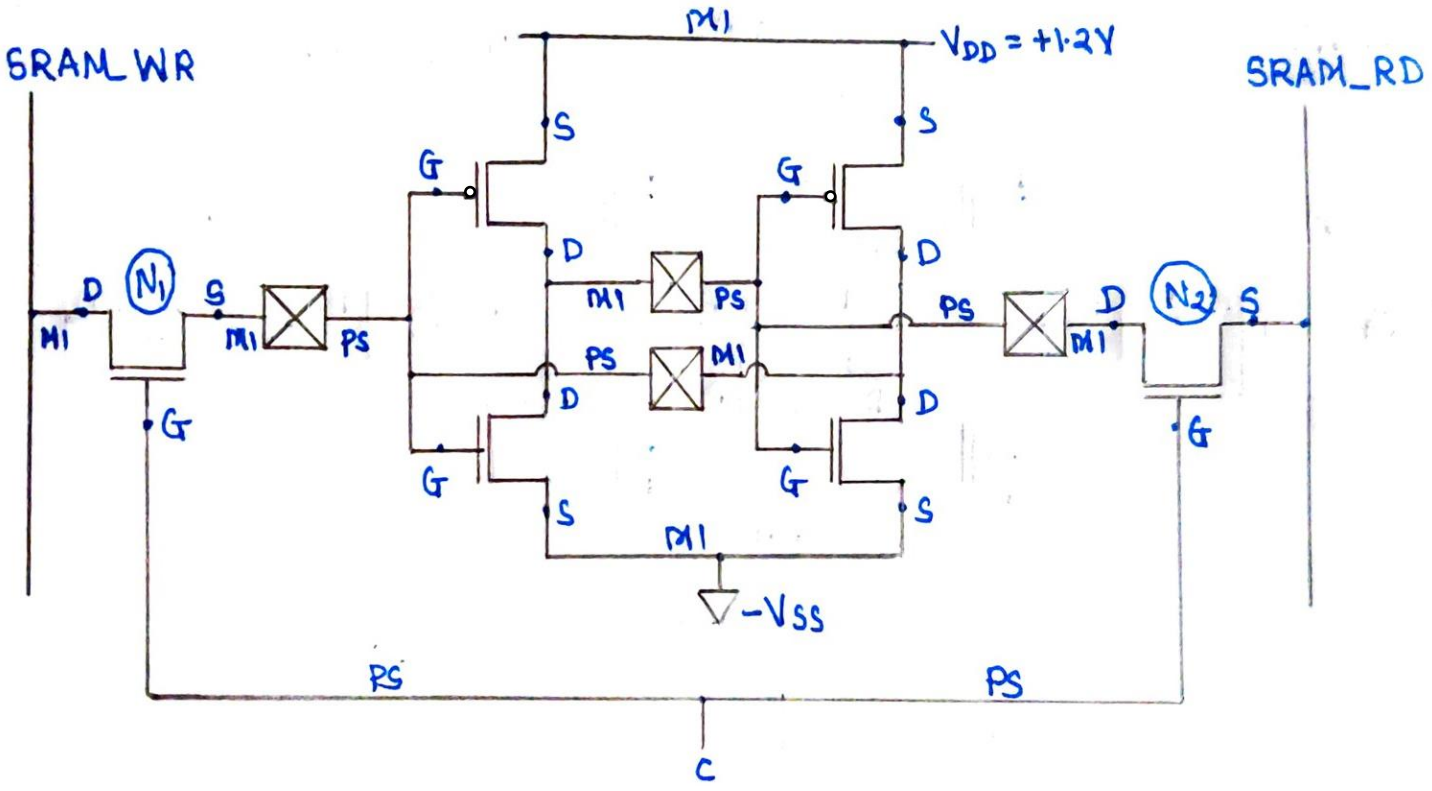
TITLE PAGE

Class	:	BE - 8
Roll. No	:	42428
Assignment No.	:	B. 3
Assignment Name	:	1-bit SRAM Cell
Date Of Performance	:	28-11-2020

Theory:

F = 90 nm.

