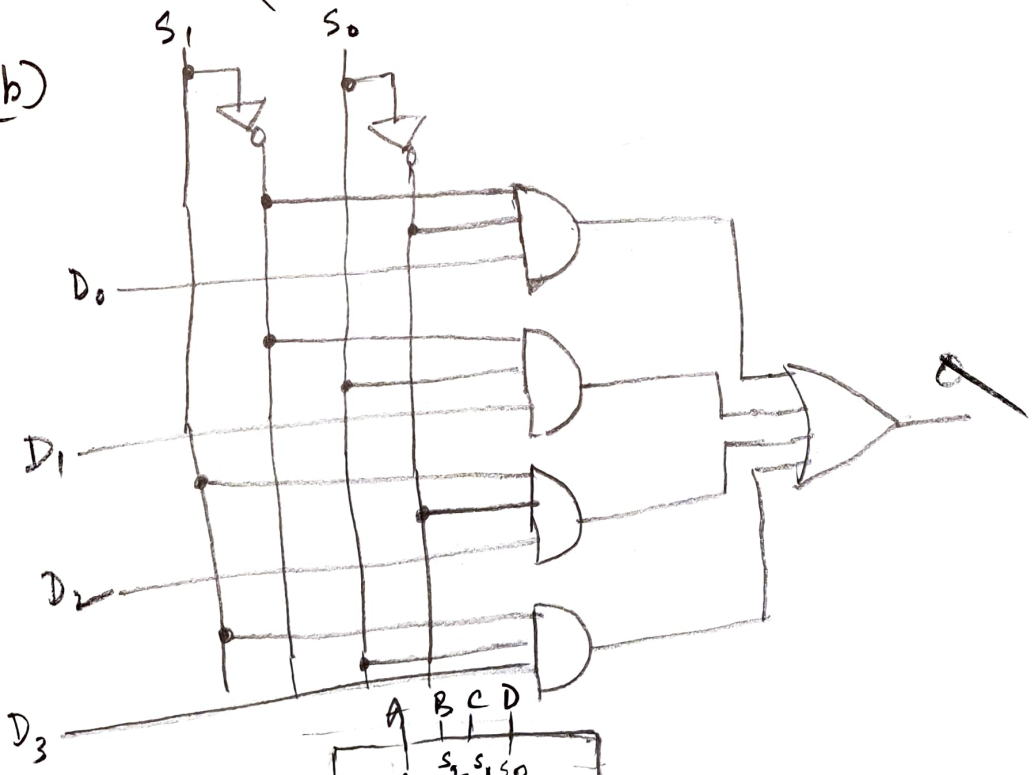
Solution 1

(a) 4-to-1- Multiplexer

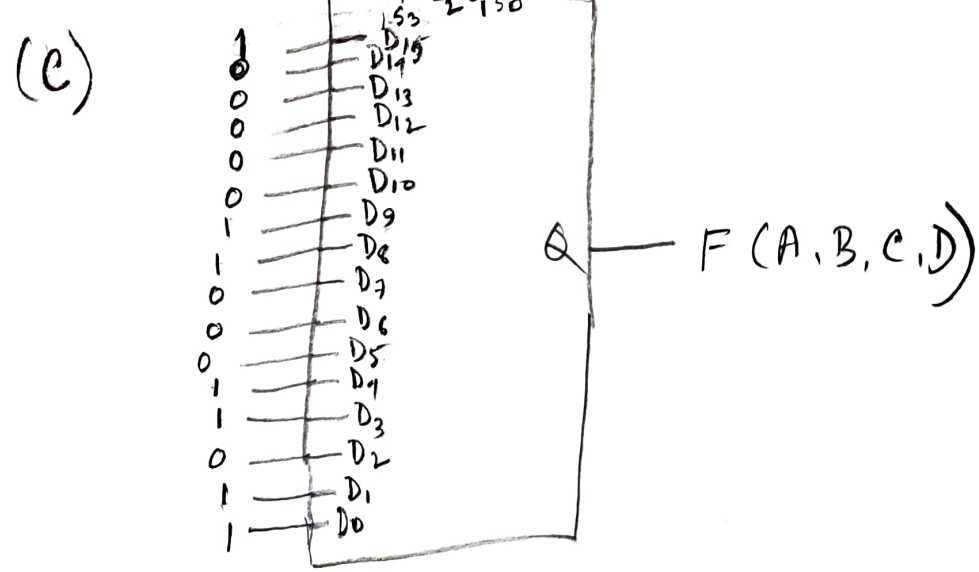
S_1	S_0	Q
0	0	D_0
0	1	D_1
1	0	D_2
1	1	D_3

