

Lab - Assignment - 4

Name

Imam Hossain

ID

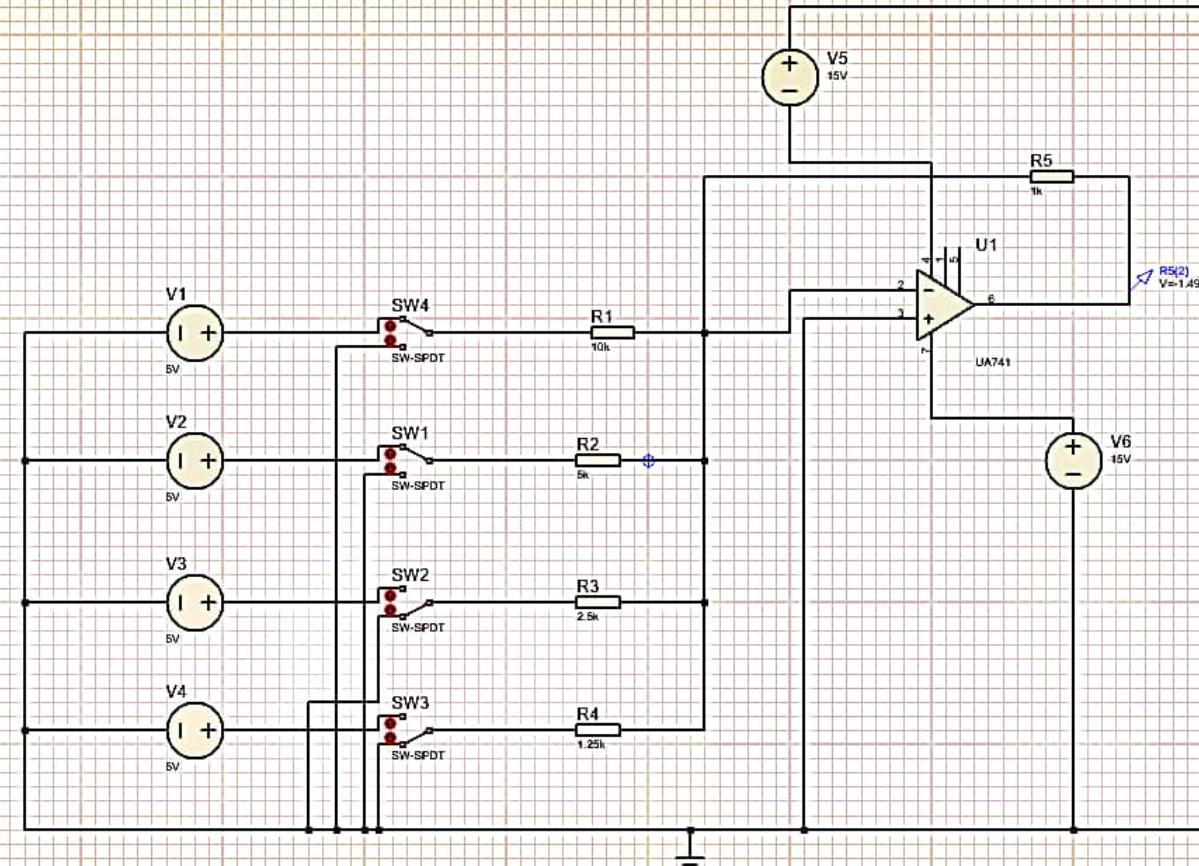
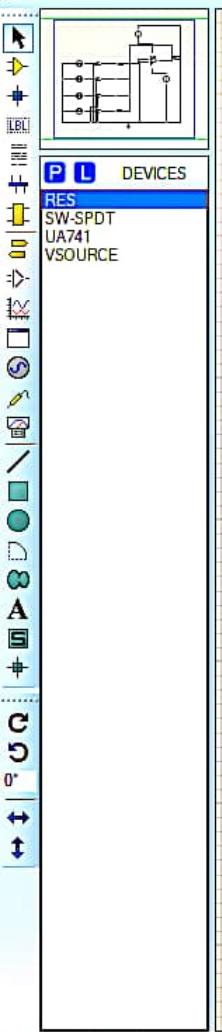
18301276