3.a) : 1-bit SRAM Cell using NMOS Switches-

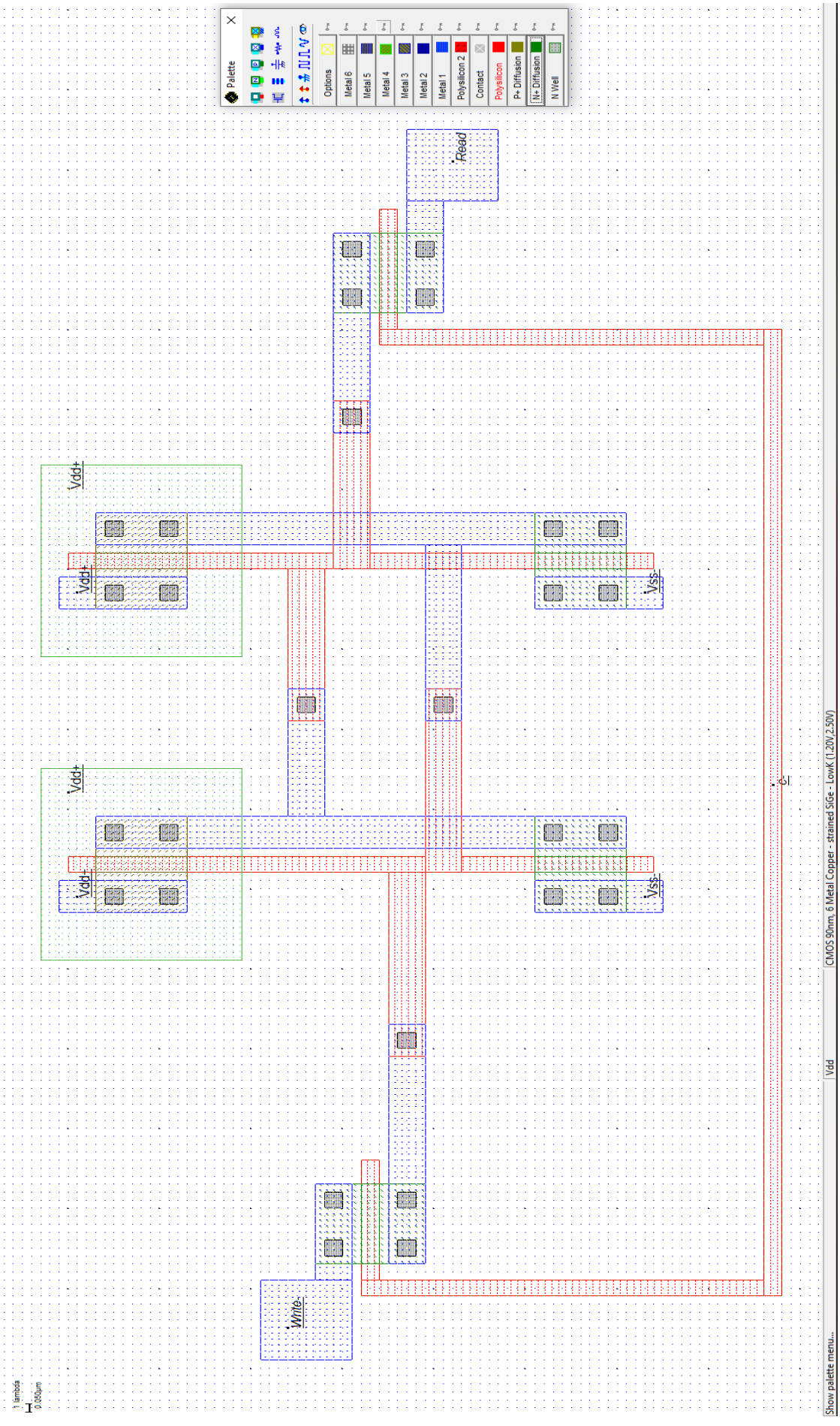


N_1, N_2 : NMOS S/W's

Function Table-

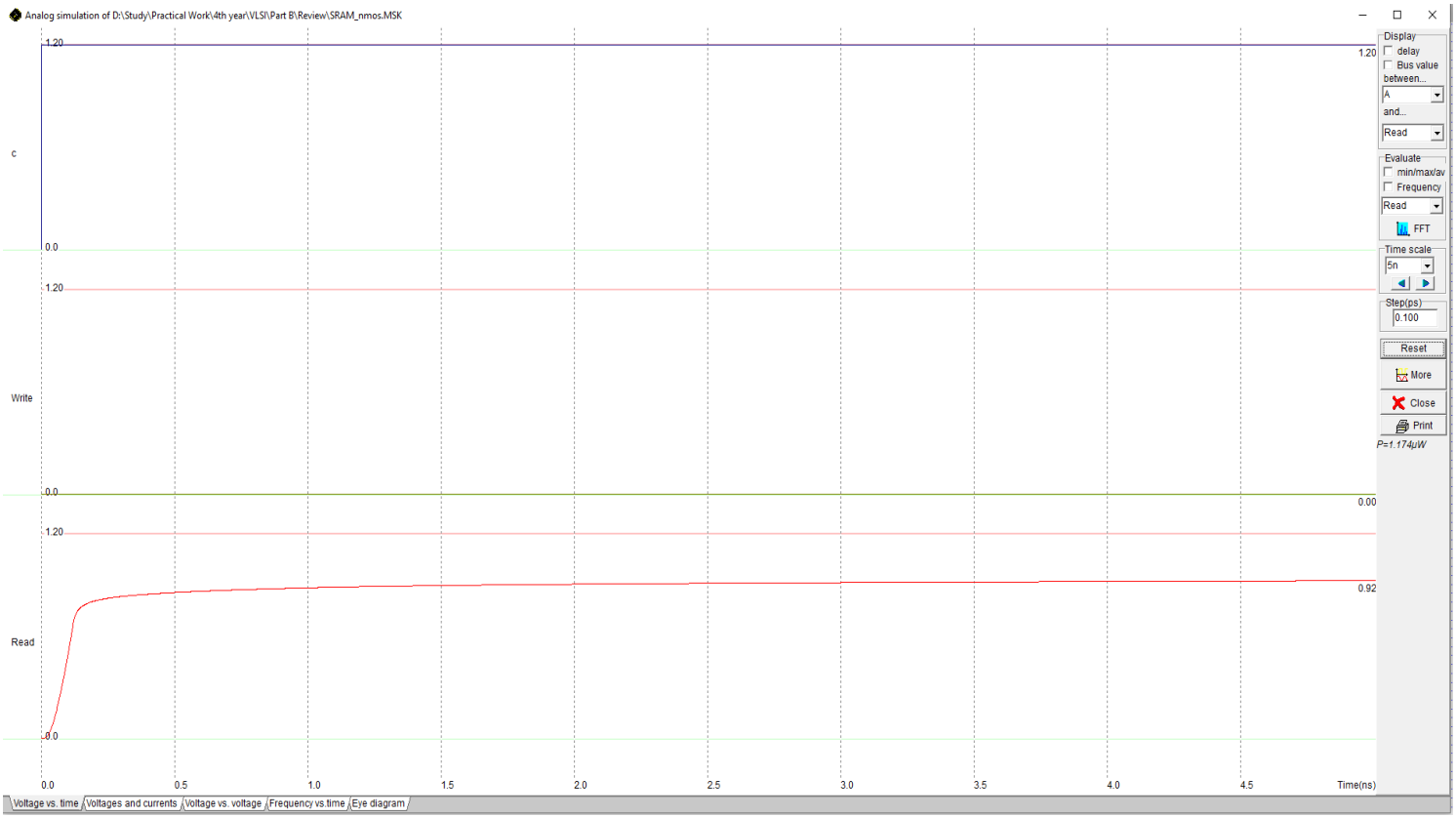
C	SRAM_WR	SRAM_RD
1	0	WEAK-1
1	1	STRONG-0
0	X	0/HOLD