$$Q = \bar{S}_1 \bar{S}_0 D_0 + \bar{S}_1 S_0 D_1 + S_1 \bar{S}_0 D_2 + S_1 S_0 D_3$$

(b)



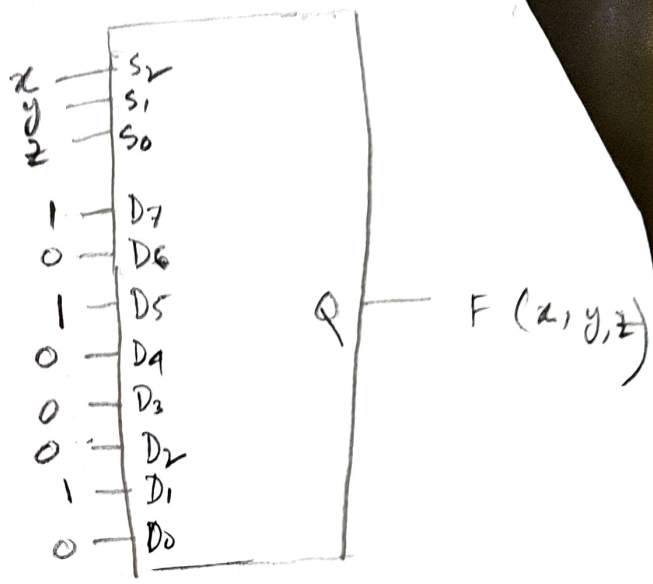
(c)



Solution Additional Problem 1

(a)

	x	y	z	F
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	1	0	0	0
5	1	0	1	1
6	1	1	0	0
7	1	1	1	1