Section:

07



Schematic Capture X



-1200.0

+1400.0

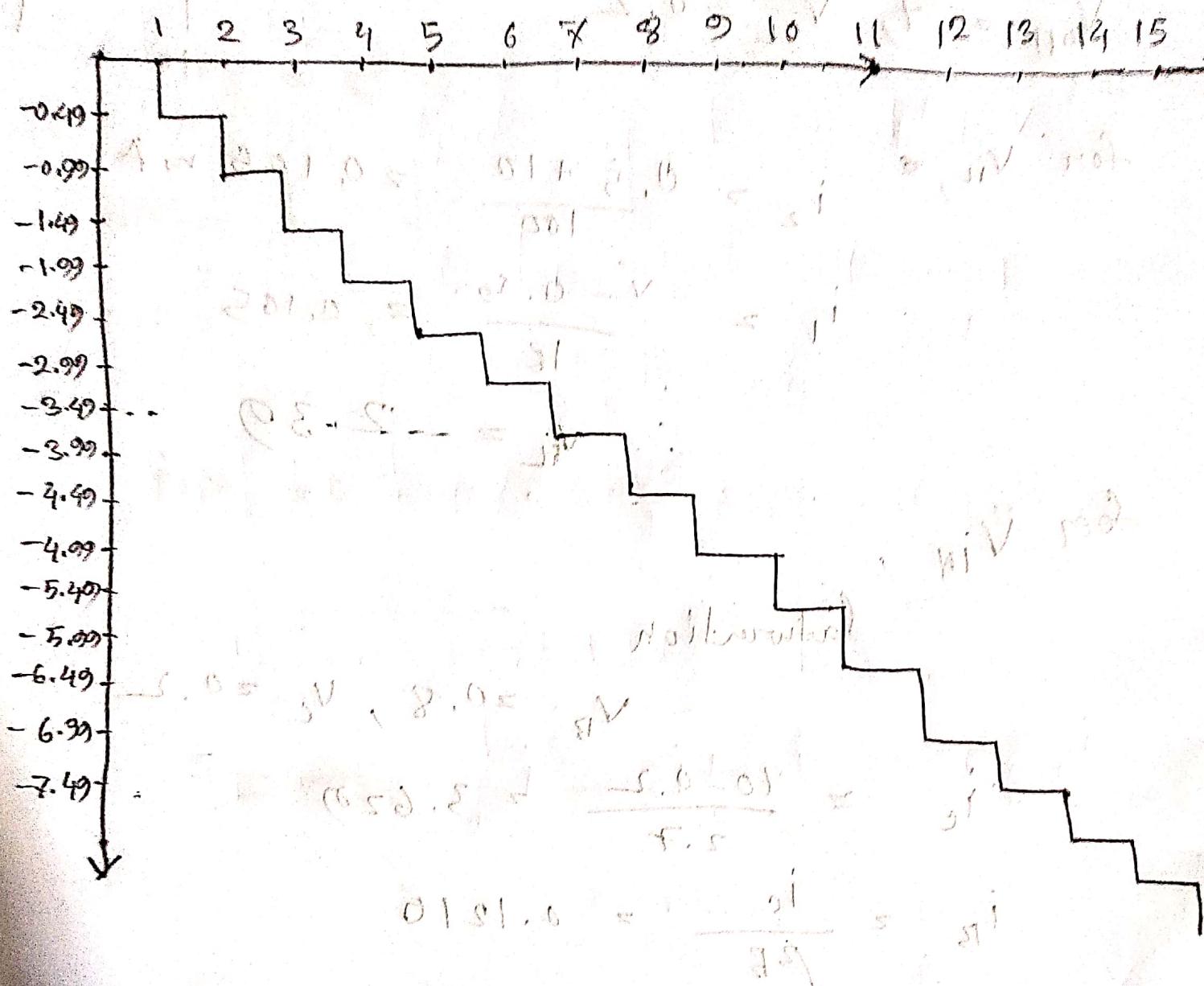
No Messages

Root sheet 1

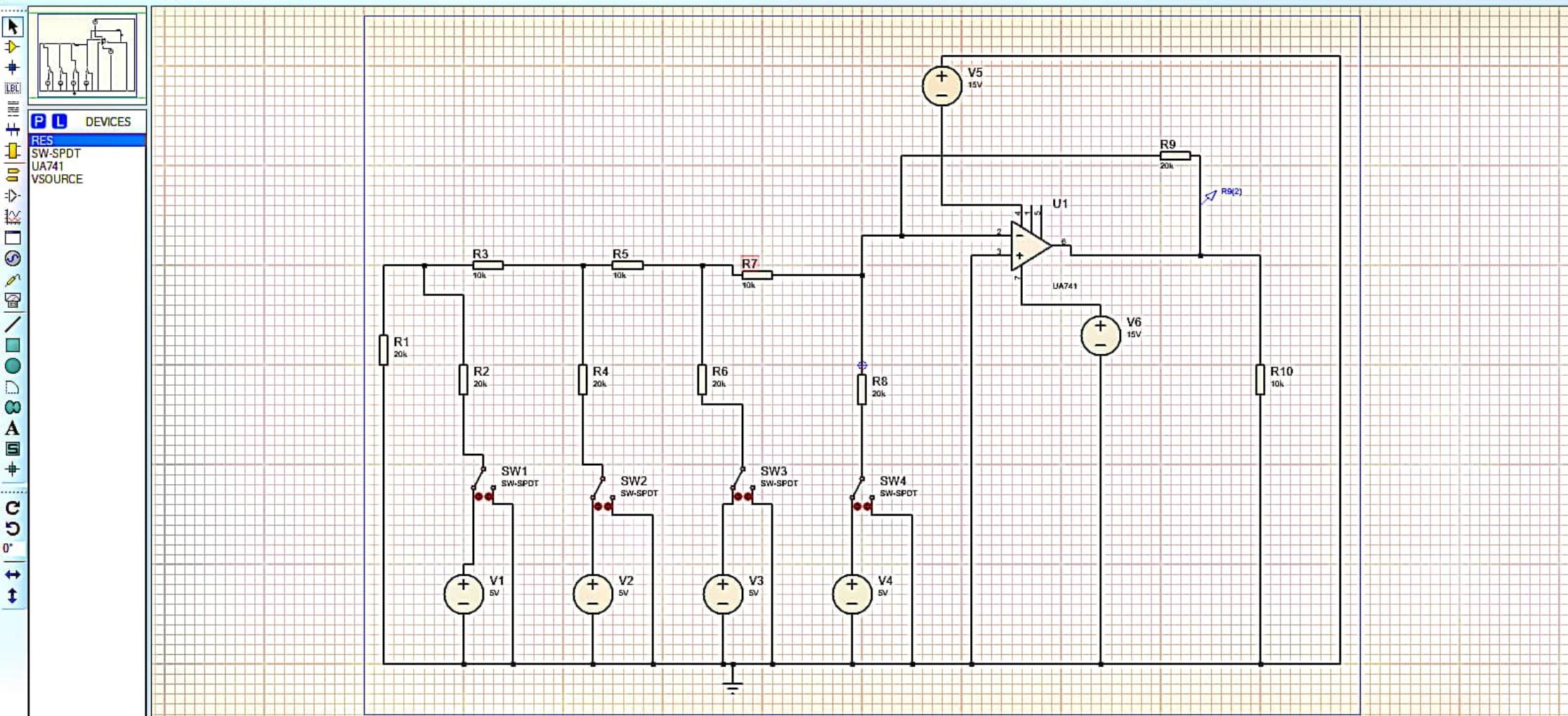
Datasheet for Circuit 1:

Input Configuration	D	A	B	C	Output Voltage, V _o (V)
1	0	0	0	0	0.0027
2	0	0	1	0	-0.4973
3	0.100	0.0	0.5	0	-0.9972
4	0	0	0.5	0.5	-1.4972
5	0	0.5	0	0	-1.9974
6	0.500	0.5	0	0.5	-2.4971
7	0.500	0.5	0.5	0	-2.9971
8	0	0.5	0.5	0.5	-3.4971
9	0.5	0.5	0	0	-3.9969
10	0.5	0	0	0.5	-4.4968
11	0.5	0	0.5	0	-4.9968
12	0.5	0	0.5	0.5	-5.4968
13	0.5	0.5	0	0	-5.9967
14	0.5	0.5	0	0.5	-6.4967
15	0.5	0.5	0.5	0	-6.9969
16	0.5	0.5	0.5	0.5	-7.4969