LAYOUT

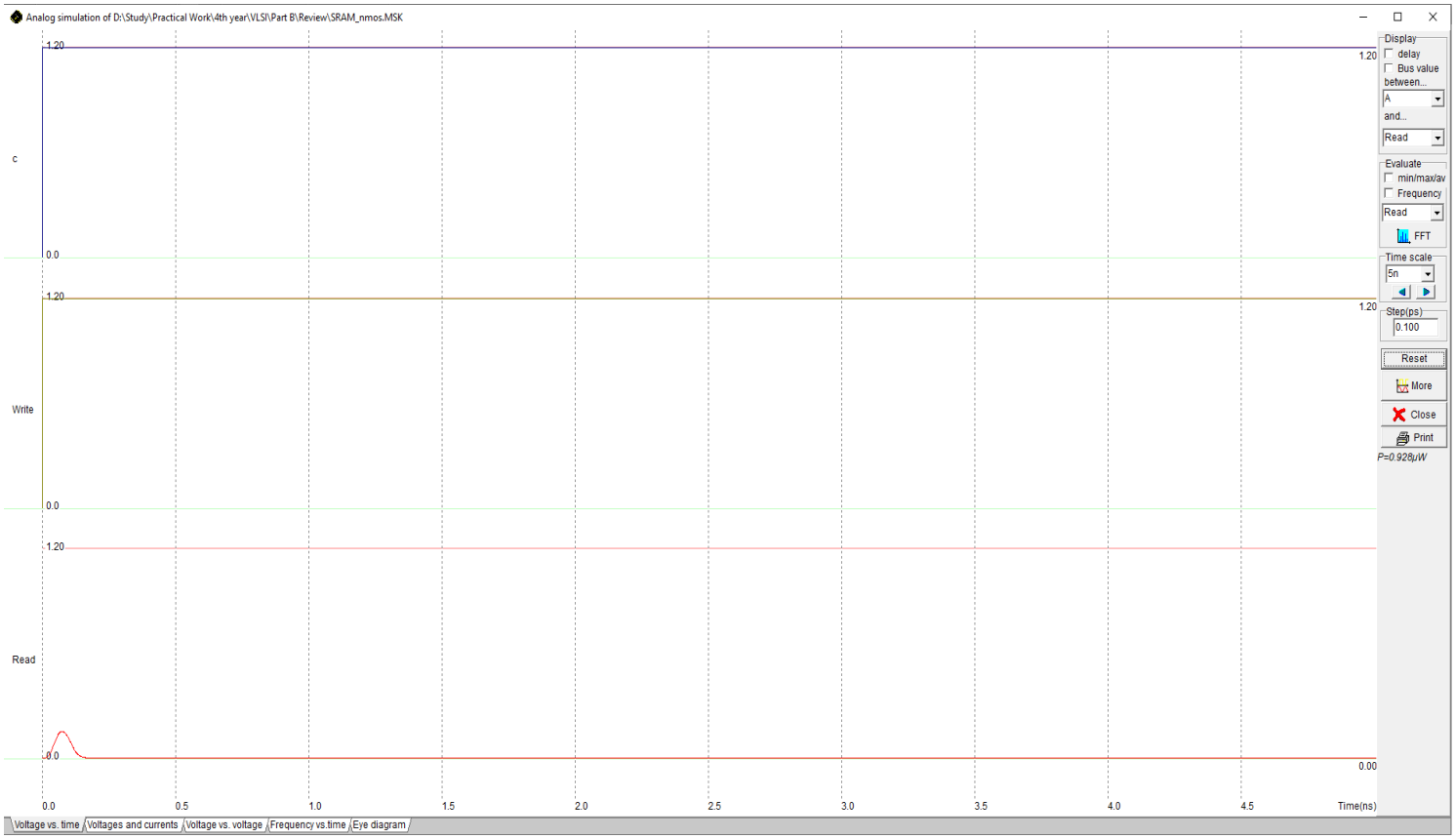

Palette
Options
Metal 6
Metal 5
Metal 4
Metal 3
Metal 2
Metal 1
Polysilicon 2
Contact
Polysilicon
P+ Diffusion
N+ Diffusion
N Well
Read
Vdd
Vss
Write
