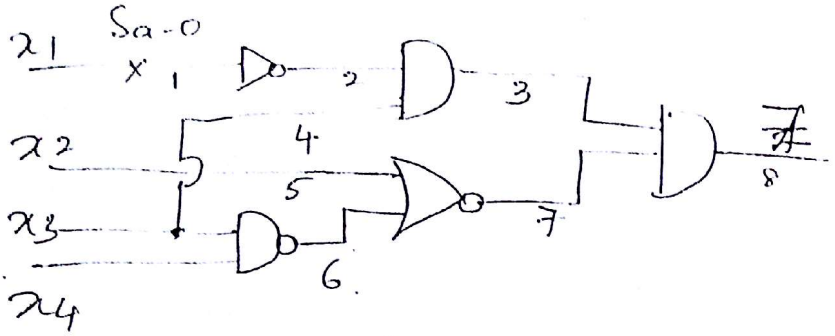
(1) Path Sensitization method



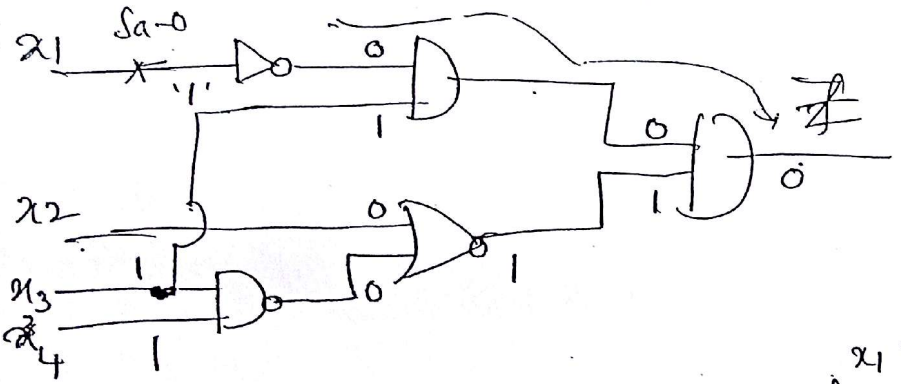
Determine the test Vector which detects the fault Sa-1. Is the test Vector unique?

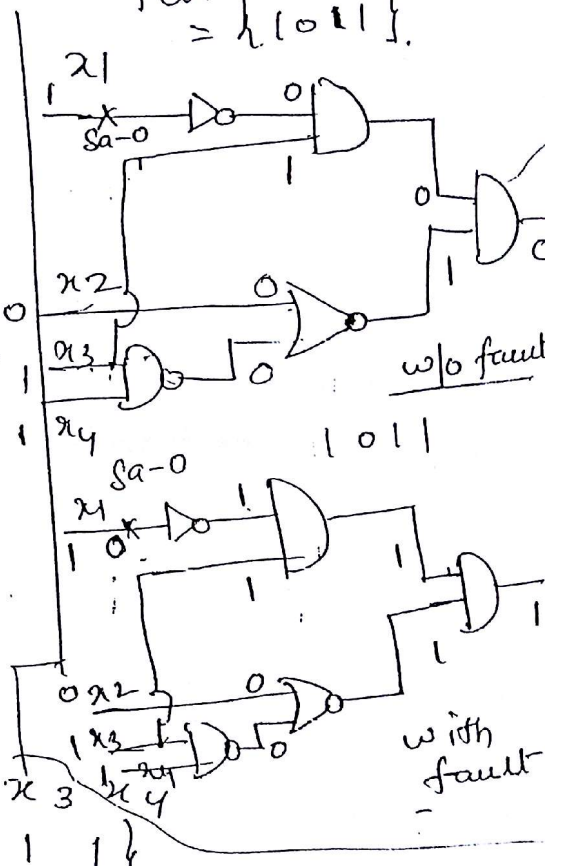
Test pattern = {1011}.

