greater than $(100)_2$.

Date:

Sun Mon Tue Wed Thu Fri Sat

(Q8)

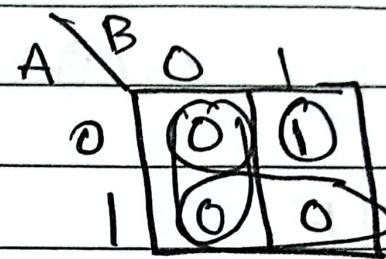
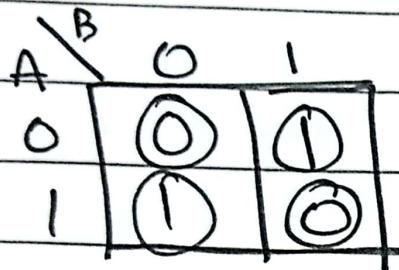


$$F = (x_1 \oplus y_1) \cdot (x_0 \oplus y_0)$$

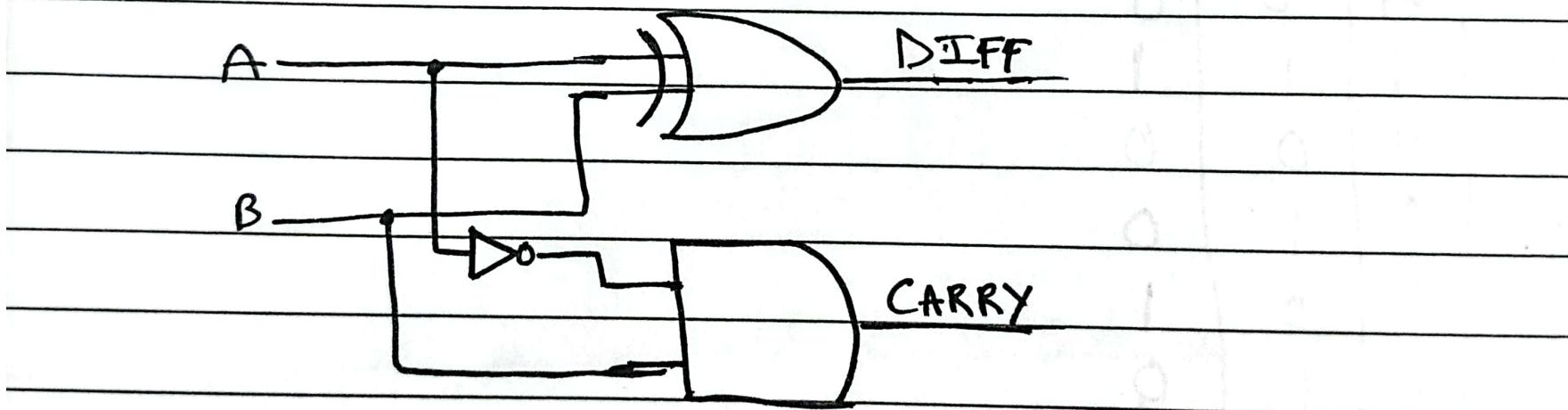
x_1	x_0	y_1	y_0	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

(Q9)

