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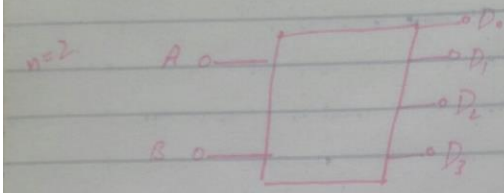
Programs: BC (CS)

Subject: Digital Logic Design

Major Assignment Final-Term Course

Summer Semester 2020

Q1 (a) A circuit for adding or subtracting two 4-bit No?



$2^4 = 2^2 \times 4$

A	B	D_0	D_1	D_2	D_3
0	0	1	0	0	0
0	1	0	1	0	0
1	0	0	0	1	0
1	1	0	0	0	1

SOP

$0 = \bar{A}, \bar{B}$

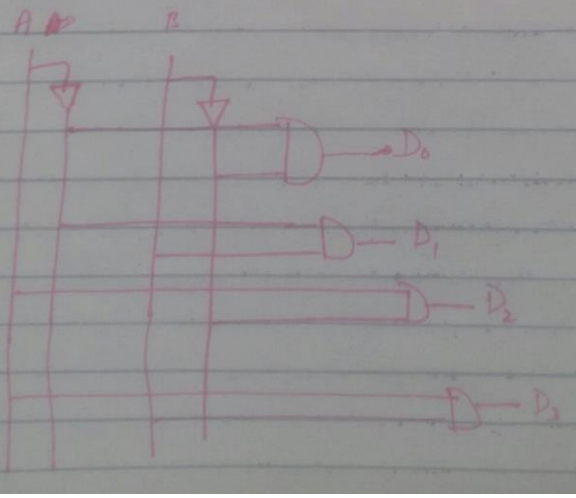
$1 = A, B$

$D_0 = \bar{A}, \bar{B}$

$D_1 = \bar{A} \cdot B$

$D_2 = A \cdot \bar{B}$

$D_3 = A \cdot B$



Q1 = (C) Decimal to BCD encoder.

$(345)_{10} = (?)_{BCD}$

3 4 5

0011 0100 0101

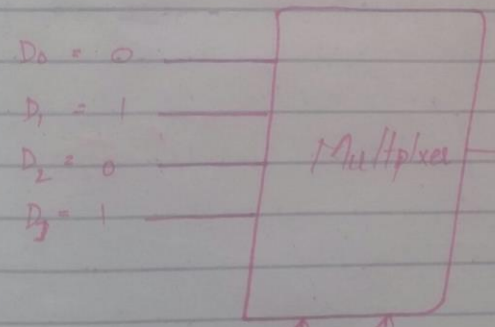
(0011 0100 0101)

$(345)_{10} = (0011\ 0100\ 0101)_{BCD}$ Ans

Q2:- For the 4input multiplexer, data inputs are given as: $D_0=0$, $D_1=1$, $D_2=0$, $D_3=1$

Find the output Y if the select input are given as:

Sol:- a) $S_0 = 1$ $S_1 = 0$



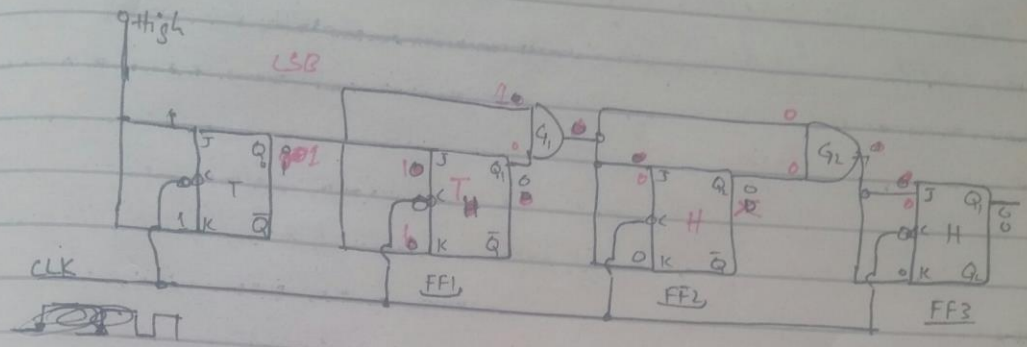
S_0	S_1	Y
0	0	I_0
0	1	I_1
1	0	I_2
1	1	I_3