I Step

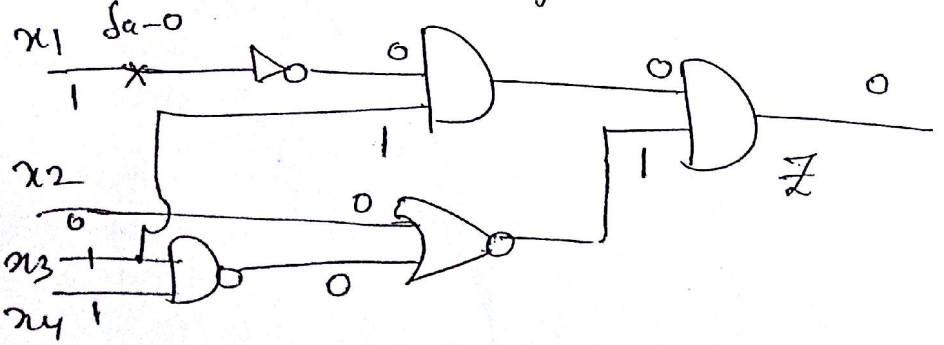
(1) Identify fault
Sa-0 in line 1.

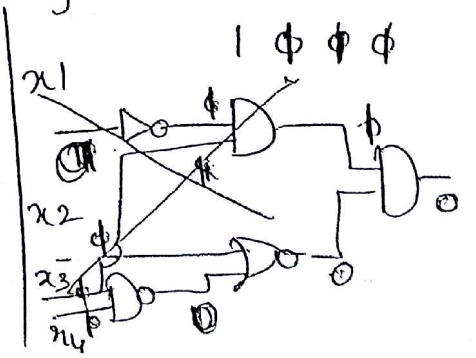
(2) Fault Activation
Sa-0 take opposite ie '1'