A	B	DIFF	CARRY
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0



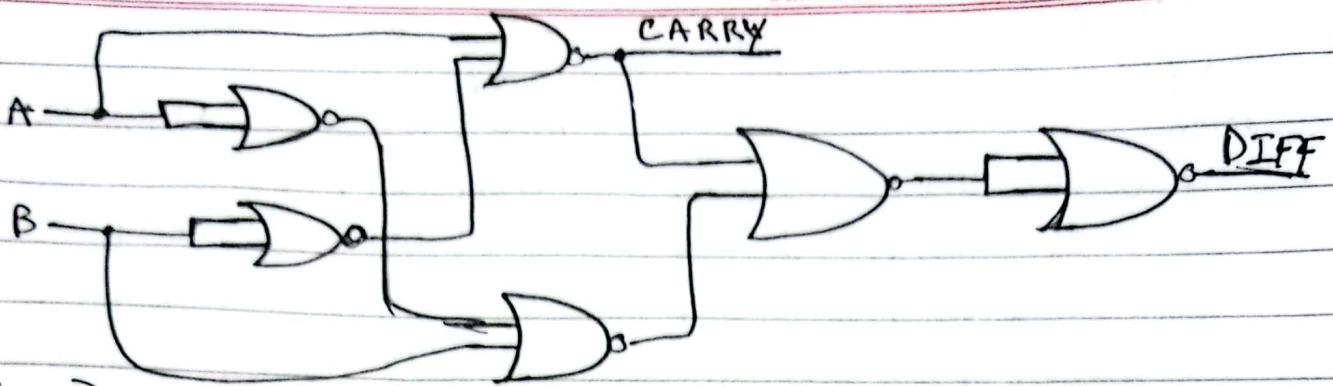
$$D = (\bar{A}B + A\bar{B}) \times (\bar{A}+B) \times (\bar{A}+B) \quad C = \bar{A}B \quad (\cancel{\bar{A}B + A\bar{B}})$$



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Date:

Sun Mon Tue Wed Thu Fri Sat



(B10)

A_2	A_1	B_2	B_1	$A > B$	$A = B$	$A < B$
0	0	0	0	0	1	0
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	0	1	1	0	0	1
0	1	0	0	1	0	0
0	1	0	1	0	1	0
0	1	1	0	0	0	1
0	1	1	1	0	0	1
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	0	1	0
1	0	1	1	0	0	1
1	1	0	0	1	0	0
1	1	0	1	1	0	0
1	1	1	0	1	0	0
1	1	1	1	0	1	0

Date:

For $A > B$

		$B_2 B_1$			
		$A_2 A_1$	00	01	11
A_2	A_1	00	0	0	0
0	1	01	1	0	0
1	1	11	1	0	1
1	0	10	1	0	0

For $A = B$

		$B_2 B_1$			
		$A_2 A_1$	00	01	11
A_2	A_1	00	1	0	0
0	1	01	0	1	0
1	1	11	0	0	1
1	0	10	0	0	1

For $A < B$

		$B_2 B_1$			
		$A_2 A_1$	00	01	11
A_2	A_1	00	0	1	1
0	1	01	0	0	1
1	1	11	0	0	0
1	0	10	0	1	0

$$(A > B) = A_1 \bar{B}_2 \bar{B}_1 + A_2 \bar{B}_2 + A_2 A_1 \bar{B}_1$$

~~$$(A > B) = A_2 A_1 \bar{B}_2 + A_2 A_1 B_1 + A_2 A_1 B_2 + A_2 A_1 B_1 + A_2 A_1 B_2 + A_2 A_1 B_1$$~~

~~$$= A_2 \bar{B}_2 (\bar{A}_1 B_1 + A_1 B_1) + A_2 B_2 (\bar{A}_1 B_1 + \bar{A}_1 B_1)$$~~
~~$$= \bar{A}_2 \bar{B}_2 (A_1 B_1)$$~~

$$(A < B) = \bar{A}_2 \bar{A}_1 B_1 + \bar{A}_2 B_2 + \bar{A}_1 B_2 B_1$$

$$\begin{aligned} (A = B) &= \bar{A}_2 \bar{A}_1 \bar{B}_2 \bar{B}_1 + \bar{A}_2 A_1 \bar{B}_2 B_1 + A_2 A_1 B_2 B_1 + A_2 \bar{A}_1 B_2 \bar{B}_1 \\ &= \bar{A}_2 B_2 (\bar{A}_1 \bar{B}_1 + A_1 B_1) + A_2 B_2 (A_1 B_1 + \bar{A}_1 \bar{B}_1) \\ &= (A_1 \oplus B_1) (A_2 \oplus B_2) \end{aligned}$$