11-1830127.6



Graph: Input-Output graph of Circuit 1



No Messages

COMPONENT R7. Value=10k, Module=<NONE>. Device=RES, Package=RES40

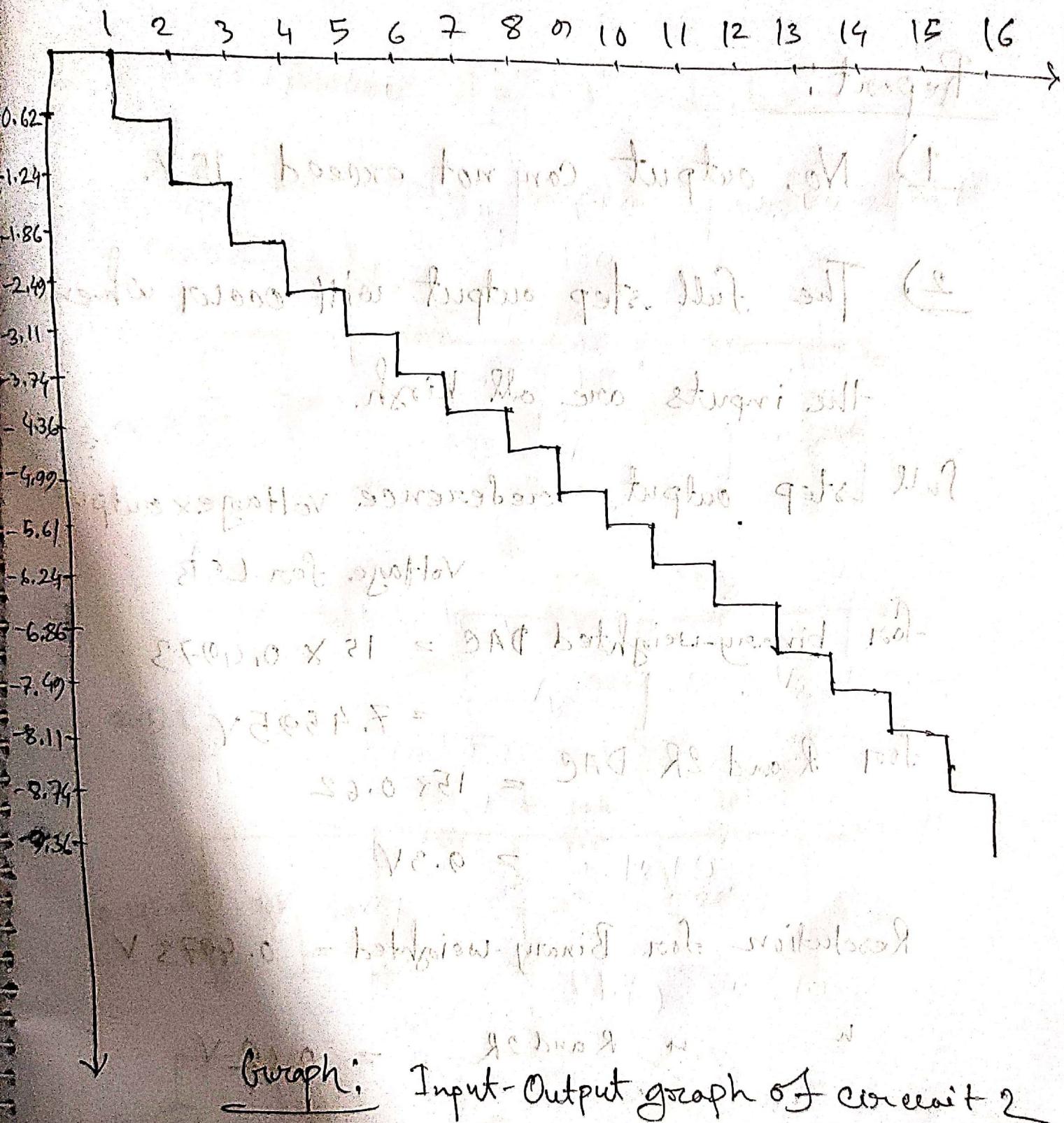
-1100.0

+1000.0 th

Datasheet for Circuit 2:

Input Configuration	D	C	B	A	Output Voltage, V _o (V)
1	0	0	0	0	0.0049
2	0	0	0	5	-0.6250
3	0	0	5	6	-1.2450
4	0	0	5	5	-1.8699
5	0	5	0	0	-2.4949
6	0	5	0	5	-3.1199
7	0	5	5	6	-3.7449
8	0	5	5	5	-4.3699
9	5	0	0	0	-4.9949
10	5	0	0	5	-5.6199
11	5	0	5	0	-6.2448
12	5	0	5	5	-6.8698
13	5	5	0	0	-7.4947
14	5	5	0	5	-8.1198
15	5	5	5	0	-8.7447
16	5	5	5	5	-9.36972

#18301276



Pevitin®

Report:

- 1) No, output can not exceed 15 V.
- 2) The full step output will occur when the inputs are all high.

full step output = reference voltage \times output

Voltage for LSB

for binary-weighted DAC = 15×0.4973

= 7.4595 V

for R and 2R DAC = 15×0.62

= 9.3 V

Resolution for Binary-weighted = 0.4973 V

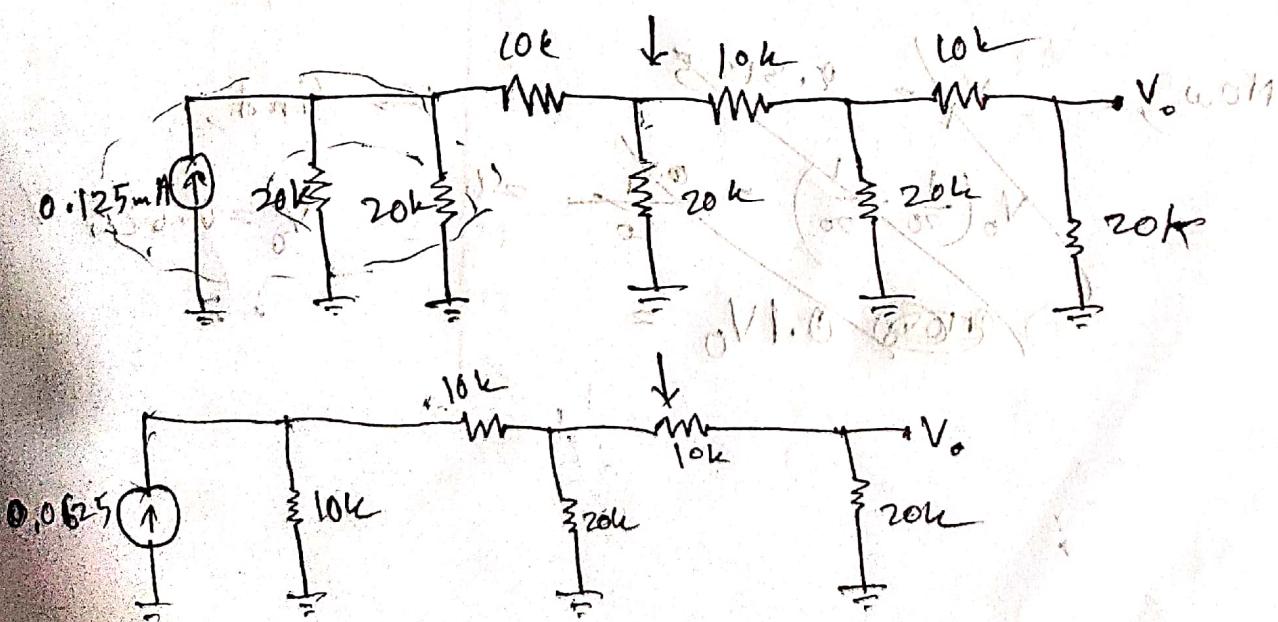
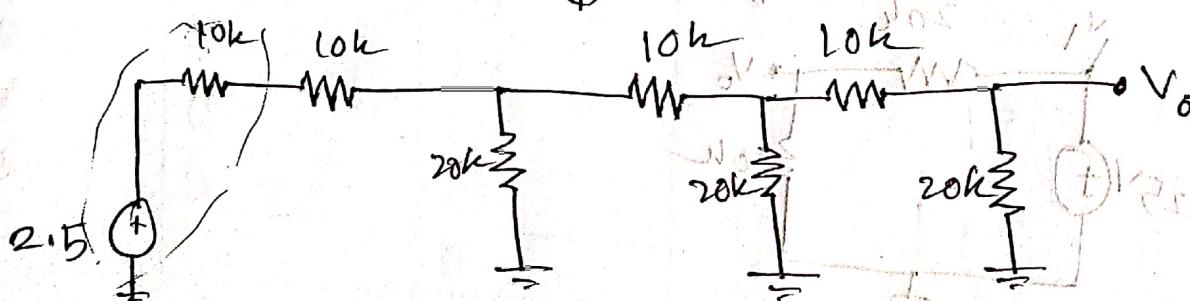
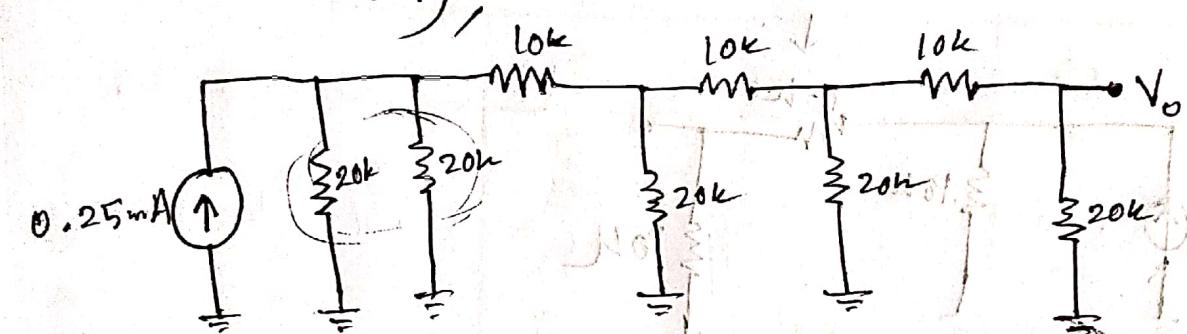
n bits R and 2R = 0.62 V