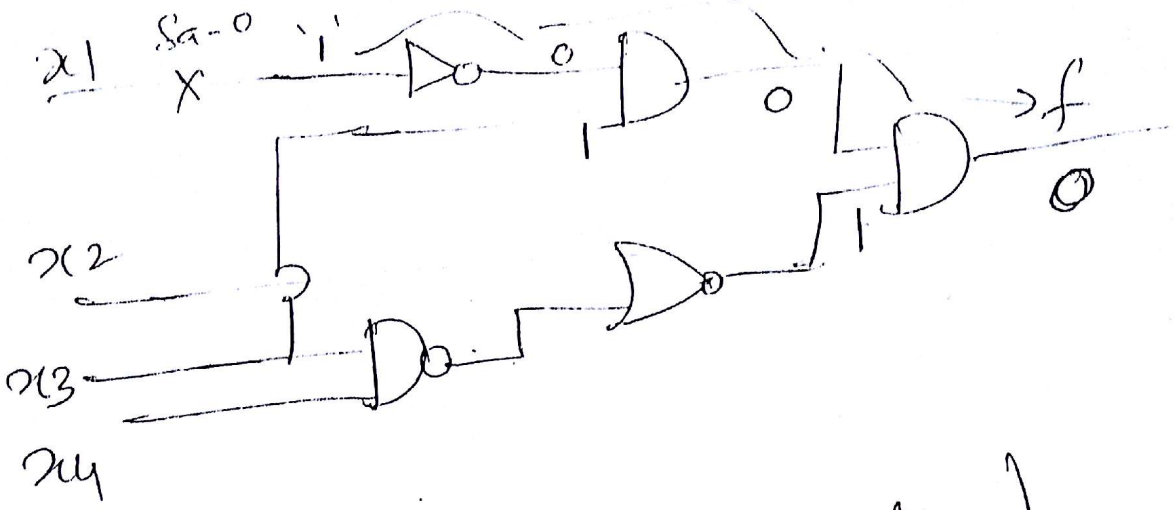


test vector pattern {1 0 1 1}

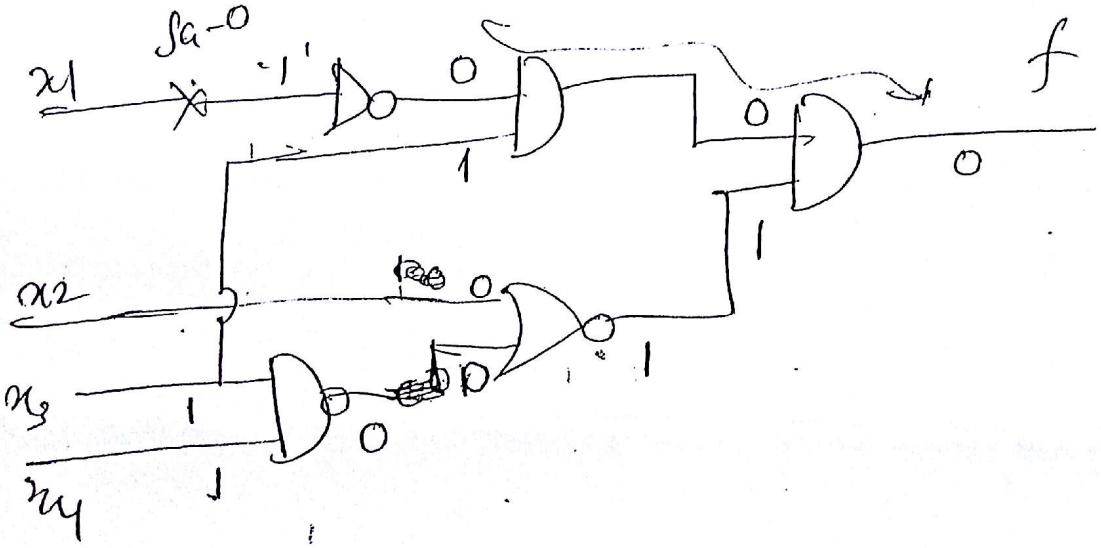




(3) Fault propagation



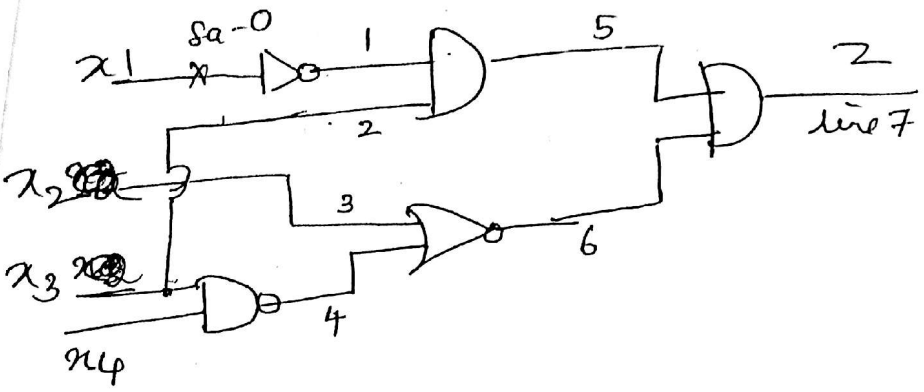
(4) Fault (Back propagation) to find test vectors.



x_1	x_2	x_3	x_4
1	0	1	1

determine a test vector which detects the fault x_4 sa-0. is this test pattern unique? Describe the method used.

(II) Boolean difference



(I) Find Z (without fault)

line 1 → $\bar{x}_1$

line 2 → x_3

line 3 → $\bar{x}_2$

line 4 → $\overline{x_3 x_4} = \bar{x}_3 + \bar{x}_4$

line 5 → $\bar{x}_1 x_3 = 1 \cdot 2$

line 6 → $\overline{x_2(\bar{x}_3 + \bar{x}_4)}$

line 6 = $\bar{x}_2 \cdot x_3 x_4$

line 7 → $Z = 5 \cdot 6 \rightarrow (\bar{x}_1 x_3)(\bar{x}_2 x_3 x_4) = \bar{x}_1 \bar{x}_2 x_3 x_4$

(II) To find Z_f (with fault).

line 1 → '1'

line 2 → x_3

line 3 = $x_2 \cdot 1 = x_2$

line 4 = $\overline{x_3 x_4} = \bar{x}_3 + \bar{x}_4$

line 5 = $1 \cdot 2 = 1 \cdot x_3 = x_3$

line 6 = $3 + 4 = x_2 + \bar{x}_3 + \bar{x}_4$

$= \bar{x}_2 \cdot x_3 \cdot x_4$

$Z_f = 5 \cdot 6$

$= x_3 \cdot \bar{x}_2 \cdot x_3 \cdot x_4$

$Z_f = \bar{x}_2 x_3 x_4$

(iii) To find test pattern.