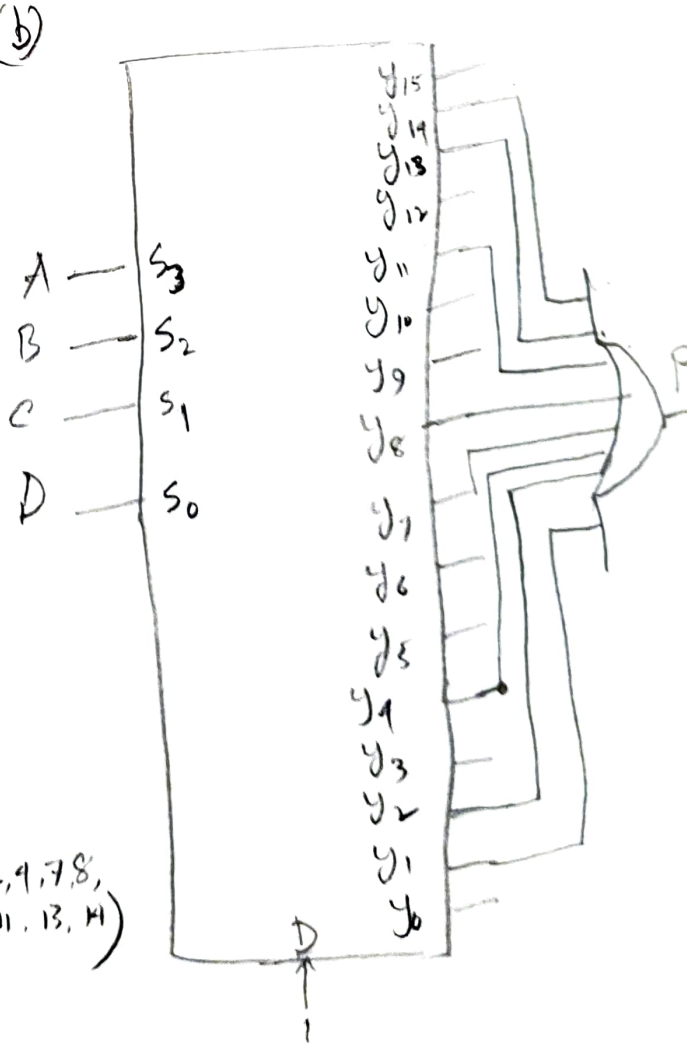
$$F = \sum_m (1, 5, 7)$$

Solution 2

(a)

	A	B	C	D	P
0	0	0	0	0	0
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	1
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	1
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	0

(b)



$$P = \sum_m (1, 2, 4, 7, 8, 11, 13, 14)$$

3.

(a.)

En	S_1	S_0	Q_0	Q_1	Q_2	Q_3
0	X	X	0	0	0	0
1	0	0	1	0	0	0
1	0	1	0	1	0	0
1	1	0	0	0	1	0
1	1	1	0	0	0	1

(b)