Date:

Sun Mon Tue Wed Thu Fri Sat

Q11

$$D_3 = 1, D_2 = 0, D_1 = 0, D_0 = 1$$

A11

a) $s = 10 = 2$ $s_0 = 0, s_1 = 1$

~~selected~~ ~~D₂~~ =

$$y = D_2 = 0$$

b) $s = 11$ $s_0 = 1, s_1 = 1$

$$y = D_3 = 1$$

c) $s = \cancel{D_2} \cancel{D_1} = 1$ $s_0 = 1, s_1 = 0$

$$y = D_1 = 0$$

Q12

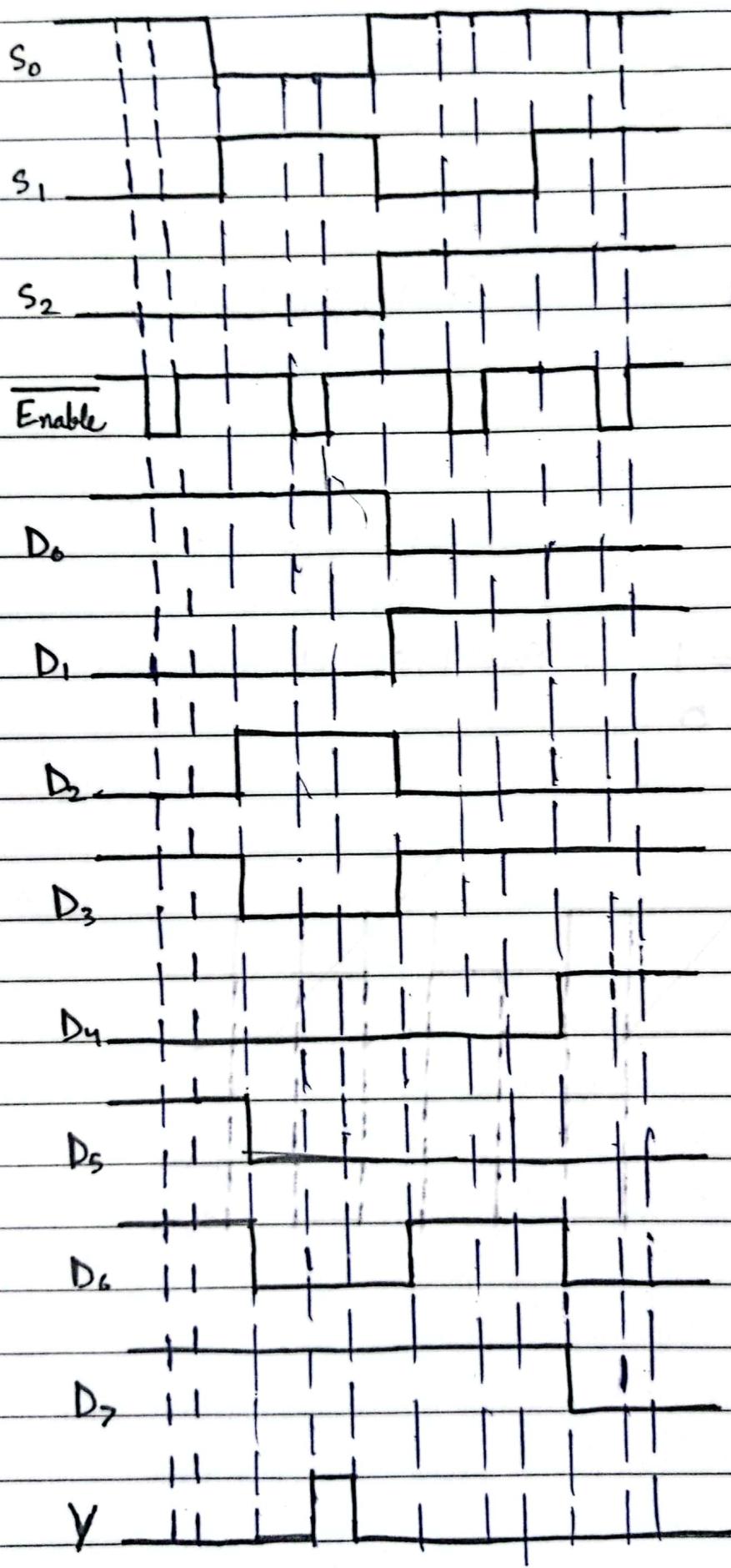
s_0

s_1

s_2

y

