kh. Jardin Zubair Nafis. ID: 19301007 } 350-Lab01

Last 3 digit of ID = 007

OR

V_A	V_B	V_{R_1} (mV)	V_{R_2} (mV)	I_{R_1}	I_{R_2}	$V_R = Y$
5	5	0.16	0.16	2.2×10^{-3}	2.2×10^{-5}	4.44
0	5	0	0.31	-4.4×10^{-12}	4.4×10^{-5}	4.425
5	0	0.31	0	4.4×10^{-5}	-4.4×10^{-12}	4.425
0	0	0	0	1.19×10^{-20}	1.19×10^{-20}	1.38×10^{-15}

AND

V_A	V_B	V_{R_1} mV	V_{R_2} mV	I_{R_1}	I_{R_2}	$V_R = Y$
5	5	0	0	5×10^{-12}	5×10^{-12}	5
0	5	0.31	0	4.43×10^{-5}	9.44×10^{-12}	0.57
5	0	0	0.31	9.44×10^{-12}	-4.43×10^{-5}	0.57
0	0	0.16	0.16	-2.20×10^{-5}	-2.22×10^{-5}	0.56

NOT

V_i	V_{R_1}	V_{R_2}	V_{RC}	I_1	I_2	I_B	I_C	Y
5	4.30	5.70	4.89	0.00028	57×10^{-5}	0.00022	0.0022	0.1087
0	0.652	9.35	0	4.35×10^{-5}	4.35×10^{-5}	3.19×10^{-5}	1.79×15^{11}	5

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① If we only apply high volt for both input, we will get high output. Otherwise, we will not get high output for AND circuit.

② Yes, The Diodes D_1 and D_2 will work, if $V_A = V_B = 6V$ and $V_R = 5V$. [from proteus]

③ Here, R_2 controls I_B which is base current. It is used to limit the base current to ON the diode

④ if $V_i = 0V$, $\therefore i_B = i_C = i_E = 0$

As it is Inverter, $V_o = 5V$

from Lab, $V_{BE} = V_B - V_E = 0.652 < 0.7$

Again, $V_{BC} = V_B - V_C = 0.652 - 5$ [$\because V_C = 5V$]

$= -4.53 < 0.5V$

So, it is in cutoff.