$z \oplus z_f = 1$

$z = \bar{x}_1 \bar{x}_2 x_3 x_4$

$z_f = \bar{x}_2 x_3 x_4$

$= z\bar{z}_f + z_f\bar{z}$

$= (\bar{x}_1 \bar{x}_2 x_3 x_4)\overline{(\bar{x}_2 x_3 x_4)} + (\bar{x}_2 x_3 x_4)\overline{(\bar{x}_1 \bar{x}_2 x_3 x_4)}$

$= (\bar{x}_1 \bar{x}_2 x_3 x_4)(x_2 + \bar{x}_3 + \bar{x}_4) + (\bar{x}_2 x_3 x_4)(x_1 + x_2 + \bar{x}_3 + \bar{x}_4)$

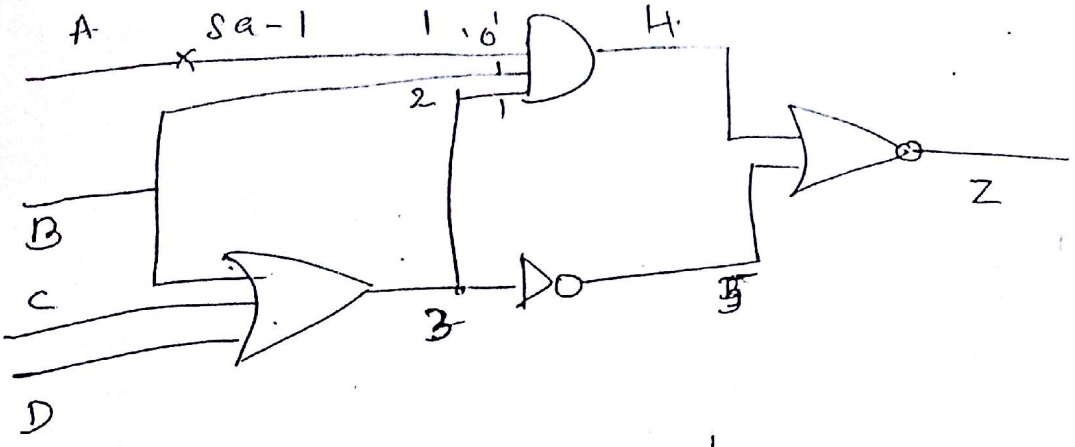
$= 0 + 0 + 0 + x_1 \bar{x}_2 x_3 x_4 + 0 + 0 + 0$

$= x_1 \bar{x}_2 x_3 x_4$

Test pattern $= x_1 \bar{x}_2 x_3 x_4 \leftarrow$ $x_1 = 1$, $\bar{x}_2 = 0$, $x_3 = 1$, $x_4 = 1$

Test $= \{1\ 0\ 1\ 1\}$

Determine the test vector detects the fault S-a-1. Is the test vector unique?



