

Experiment  $\rightarrow$  8

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19BEE0032

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Aim  $\rightarrow$  Implementation of full-adder using  
4:1 multiplexer.

Apparatus required  $\rightarrow$

Name	Specialization	Quantity
Source	clock	3
Power/ground	source $\rightarrow$ high [ $V_{DD} = HI$ ]	1
	$\rightarrow$ low [ $V_{DD} = LO$ ]	1
7400	• 7404 [NOT]	1
	• 74153 [dual multiplexer]	1



# Truth table / Boolean equation / Logic diagram $\rightarrow$

Full adder  $\rightarrow$

Inputs			Outputs	
A	B	C	Sum	Carry
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

	00	01	10	11
0	0	1	1	0
1	1	0	0	1

Sum  $\rightarrow C \quad \bar{C} \quad \bar{C} \quad C$

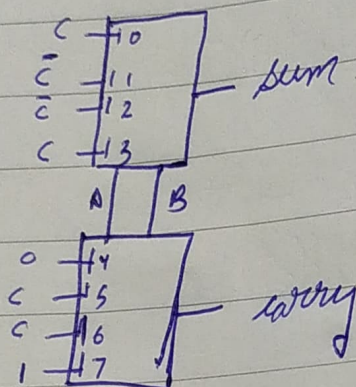
	00	01	10	11
0	0	0	0	1
1	0	1	1	1

Carry  $\rightarrow 0 \quad C \quad C \quad 1$

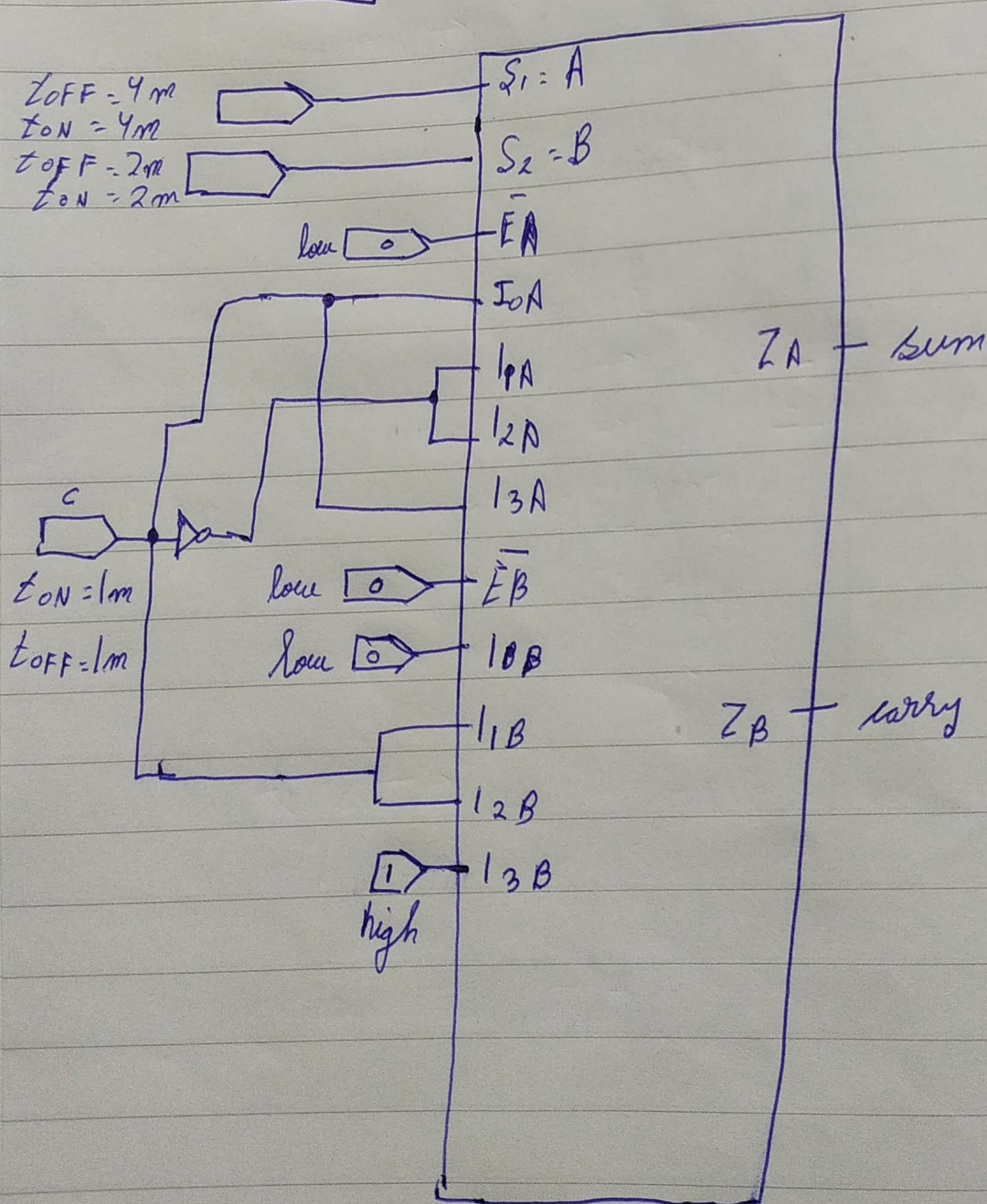
$$\text{Sum} \rightarrow \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$$

$$\begin{aligned} \text{Carry} &\rightarrow \bar{A}\bar{B}(0) + \bar{A}BC + A\bar{B}C + AB(1) \\ &= \bar{A}BC + A\bar{B}C + AB \end{aligned}$$





$t_{OFF} = 4m$   
 $t_{ON} = 4m$   
 $t_{OFF} = 2m$   
 $t_{ON} = 2m$





Inference  $\leftarrow$  Result  $\rightarrow$  We can make a full adder with the help of 4:1 multiplexers or 8:1 multiplexers

But 8:1 will give only 1 output. With 2-4:1 multiplexers, we are able to take two outputs.