Vdd
CMOS 90nm, 6 Metal Copper - strained SiGe - LowK (1.20V,2.50V)
Show palette menu...

Waveforms

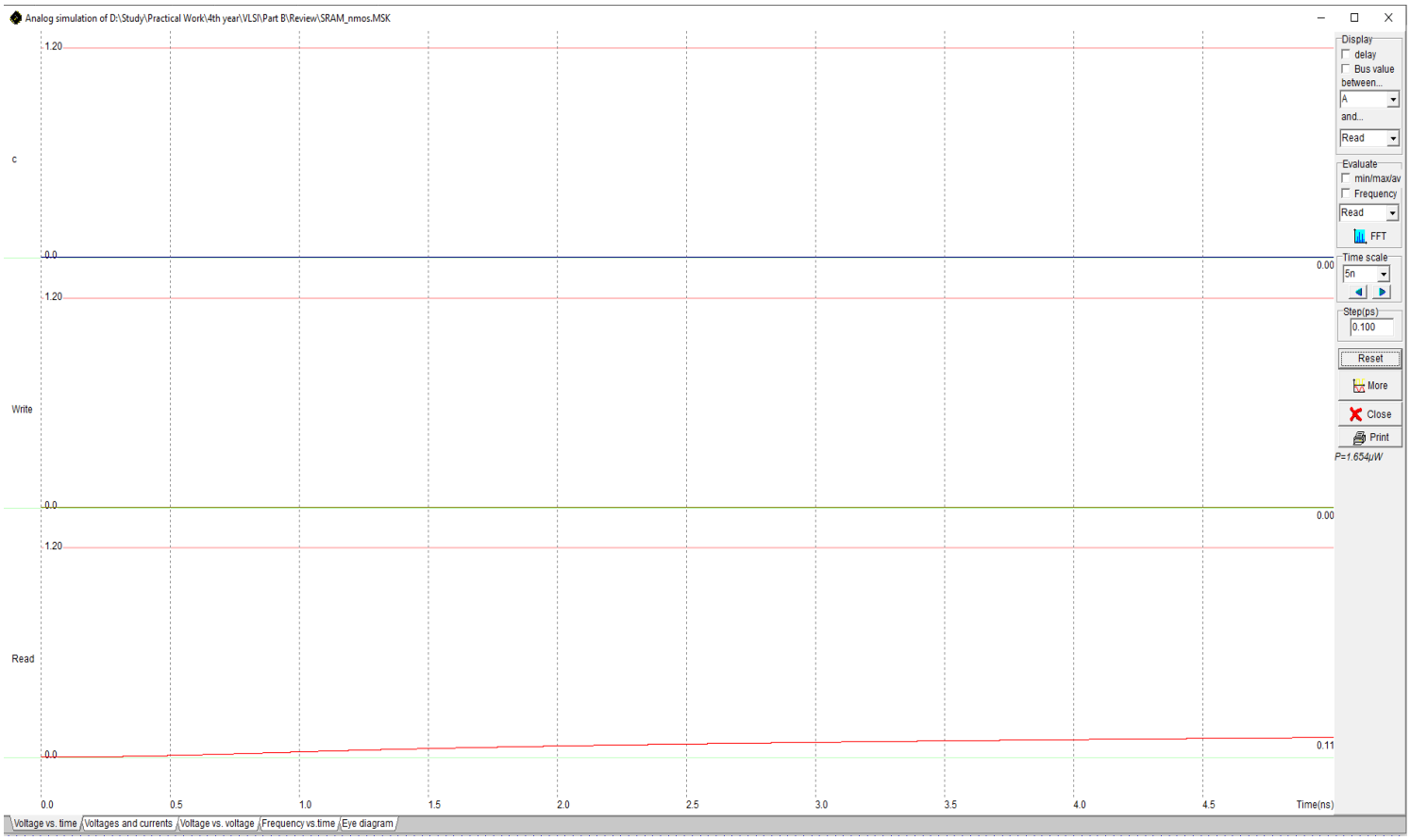
a) Read output when c = 1 and Write = 0; Read = WEAK-1