for $V_i = 5$, from Lab. $V_B = 0.703 \approx 0.8$

$V_C = 0.108 \approx 0.2$

$\because V_E = 0 \quad \therefore V_{BE} \approx 0.8, \; V_{CE} \approx 0.2.$

So, which is Saturation and $V_o = 0.1087$

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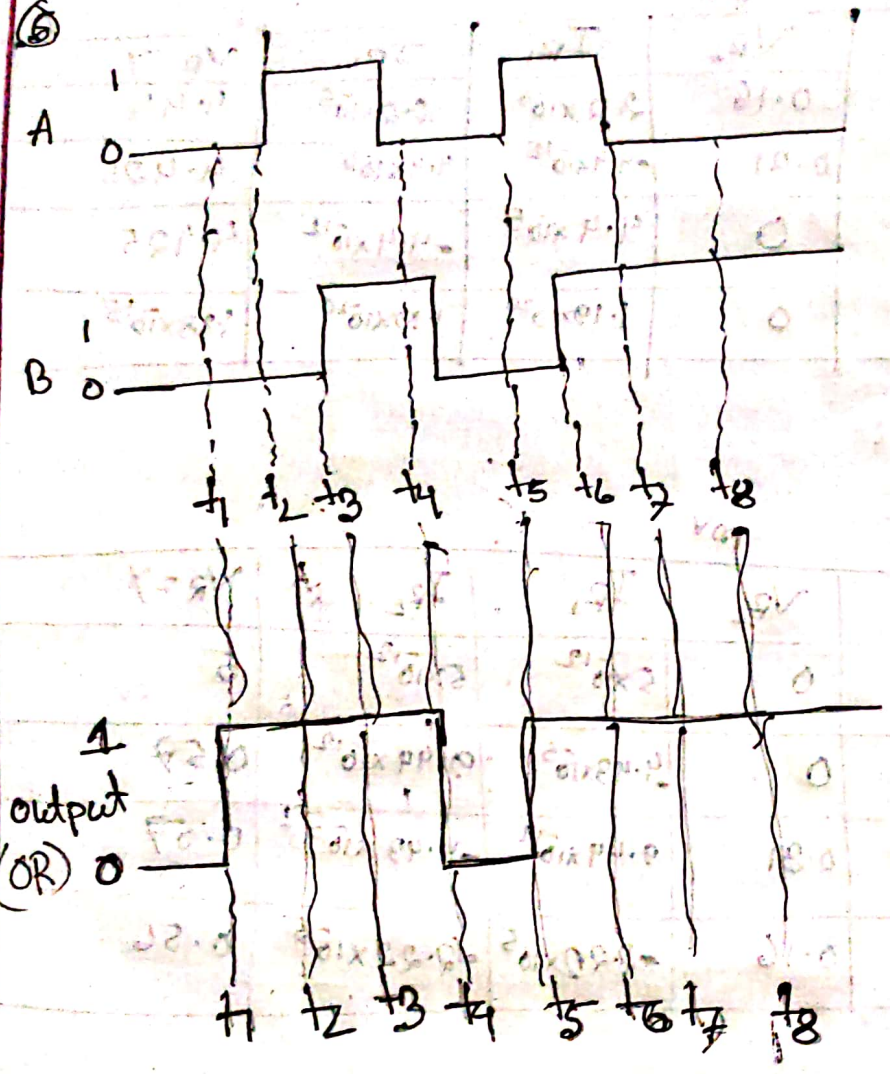
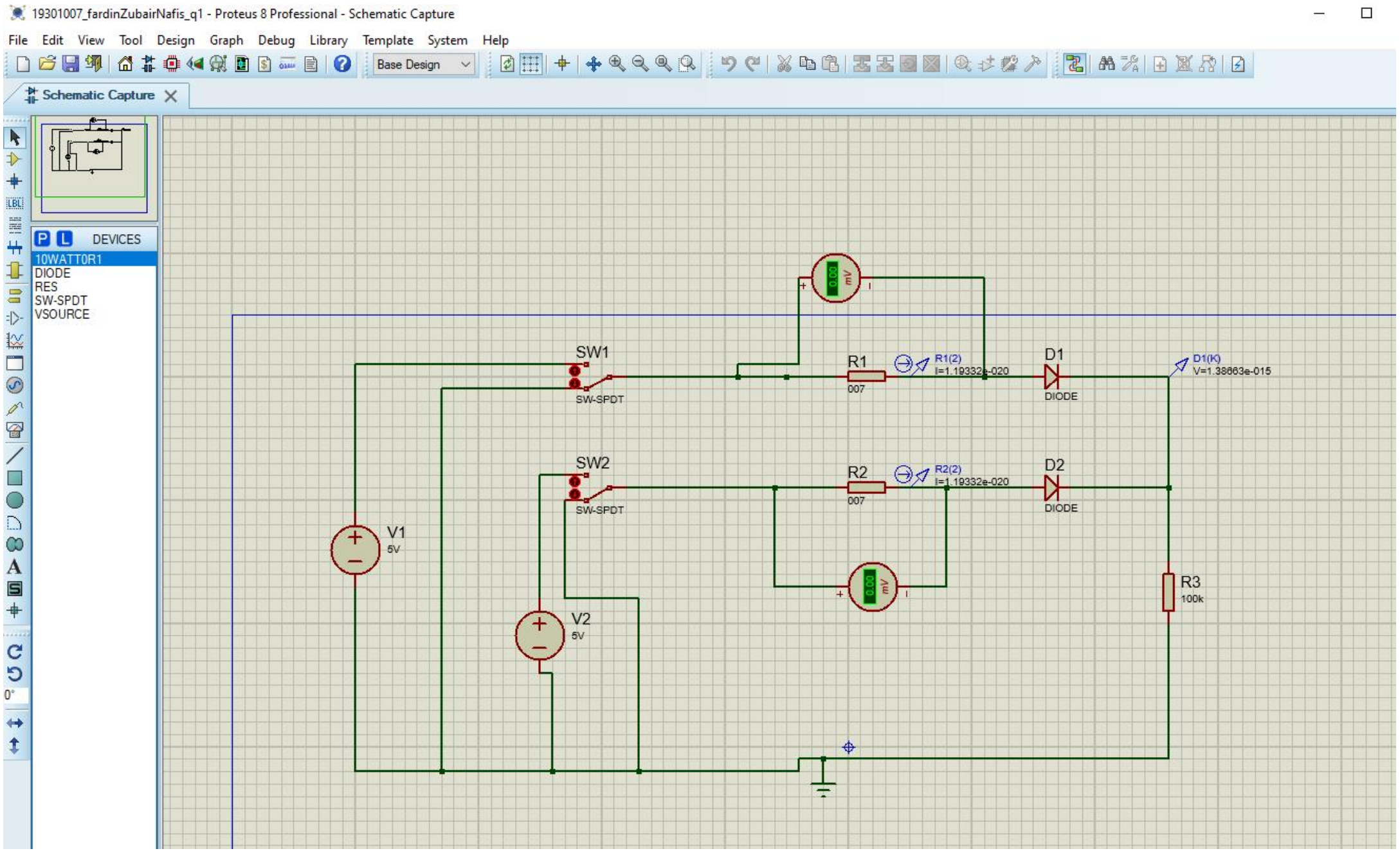
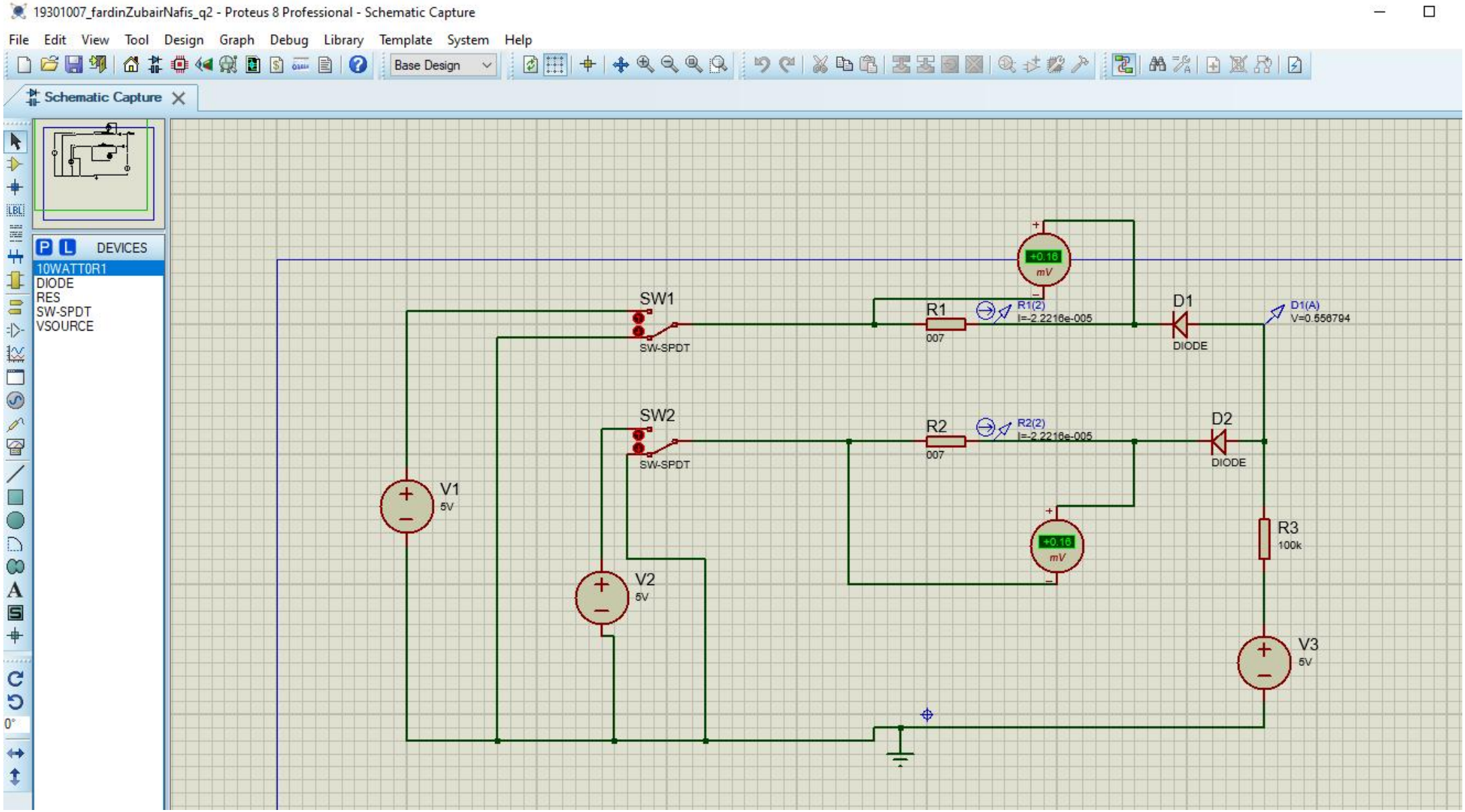
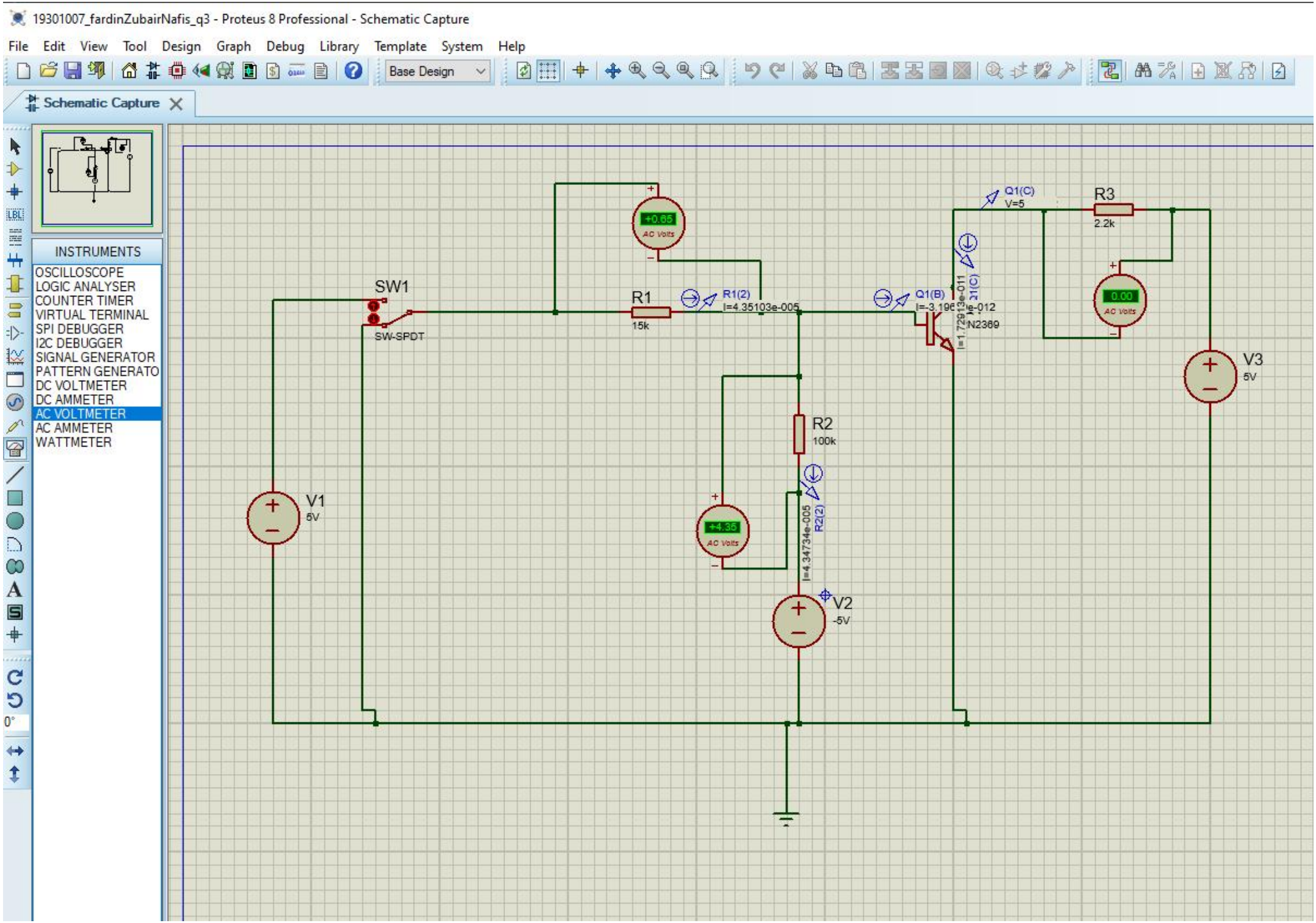
(b)