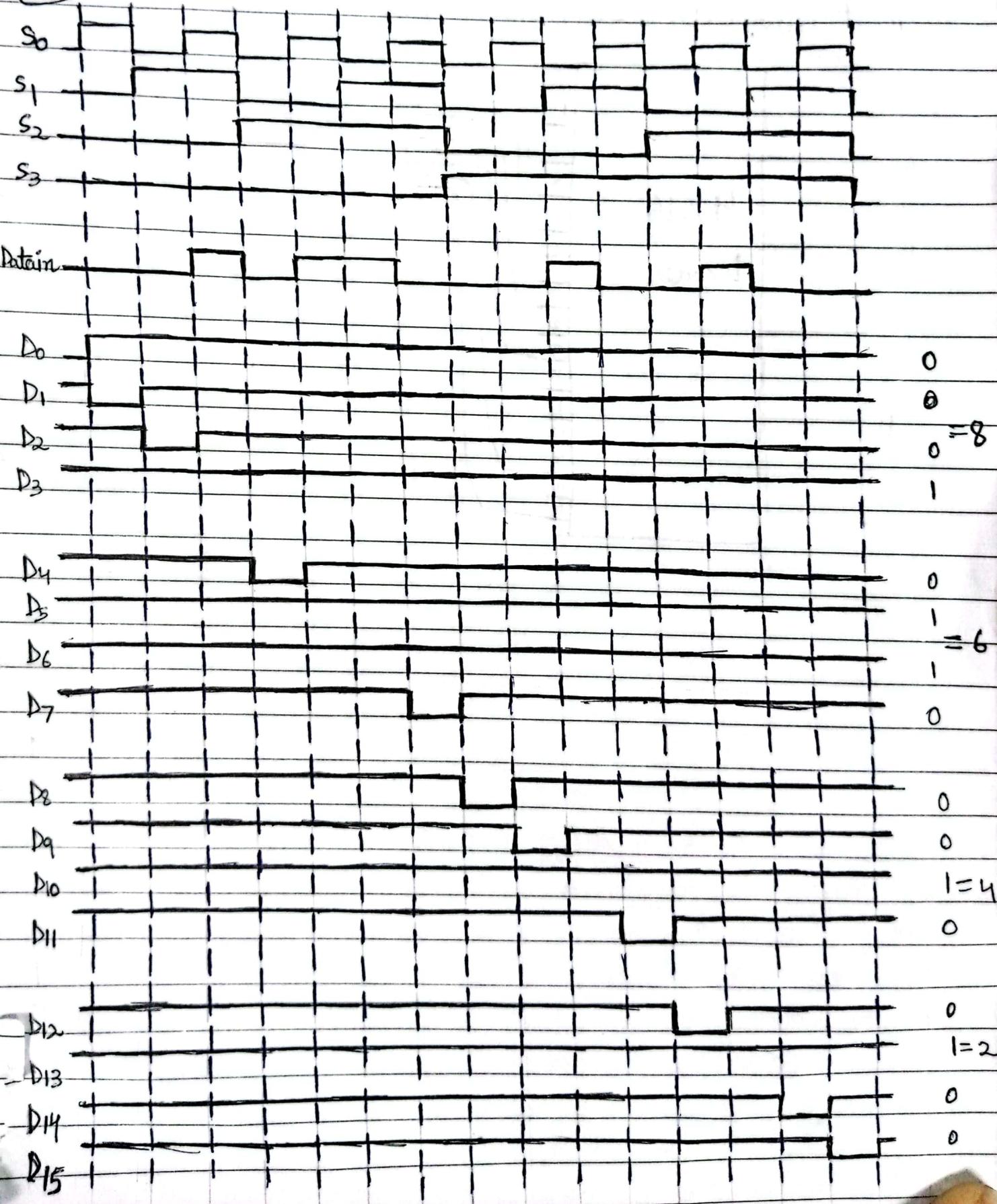
Q13



Date:

Sun Mon Tue Wed Thu Fri Sat

Q14



Q15

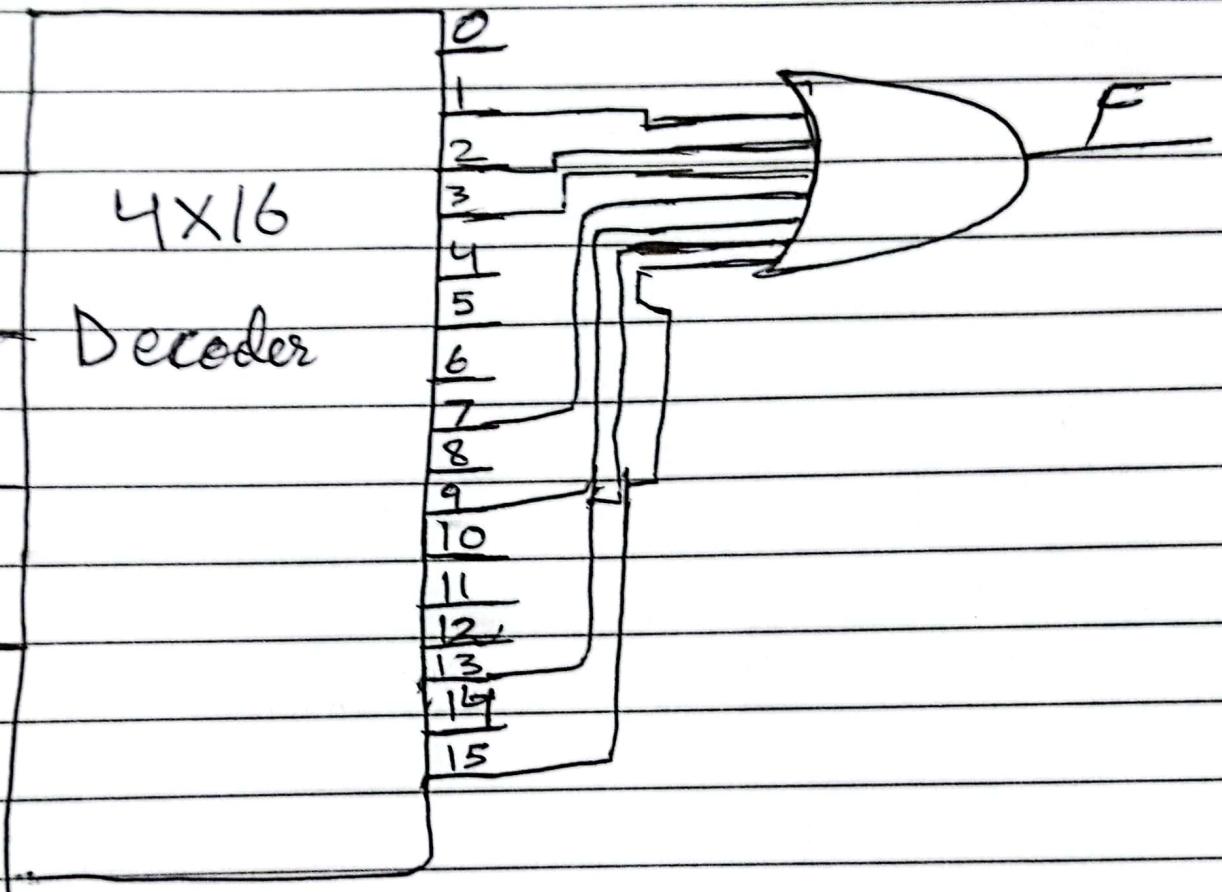
$$F(A, B, C, D) = \Sigma(1, 2, 3, 7, 9, 13, 15)$$

