Green University

ASSIGNMENT SHEET

Section : DC-221

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"Advancing knowledge. Transforming lives"

Ans: to the Qus: no: 1 (i)

Truth table for 3 input adder circuit:

A	B	Cin	Sum	Cout
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

So the sum bit is simplified as :-

$$\bar{A}\bar{B}C_{in} + \bar{A}B\bar{C_{in}} + A\bar{B}\bar{C_{in}} + ABC_{in}$$

$$= A \oplus B \oplus C$$

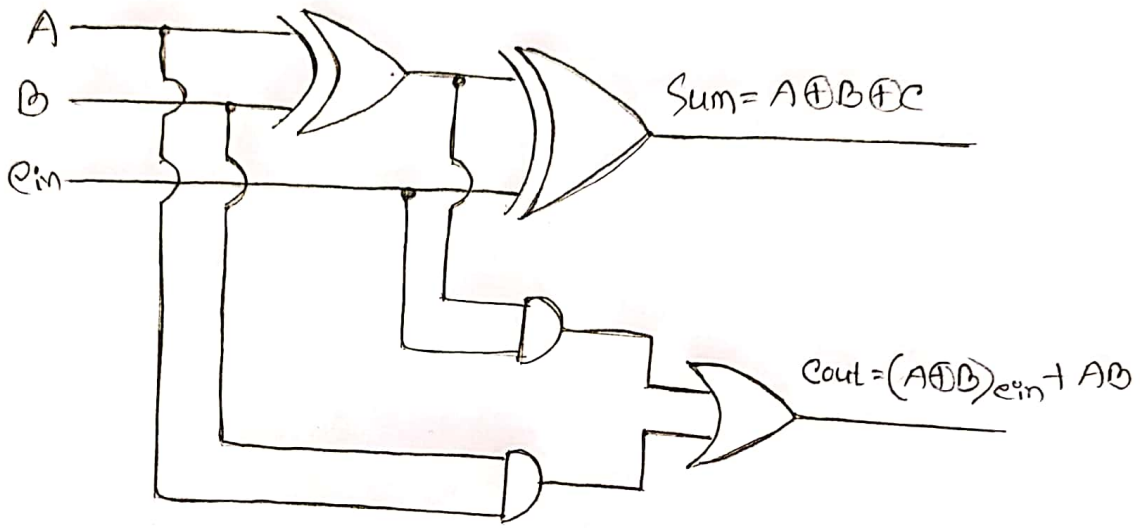
So the carry bit is simplified as :-

$$C_{out} = \bar{A}BC_{in} + A\bar{B}C_{in} + AB\bar{C_{in}} + ABC_{in}$$

$$= C_{in}(\bar{A}B + A\bar{B}) + AB(\bar{C_{in}} + C_{in})$$

$$= C_{in}(A \oplus B) + AB$$

So the circuit diagram is :-



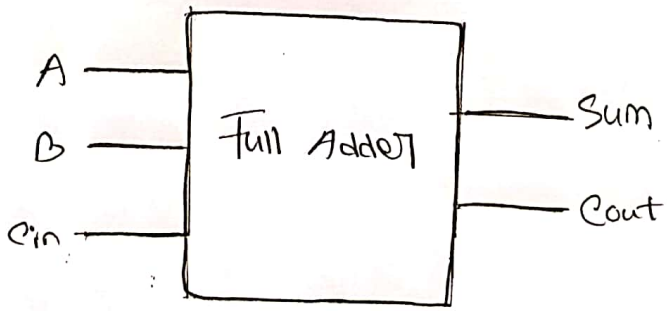
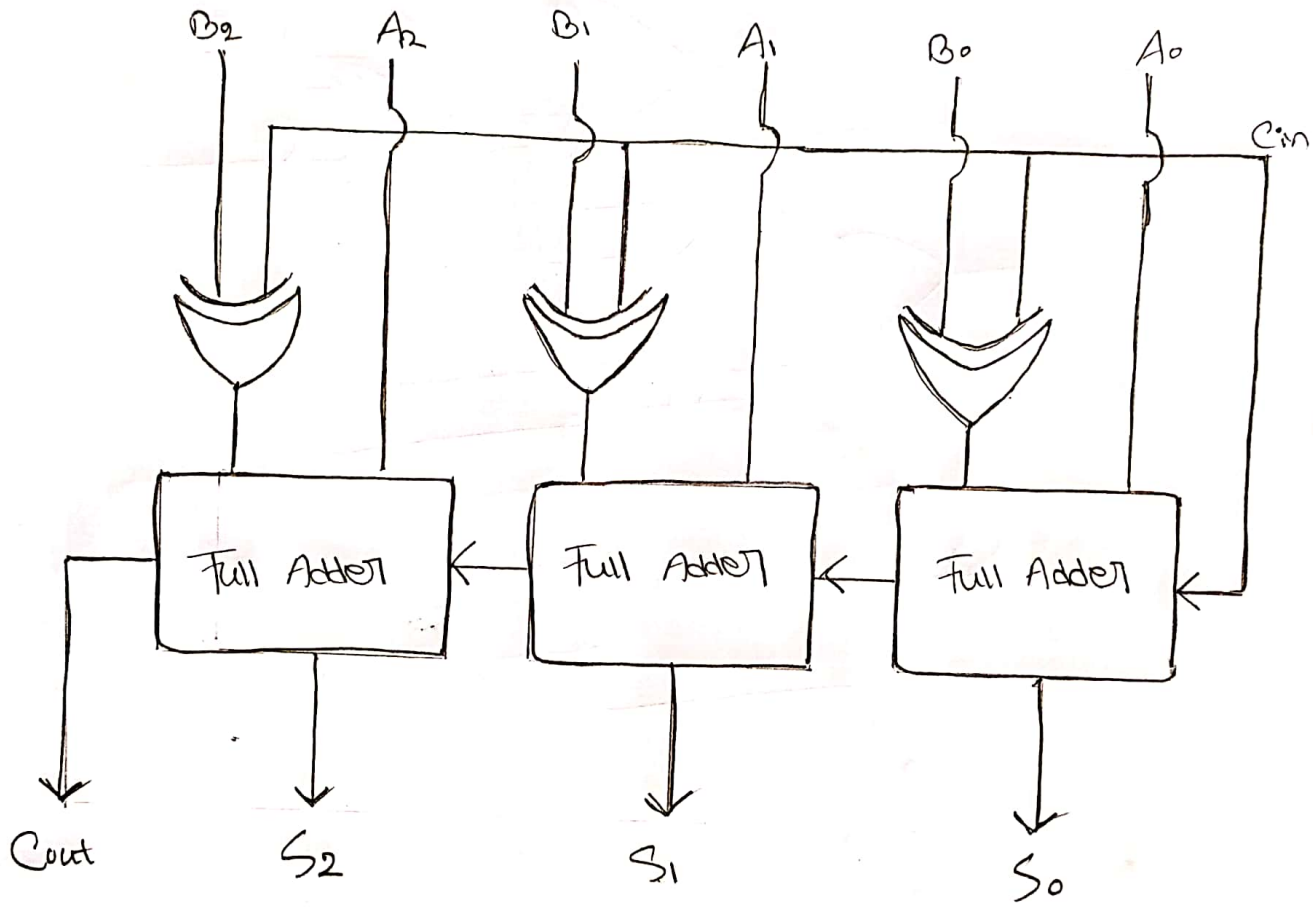


