Guião 7 'Parte I

1

S	I0	I1	Y
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

$Y = (\overline{S} \times I0) + (S + I1)$
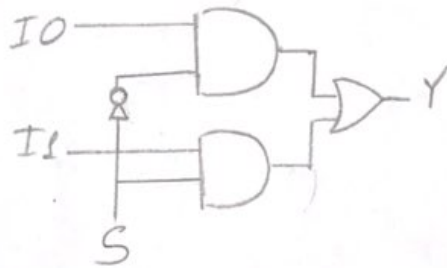
S	y
0	I0
1	I1

5

S3	S2	S1	S0	y
0	0	0	0	I0
0	0	0	1	I1
0	0	1	0	I2
0	0	1	1	I3
0	1	0	0	I4
0	1	0	1	I5
0	1	1	0	I6
0	1	1	1	I7
1	0	0	0	I8
1	0	0	1	I9
1	0	1	0	I10
1	0	1	1	I11
1	1	0	0	I12
1	1	0	1	I13
1	1	1	0	I14
1	1	1	1	I15

$2^4 = 16$, O sinal S vai ter 4 bits

This is a 16-to-1 multiplexer constructed from 2-to-1 multiplexers arranged in a tree structure. Inputs I0 through I15 feed into the first stage of multiplexers. Select lines S0, S1, S2, and S3 control the successive stages, producing output Y.

Parte II

1)

$$f(A,B,C,D) = A + \bar{C} \times D + B \times \bar{D} + \bar{B} \times D + \bar{B} \times C \ ^3$$

Karnaugh map:
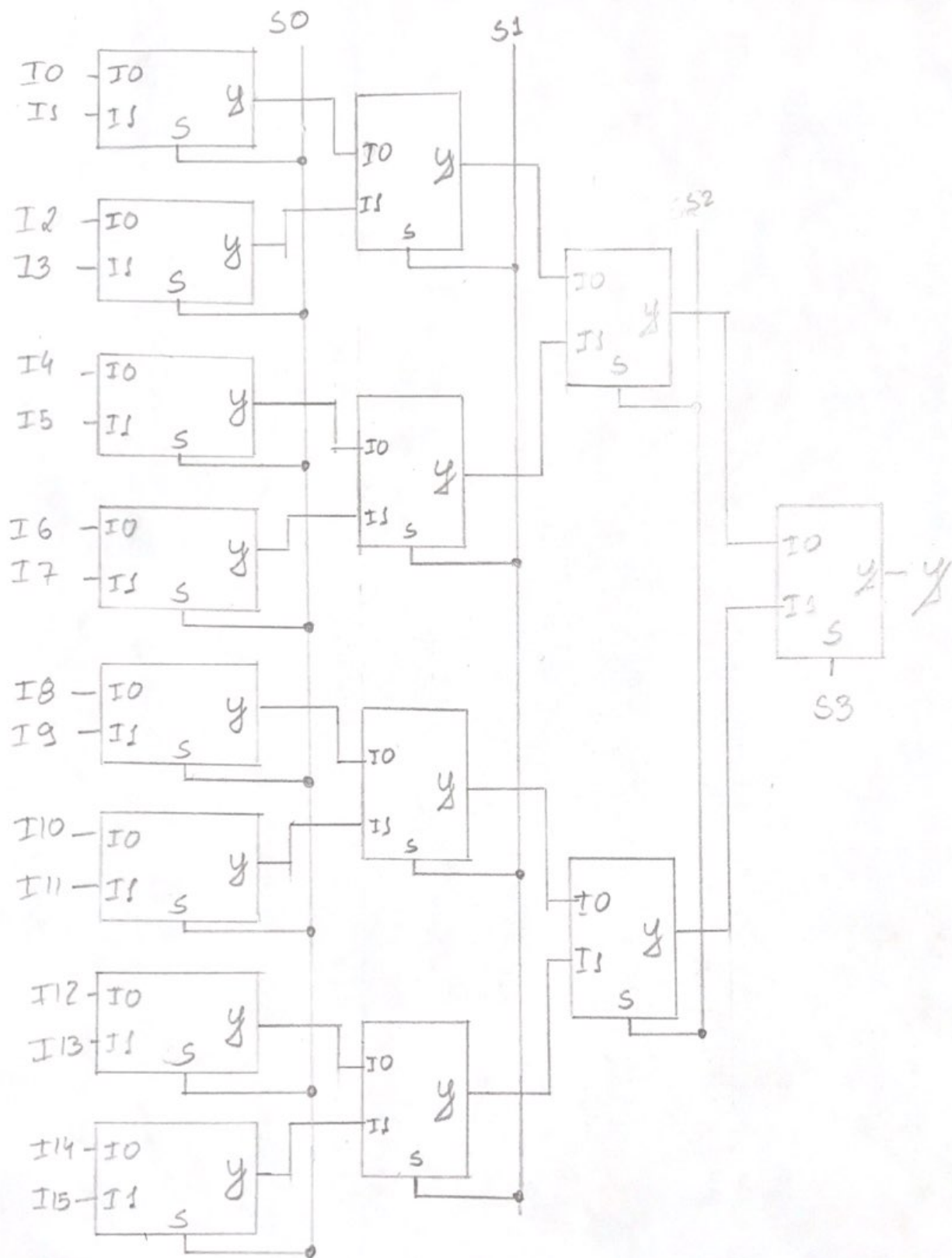
AB \ CD	00	01	11	10
00	0	1₁	1₃	1₂
01	1₄	1₅	1₇	1₆
11	1₁₂	13	1₁₅	1₁₄
10	1₈	1₉	1₁₁	1₁₀

$$f(A,B,C,D) = A + \bar{C}\,B + D\,\bar{B} + C\,\bar{D}$$

2)

$$f(A,B,C,D) = \sum_{m}(1,2,3,4,5,6,7,8,9,10,11,12,14,15)$$

Circuit: GND, multiplexer inputs D₀–D₁₅, selects S3–A, S2–B, S1–C, S0–D, VCC, output y — f
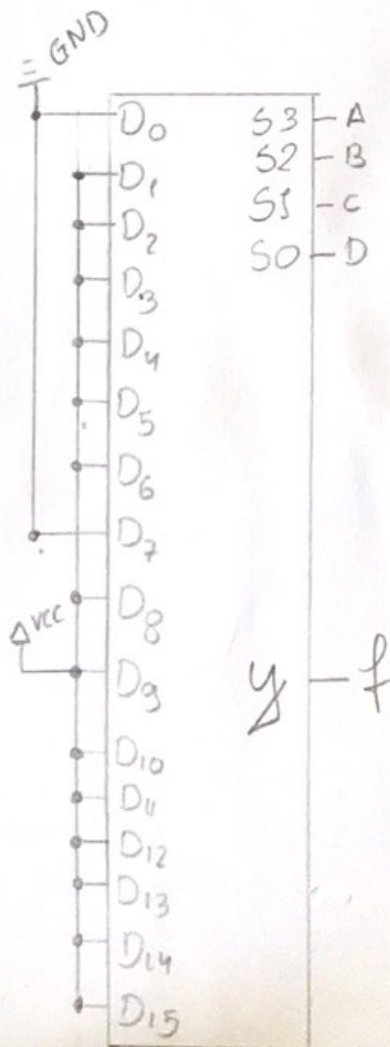
A	B	C	D	f
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1