1.

$$S_0 = (A_0 \oplus B_0) \oplus C_{in}$$
$$C_{01} = A_0 B_0 + B_0 C_{in} + A_0 C_{in}$$

$$S_1 = (A_1 \oplus B_1) \oplus C_{01}$$
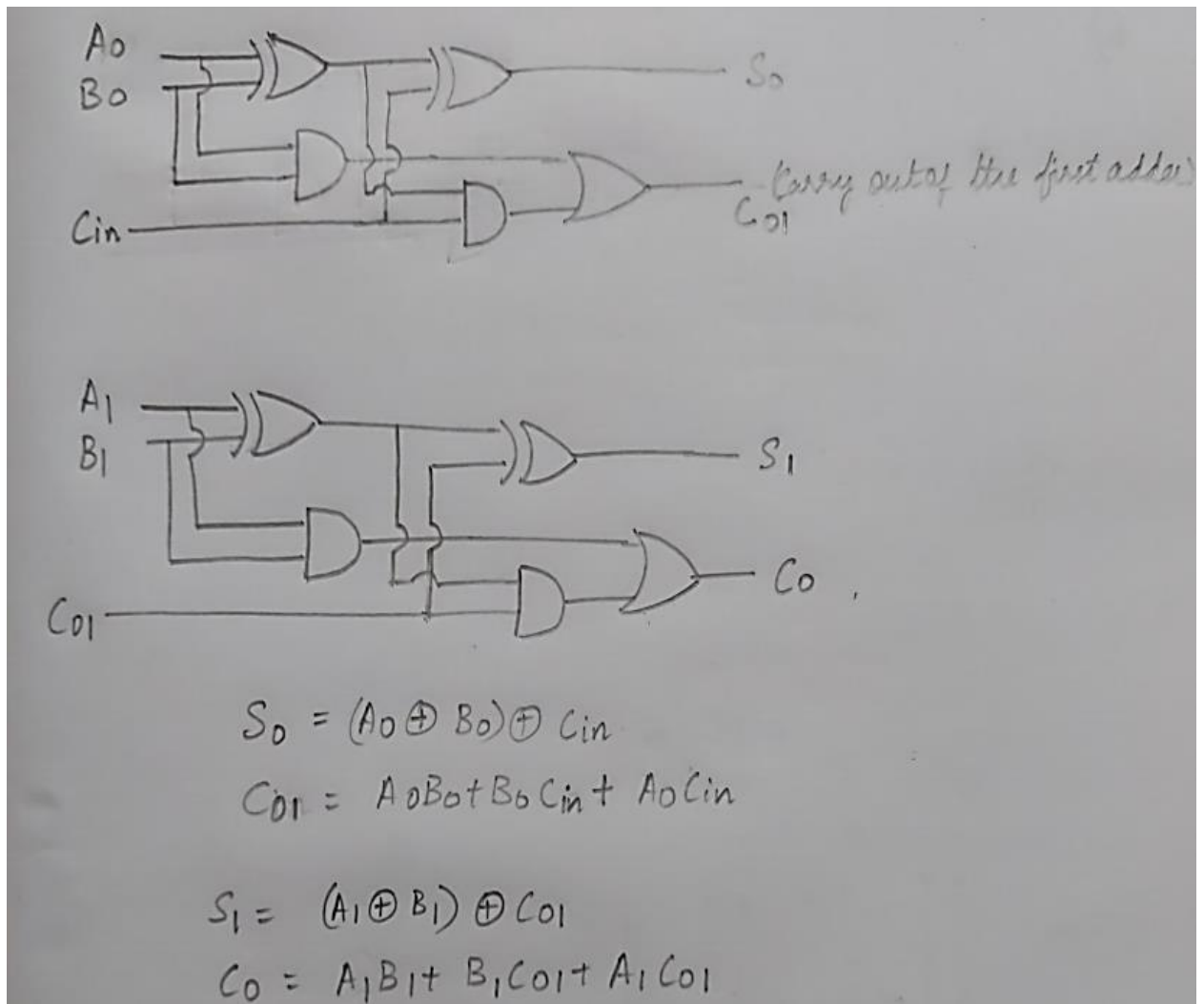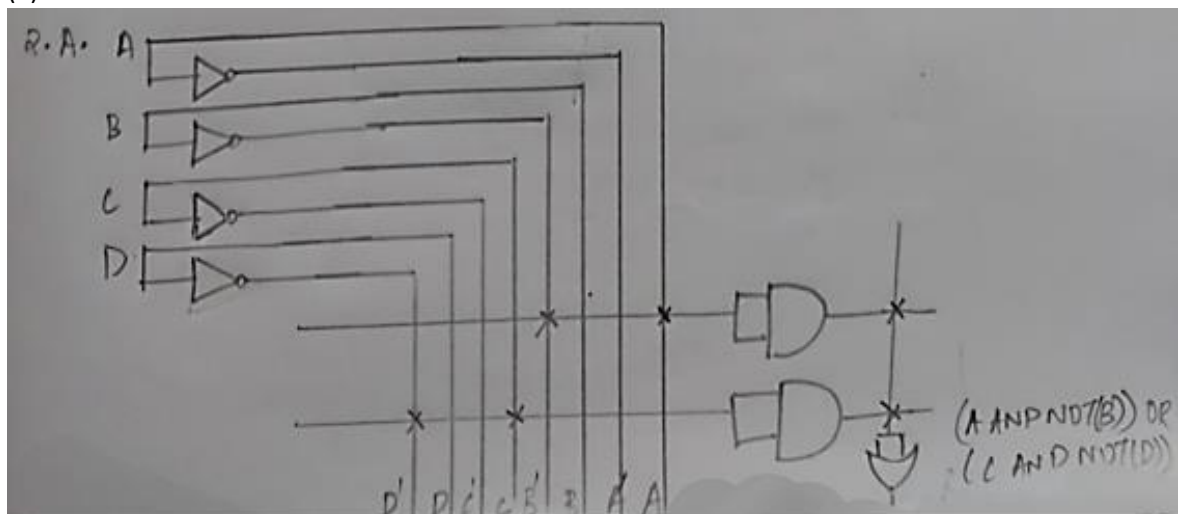$$C_0 = A_1 B_1 + B_1 C_{01} + A_1 C_{01}$$

2. (a)

In the above implementation of boolean function using PLA, the fuses are placed at A and $\overline{B}$ and C and $\overline{D}$. These are given as an input to the programmable AND gate. Two more fuses are placed at the outputs of the AND array. They are given as an input to the programmable OR gate.

(b) Boolean function: (A AND NOT(B)) OR (C AND NOT(D))

RAM CONTENTS				
ADDRESS				OUTPUT DATA
A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0