b) Read output when c = 1 and Write = 1; Read = STRONG-0

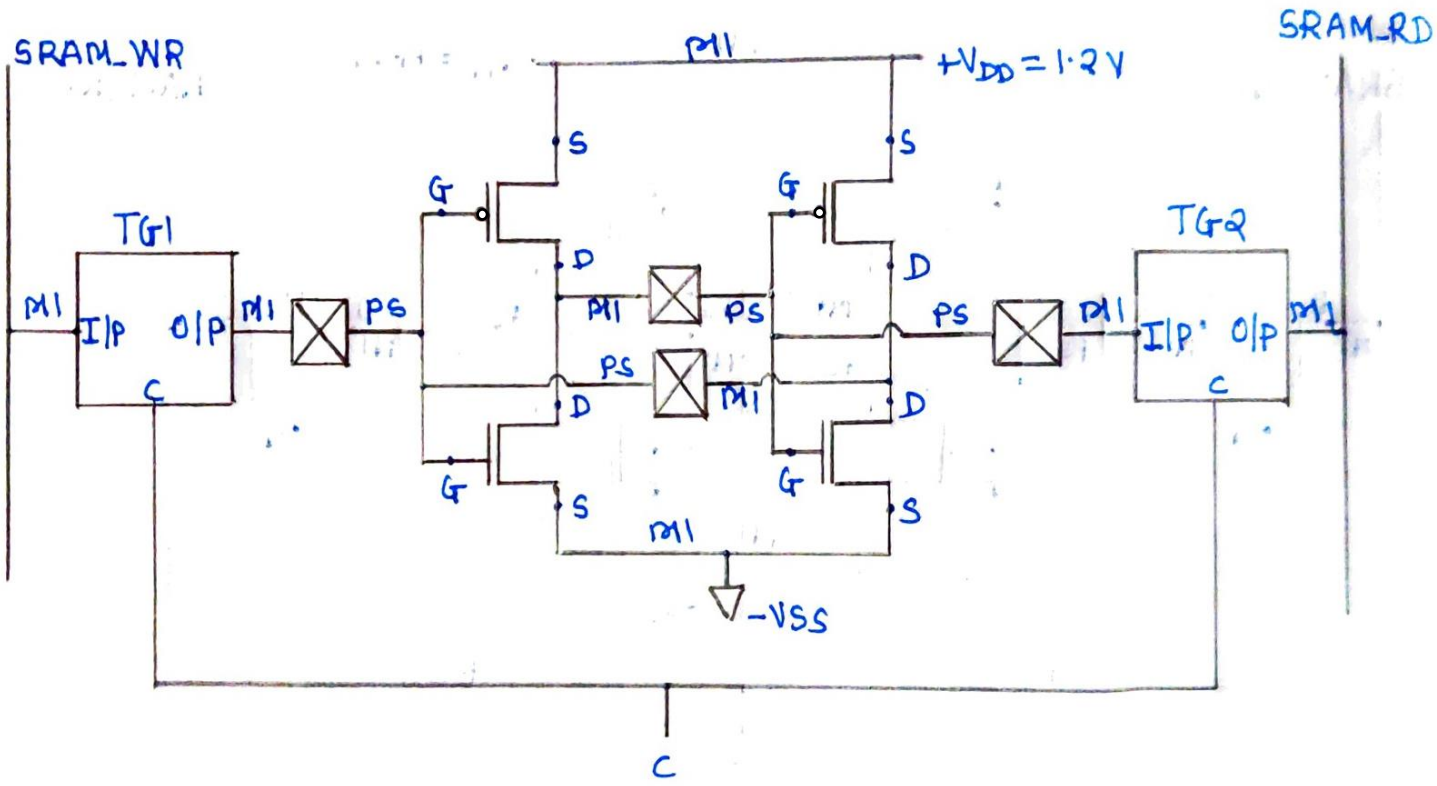


c) Read output when c = 0 and Write = 0; Read = HOLD



Theory:

3.b)- 1-bit SRAM cell using TG switches.