A

B

C

D



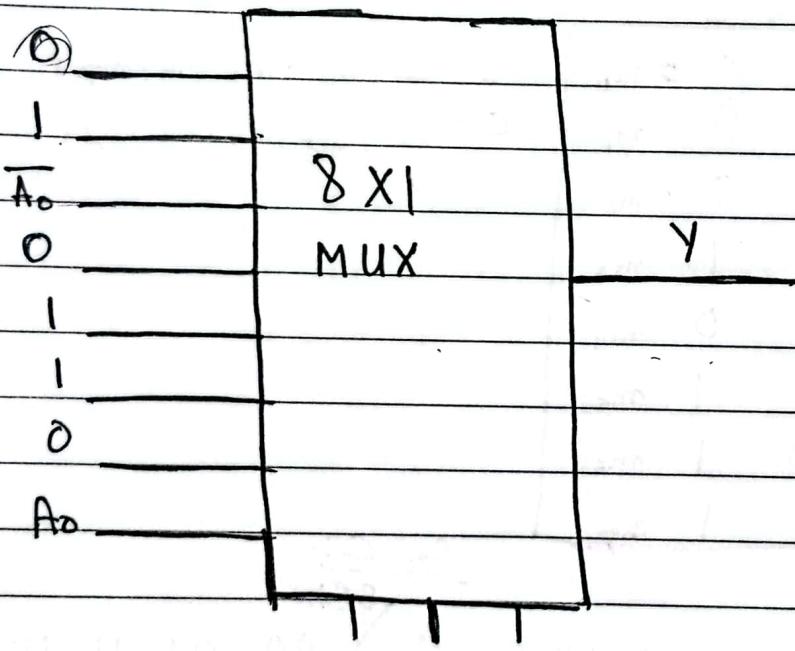
Date:

Sun Mon Tue Wed Thu Fri Sat

Q16) $X(A_3, A_2, A_1, A_0) = \sum (2, 3, 4, 8, 9, 10, 11, 15)$

		$A_3 A_2$	00	01	11	10
		$A_1 A_0$	00	01	11	10
00	00	0	0	(1)	1	
01	01	1	0	0	0	
11	11	0	0	1	0	
10	10	1	1	1	1	1

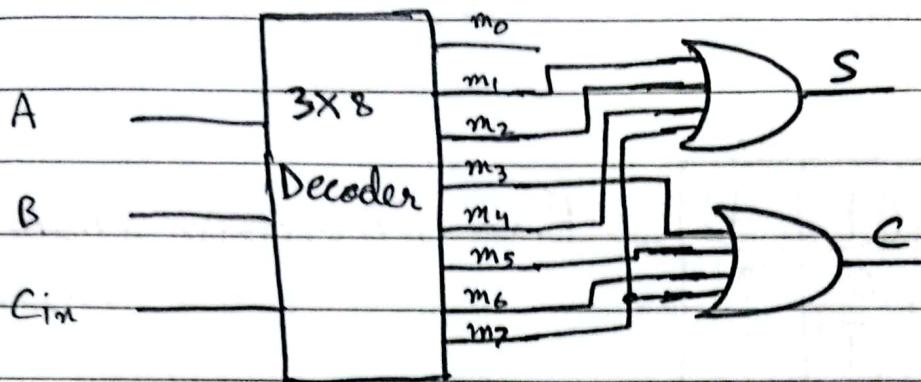
$$FX = \bar{A}_2 A_1 + A_3 \bar{A}_2 + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 \\ + A_3 A_2 A_1 A_0$$