19301007_fardinZubairNafis_q1 - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
DEVICES
10WATT0R1
DIODE
RES
SW-SPDT
VSOURCE
SW1
SW-SPDT
R1
007
R1(2)
I=1.19332e-020
D1
DIODE
D1(K)
V=1.38663e-015
SW2
SW-SPDT
R2
007
R2(2)
I=1.19332e-020
D2
DIODE
R3
100k
V1
5V
V2
5V


19301007_fardinZubairNafis_q2 - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
DEVICES
10WATT0R1
DIODE
RES
SW-SPDT
VSOURCE
SW1
SW-SPDT
SW2
SW-SPDT
V1
5V
V2
5V
V3
5V
R1
007
R1(2)
I=-2.2216e-005
R2
007
R2(2)
I=-2.2216e-005
R3
100k
D1
DIODE
D1(A)
V=0.556794
D2
DIODE
+0.16
mV
+0.16
mV


19301007_fardinZubairNafis_q3 - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
INSTRUMENTS
OSCILLOSCOPE
LOGIC ANALYSER
COUNTER TIMER
VIRTUAL TERMINAL
SPI DEBUGGER
I2C DEBUGGER
SIGNAL GENERATOR
PATTERN GENERATO
DC VOLTMETER
DC AMMETER
AC VOLTMETER
AC AMMETER
WATTMETER
SW1
SW-SPDT
R1
15k
R1(2)
I=4.35103e-005
R2
100k
R2(2)
I=4.34734e-005
R3
2.2k
Q1(C)
V=5
Q1(B)
2N2369
V1
5V
V2
-5V
V3
5V
+0.65
AC Volts
+4.35
AC Volts
0.00
AC Volts
0°