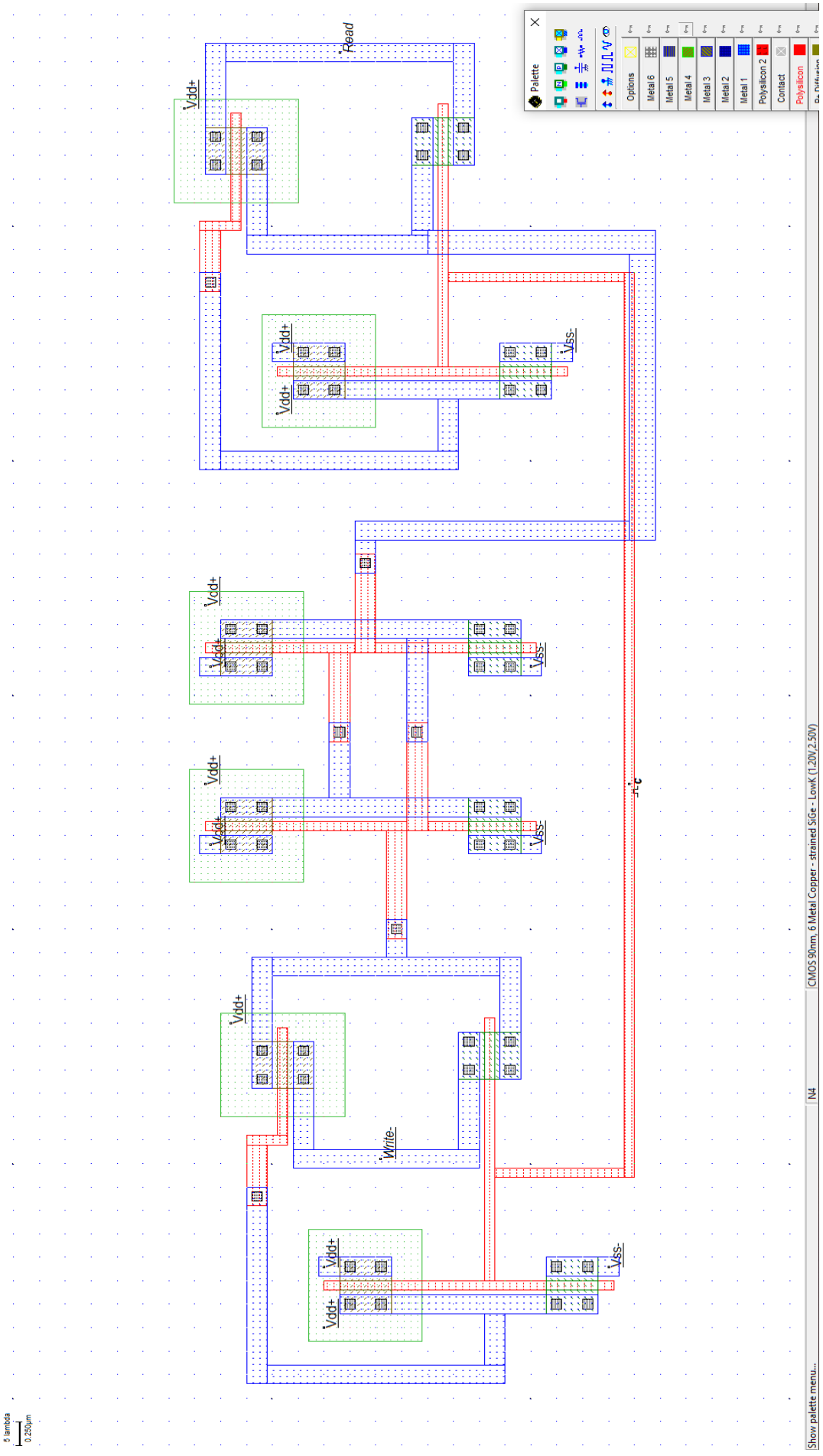


TG1, TG2 : Transmission Gate switches

Function Table.

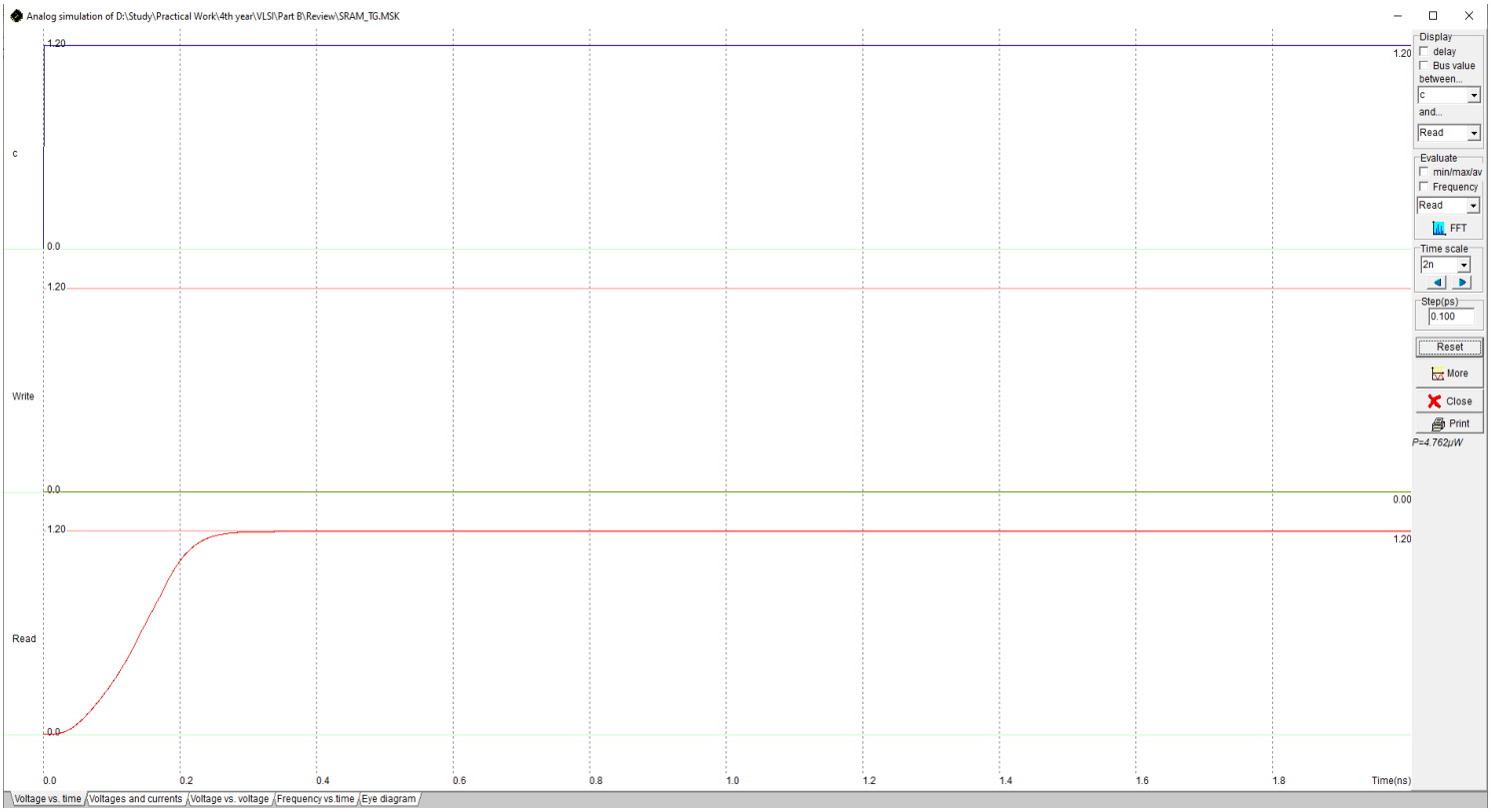
C	SRAM_WR	SRAM_RD
1	0	STRONG-1
1	1	STRONG-0
0	X	0/HOLD