~~Proof~~ Proof

$$\begin{aligned}
 Y &= \bar{A}_3 \bar{A}_2 A_1 + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 + A_3 \bar{A}_2 \bar{A}_1 + A_3 \bar{A}_2 A_1 + A_3 A_2 A_1 A_0 \\
 &= \bar{A}_3 \bar{A}_2 A_1 + A_3 \bar{A}_2 A_1 + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 + A_3 \bar{A}_2 \bar{A}_1 + A_3 A_2 A_1 A_0 \\
 &= \bar{A}_2 A_1 (A_3 + \bar{A}_3) + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 + A_3 \bar{A}_2 \bar{A}_1 + A_3 A_2 A_1 A_0 \\
 &= \bar{A}_2 A_1 + A_3 \bar{A}_2 \bar{A}_1 + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 + A_3 A_2 A_1 A_0 \\
 &= \bar{A}_2 (A_1 + A_3) + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 + A_3 A_2 A_1 A_0 \\
 &= \bar{A}_2 (A_1 + A_3) + \bar{A}_3 A_2 \bar{A}_1 \bar{A}_0 + A_3 A_2 A_1 A_0 \\
 &= A_3 \bar{A}_2 + \bar{A}_2 A_1 + \bar{A}_3 A_2 \bar{A}_1 A_0 + A_3 A_2 A_1 A_0 \\
 &= A_3 \bar{A}_2 + A_3 A_2 A_1 A_0 + \bar{A}_2 A_1 + \bar{A}_3 A_2 \bar{A}_1 A_0 \\
 Y &= \cancel{A_3} \bar{A}_2 + A_3 A_2 A_1 A_0 + \bar{A}_2 A_1 + \bar{A}_3 A_2 \bar{A}_1 A_0 = X
 \end{aligned}$$

Q17 @



A	B	Cin	S	C
0	0	0	0	$0 \oplus m_0$
0	0	1	1	m_1
0	1	0	1	m_2
0	1	1	0	m_3
1	0	0	1	m_4
1	0	1	0	m_5
1	1	0	0	m_6
1	1	1	1	m_7

$$S = \sum (m_1, m_2, m_4, m_7)$$

$$C = \sum (m_3, m_5, m_6, m_7)$$

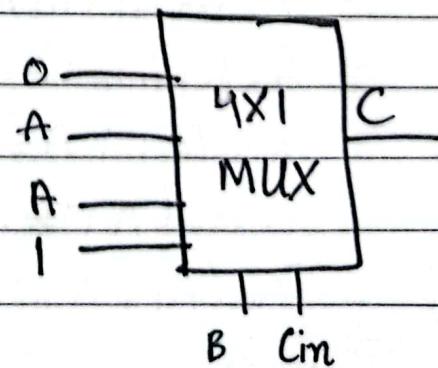
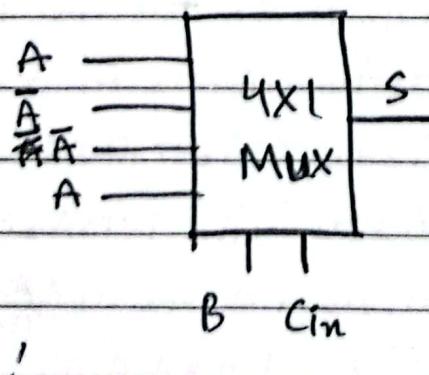
b)

for S:-

A	BCin				
	00	01	11	10	
0	0	1	0	1	
1	1	0	1	0	

for C:-

A	BCin				
	00	01	11	10	
0	0	0	0	1	0
1	0	1	1	1	1



Date:

Sun Mon Tue Wed Thu

A18