Path Sensitization method

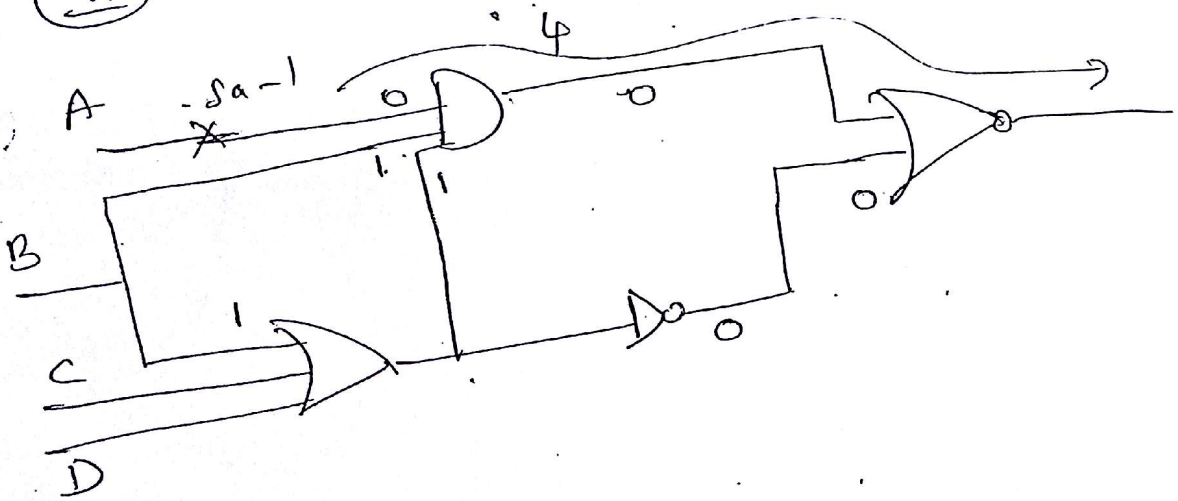
(I) line 1 → Take opposite value '0' (fault activation)

Sa-1 → '0'

line 2 → B

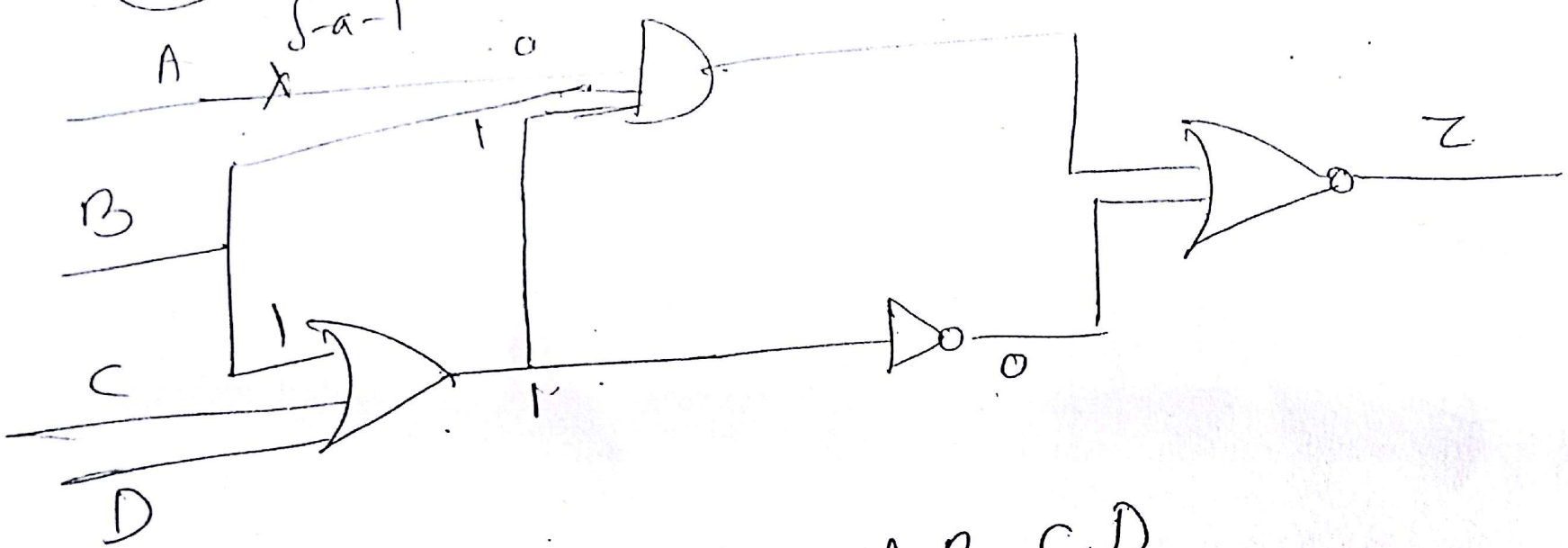
line 3 → B+C+D

(II) fault propagation



(III)

(iii) fault Back propagation



Test pattern.

A	B	C	D
0	1	x	x

Test pattern :

{0100, 0101, 0110, 0111}