LAYOUT

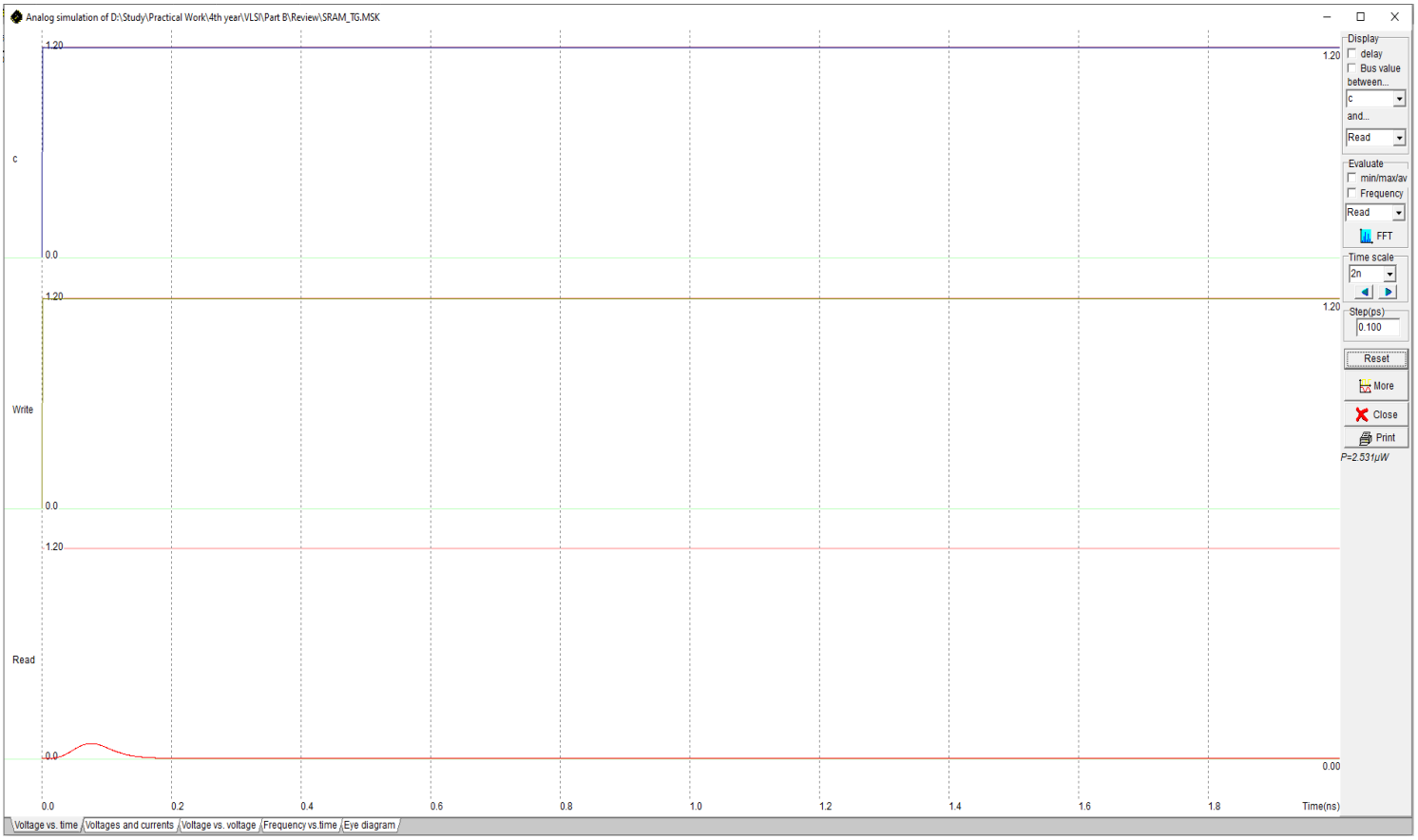

Palette
Options
Metal 6
Metal 5
Metal 4
Metal 3
Metal 2
Metal 1
Polysilicon 2
Contact
Polysilicon
Read
Write
Vdd+
Vss-
5 lambda
0.250µm
Show palette menu...
N4
CMOS 90nm, 6 Metal Copper - strained SiGe - LowK (1.20V,2.50V)