(approx. output range)

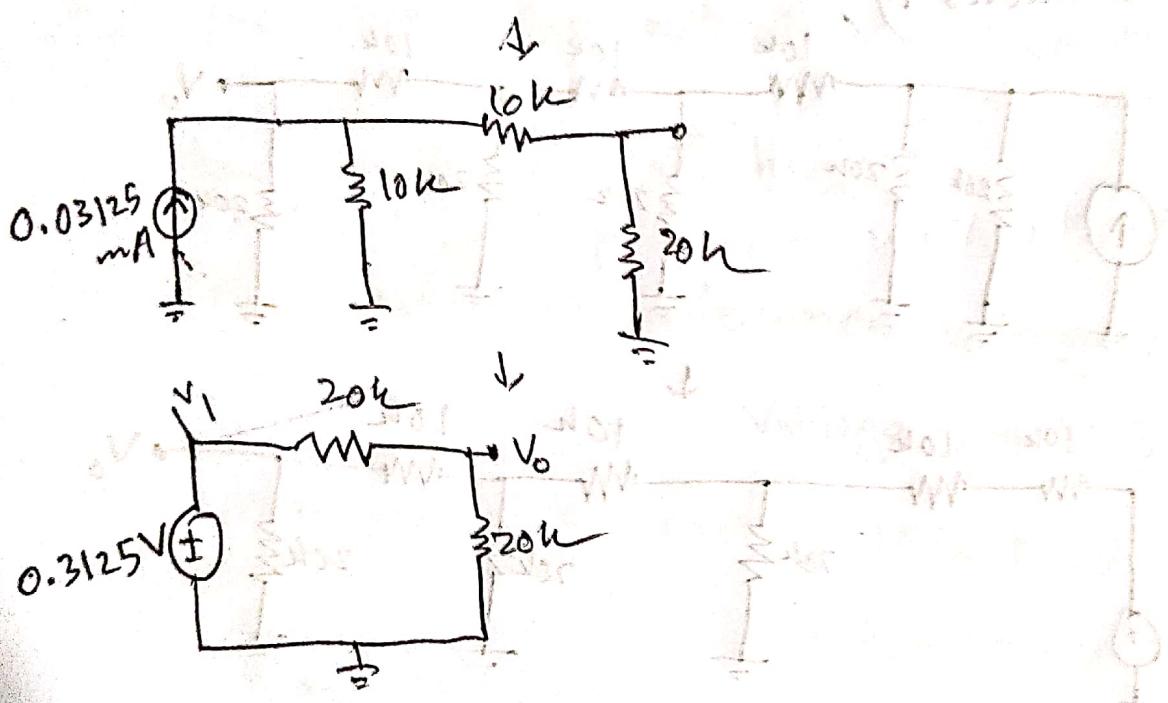
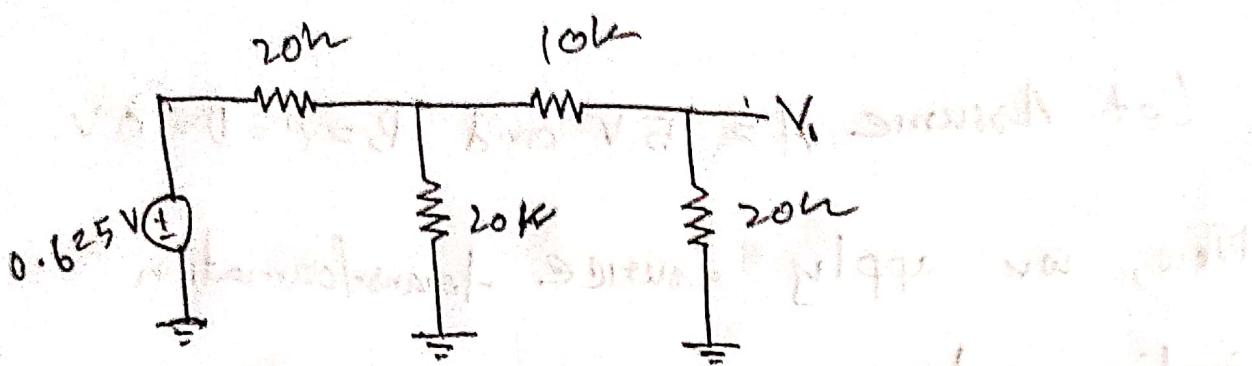
= 0.62 V

3) Let Assume $A = 5V$ and $B = C = D = 0V$

Now, we apply source transformation
continuously,



#18301275



Now, $M = 0.3125$

$V_o \left(\frac{1}{20} + \frac{1}{20} \right) - \frac{0.1V_o}{20} = 20$

$\Rightarrow 0.1V_o = 0.625V$

We find,

$$V_o = 0.625V$$

#18301276

4)

$$7+6 = 13$$

Data table: Using circuit 2

Input configuration	D	C	B	A	V _o
1	0	0	0	0	0.0049
2	0	0	0	13	-1.62
3	0	0	13	0	-3.245
4	0	0	13	13	-4.869
5	0	13	0	0	-6.495
6	0	13	0	0	-8.119
7	0	13	0	13	-9.745
8	0	13	13	0	-11.369
9	13	0	13	13	-12.995
10	13	0	0	0	-13.509
11	13	0	0	13	-13.509
12	13	0	13	0	-13.509
13	13	13	13	13	-13.508
14	13	13	0	0	-13.508
15	13	13	0	13	-13.5089
16	13	13	13	0	-13.5089
				13	-13.5089

Pevitin®

#18301276

5)

$$\text{current} = \frac{V_o}{R_F}$$

so, if R_F gets increased, output voltage will also increase.

∴ Thus, step size will also increase.