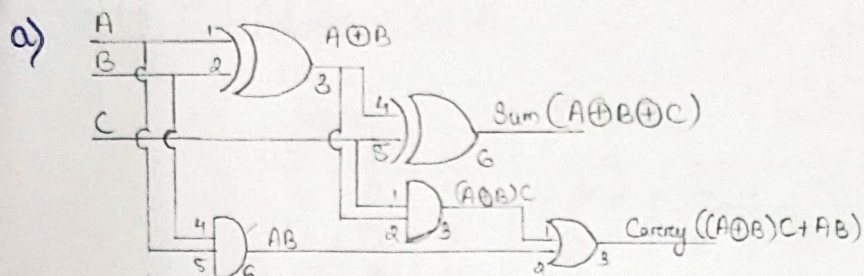


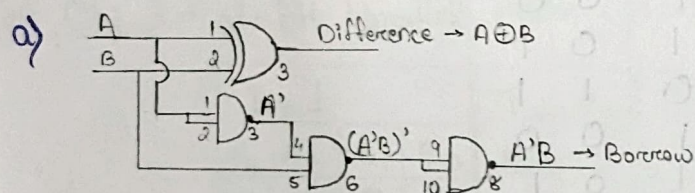
For Obj. 1: - Full Adder Circuit



b) Truth table →

Inputs			Outputs	
A	B	C	Carry	Sum
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

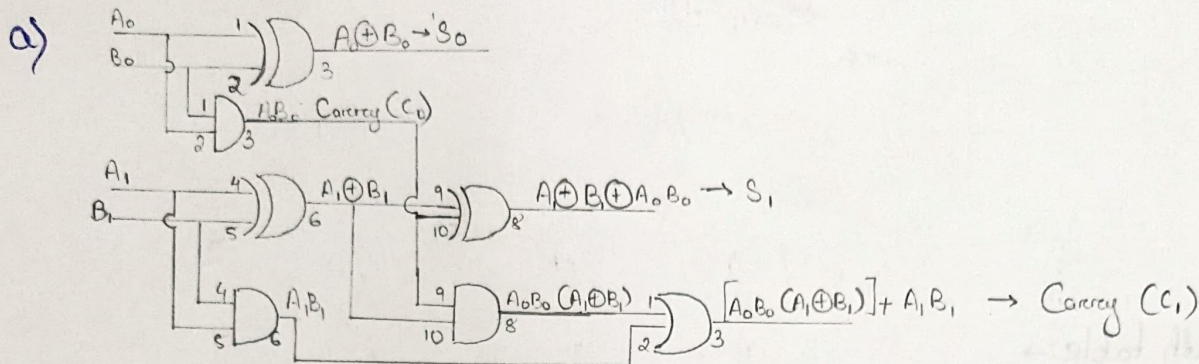
For Obj-2 → Half-Subtractor Circuit



b) Truth table →

Inputs		Outputs	
A	B	Borrow	Difference
0	0	0	0
0	1	1	1
1	0	0	1
1	1	0	0

Forc Obj - 3 → 2-bit Parallel Adder Circuit



Inputs				Outputs		
A_1	A_0	B_1	B_0	C_0	S_1	S_0
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	1	0
0	0	1	1	0	1	1
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	0	1	1
0	1	1	1	1	0	0
1	0	0	0	0	1	0
1	0	0	1	0	1	1
1	0	1	0	1	0	1
1	0	1	1	1	0	0
1	1	0	0	1	0	1
1	1	0	1	1	0	0
1	1	1	0	1	1	1
1	1	1	1	1	1	0

III) LAB →

Components Required →

Sl. No.	Name of the Component	Specification	Quantity
1	7400 IC	Quad 2 input NAND Gate	1
2	7408 IC	Quad 2 input AND Gate	1
3	7432 IC	Quad 2 input OR Gate	1
4	7486 IC	Quad 2 input XOR Gate	1
5	Universal Trainer Kit	—	1
6	Connecting Wires	23 SWG	As required

Observation →

For Obj 1 → Full Adder Circuit

Input			Outputs		Practical Output	
A	B	C	Carry	Sum	Carry	Sum
0	0	0	0	0	0	0
0	0	1	0	1	0	1
0	1	0	0	1	0	1
0	1	1	1	0	1	0
1	0	0	0	1	0	1
1	0	1	1	0	1	0
1	1	0	1	0	1	0
1	1	1	1	1	1	1

For Obj. 2 → Half - Subtractor Circuit

Inputs		Theoretical Output		Practical Output	
A	B	Borrow	Difference	Borrow	Difference
0	0	0	0	0	0
0	1	1	1	1	1
1	0	0	1	0	1
1	1	0	0	0	0

For Obj. 3 → 2-bit Parallel Adder Circuit

Input				Theoretical Output			Practical Output		
A ₁	A ₀	B ₁	B ₀	Carry C ₀	S ₁	S ₀	C ₀	S ₁	S ₀
0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	0	0	1
0	0	1	0	0	1	0	0	1	0
0	0	1	1	1	1	1	0	1	1
0	1	0	0	0	0	1	0	0	1
0	1	0	1	0	1	0	0	1	0
0	1	1	0	1	1	0	0	1	0
0	1	1	1	1	0	1	1	0	1
1	0	0	0	0	0	1	0	0	1
1	0	0	1	0	0	0	0	0	0
1	0	1	0	0	1	1	0	1	1
1	0	1	1	1	1	0	1	1	0
1	1	0	0	0	1	1	0	1	0
1	1	0	1	0	0	0	0	0	1
1	1	1	0	1	0	1	1	0	1
1	1	1	1	1	1	0	1	1	0

Conclusion →

In this experiment, we implemented Full adder, Half Subtractor & 2-bit parallel adder circuit using basic gates i.e. 7400 IC, 7408 IC, 7432 IC & 7486 IC.

IV) PRE-LAB →

Q.1) A Half-adder is characterised by 2-inputs & 2 outputs.

2) A 4-bit parallel adder can add 2 × 4-bit binary numbers.

3) Two four bit numbers can be added using two full adders. Yes or No. Justify answer.

Ans → No, we require one half-adder & 3 - full adders to add two four bit numbers.