Waveforms

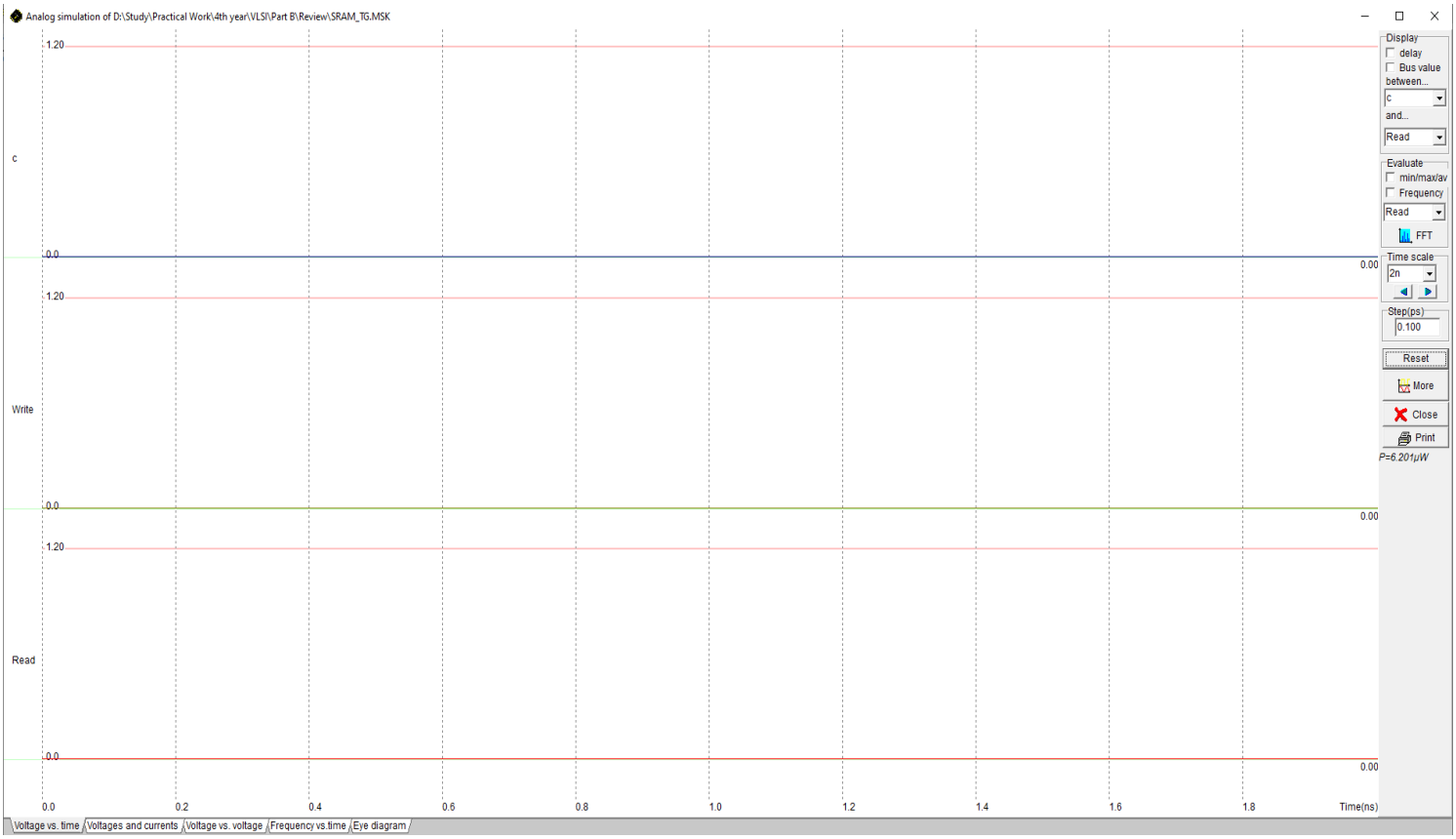
a) Read output when c = 1 and Write = 0; Read = STRONG-1



b) Read output when c = 1 and Write = 1; Read = STRONG-0



c) Read output when c = 0 and Write = 0; Read = HOLD



Conclusion:

Thus we have :

1) Drawn the LAYOUT for 1-bit SRAM Cell using 2 CMOS Inverters and 2 NMOS Transistors for switching purpose, using 90 nm Foundry.
2) Simulated the LAYOUT to observe waveforms & verified its functionality as per TRUTH-TABLE.
3) Observed the inability of NMOS to provide STRONG 1 at the output.
4) To avoid the WEAK-1/WEAK-0 outputs while using NMOS and PMOS Switches respectively, replacing them with TG Switches gives STRONG-1 and STRONG-0 at the Read Line.
5) The only drawback of this circuit is that a complemented value of the data written is read.