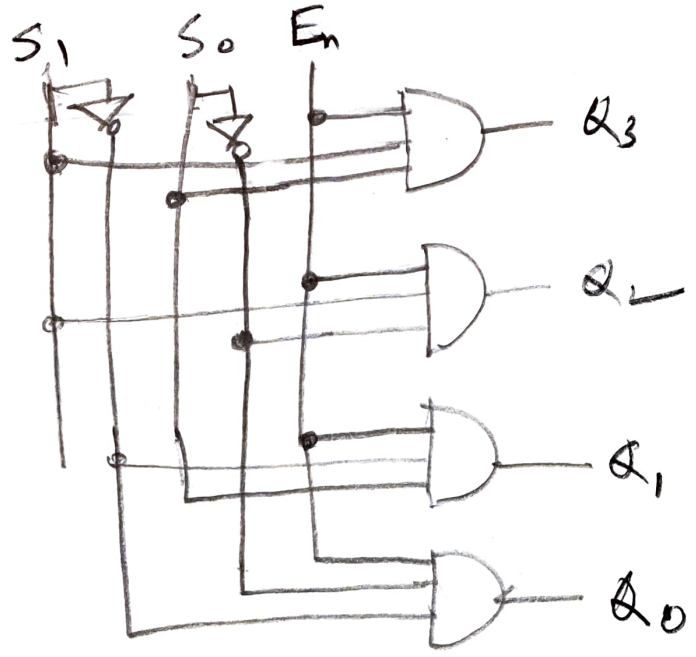
$Q_0 = En\bar{S}_1\bar{S}_0$

$Q_1 = En\bar{S}_1 S_0$

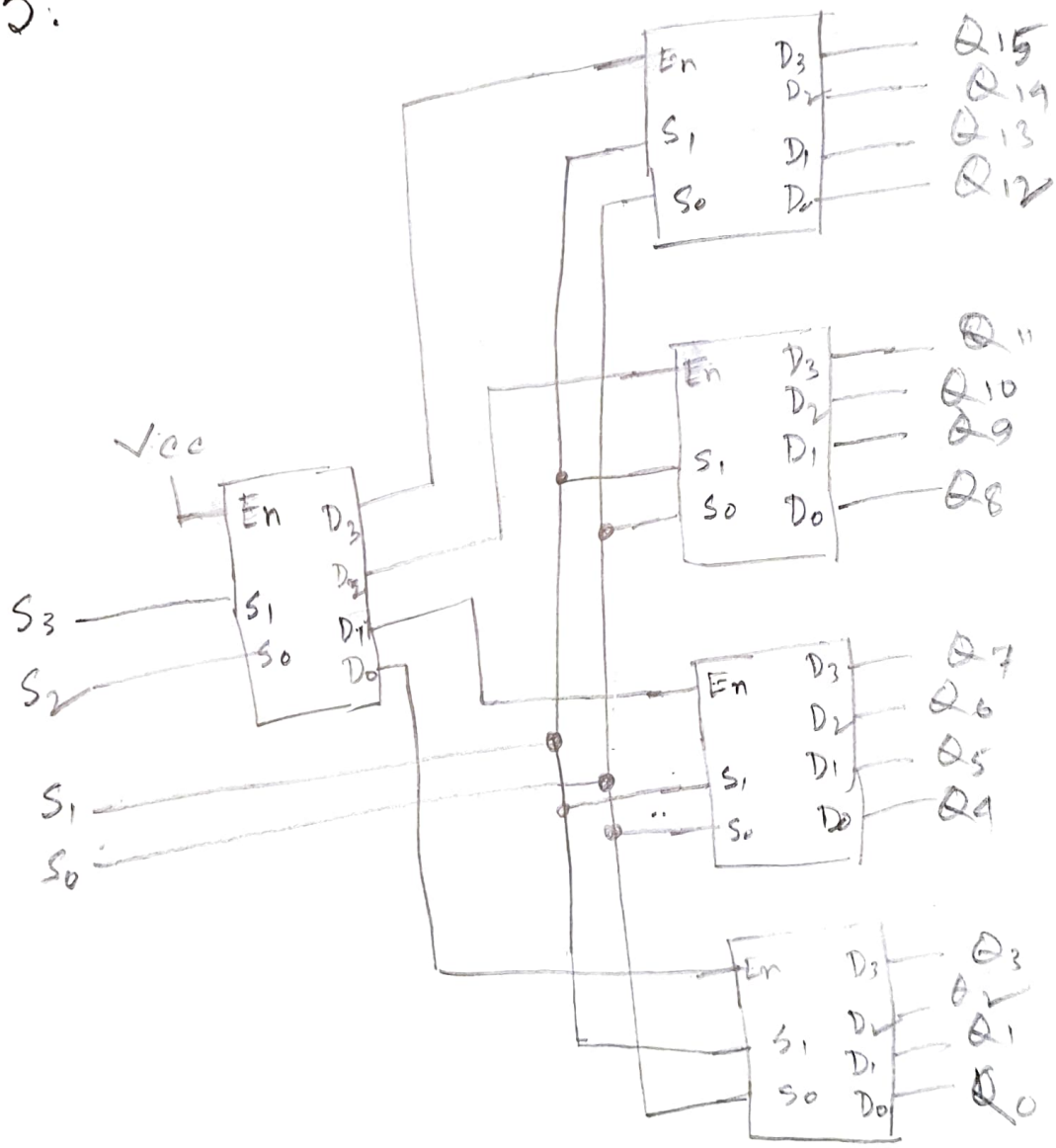
$Q_2 = EnS_1\bar{S}_0$

$Q_3 = EnS_1 S_0$

(b)



5.



4.

X	Y	Z	S	C
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

$S = \sum_m (1, 2, 4, 7)$

$C = \sum_m (3, 5, 6, 7)$

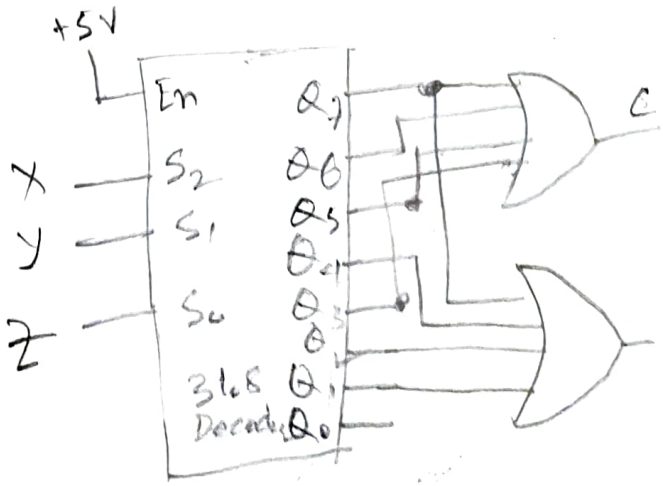


Fig: Full adder with 3 to 8 decoder