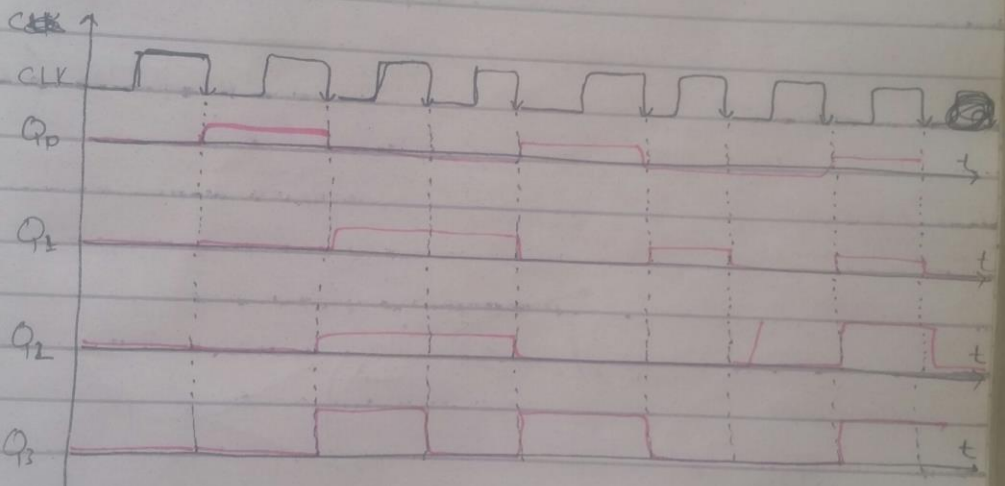
S_0	S_1	Y
0	0	No change
0	1	change
1	0	change
1	1	Parallel

Y' =

$Y = Y, Y', Y', Y$ Ans

Q5





J	K	Q
0	0	NC Hold
0	1	Reset (Q=0)
1	0	set (Q=1)
1	1	Toggle

Q3:- Timing diagram in Fig Q1 shows inputs to a 9 bit parity checker- Draw the ε Even and ε odd output for the even parity checking.

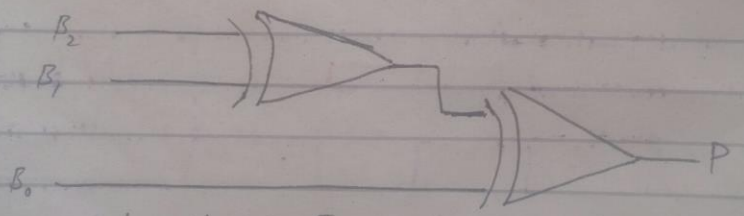
Sol:- Even Parity

B_2	B_1	B_0	P
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

$P = B_2 \oplus B_1 \oplus B_0$

O

(Full adder Sum)

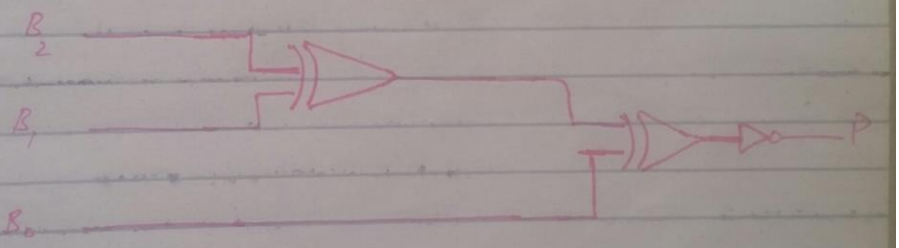


(n-1) → Ex-OR.

Parity Circuit Checker For Even

Odd Parity :

B_2	B_1	B_0	P
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0



odd parity checker Circuit

The 1J, 1K, 1CLK, 1$\overline{PRE}$, and 1$\overline{CLR}$ waveforms in Figure 7–30(a) are applied to one of the negative edge-triggered flip-flops in a 74HC112 package. Determine the 1Q output waveform.

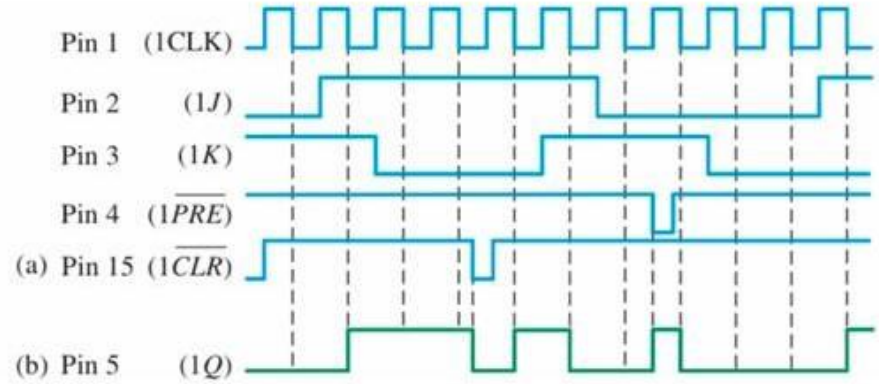


FIGURE 7–30

Solution

The resulting 1Q waveform is shown in Figure 7–30(b). Notice that each time a LOW is applied to the 1$\overline{PRE}$ or 1$\overline{CLR}$, the flip-flop is set or reset regardless of the states of the other inputs.

Related Problem

Determine the 1Q output waveform if the waveforms for 1$\overline{PRE}$ and 1$\overline{CLR}$ are interchanged.

Q4: Ans