Figure : Full Adder.

Ans: to the Qus: no: 1 (ii)

Logic diagram for 3-bit adder-subtractor using full adder.



Here,

when $C_{in}=0$, then the circuit will perform as 3-bit binary adder.

when $C_{in}=1$, then the circuit will perform as 3-bit binary subtractor.

Ans: to the Qus: no: 02

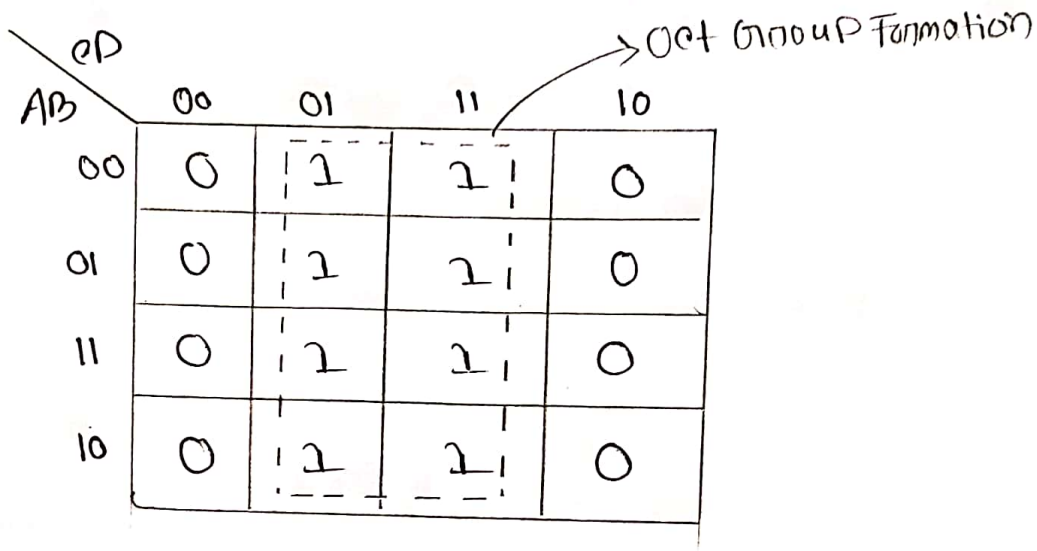
Truth Table for 4 input and 1 output

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

Here in the output section F, according to the Question for 4 inputs and 1 outputs when decimal value for input odd number then output 1 otherwise output 0.

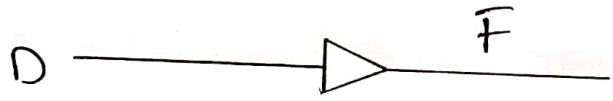
∴ SOP form : $F(A,B,C,D) = \sum m(1,3,5,7,9,11,13,15)$

∴ Using K-Map for Simplified expression :-



∴ $F = D$

The circuit diagram is :-



Ans: to the Que: no: 3

Gray code, also known as reflected binary code or Gray binary code, is a binary code system in which consecutive values differ only one bit. It is used in a variety of applications, including -

⇒ Digital communication.
⇒ Electronic circuits.
⇒ and robotics.

One of the primary benefits of Gray code is that it minimizes errors that can occur when switching between binary values.