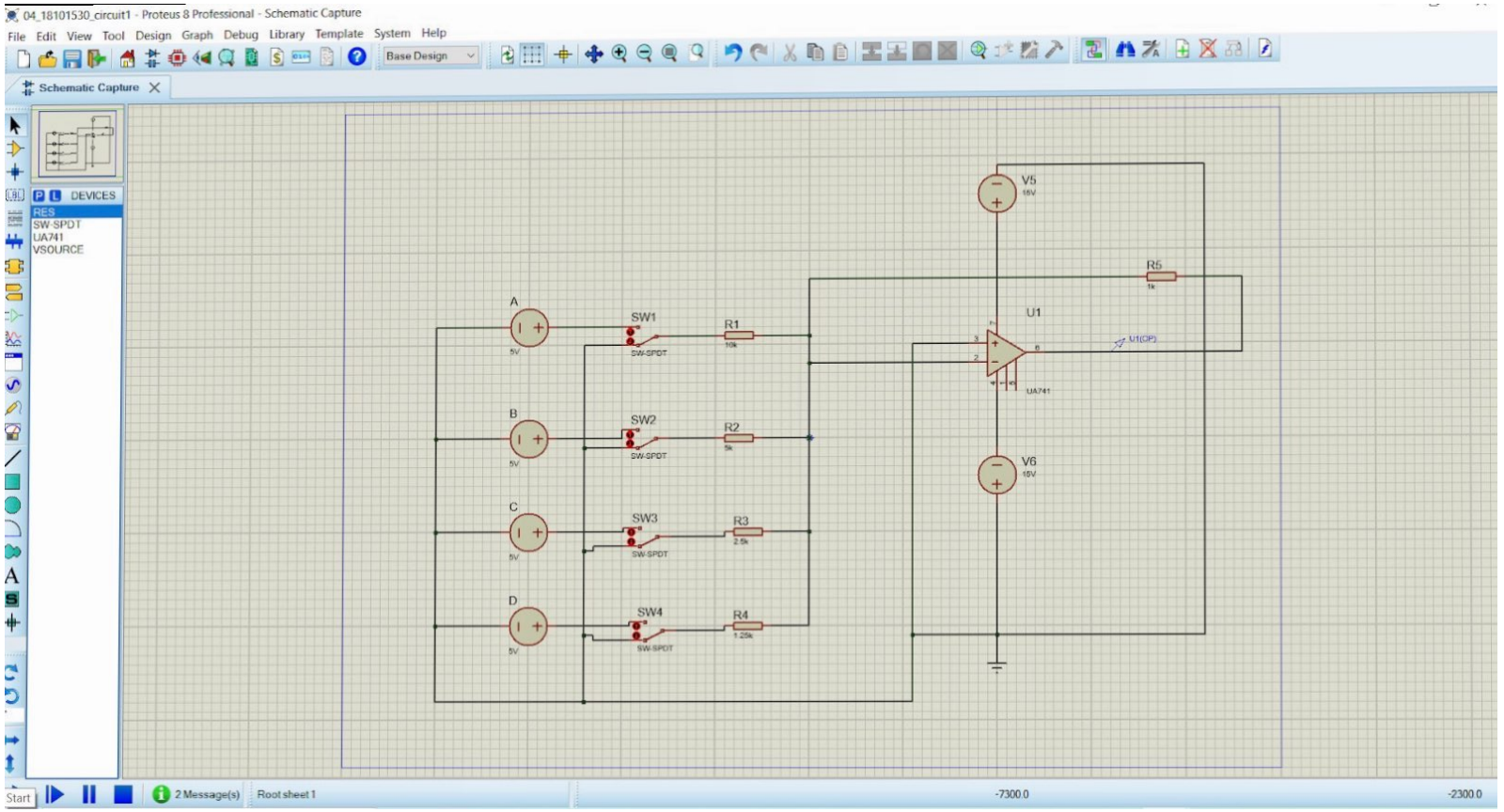
Palash Ranjan Roy

ID- 18101530

Sec - 04

CSE 350 Lab



18101530

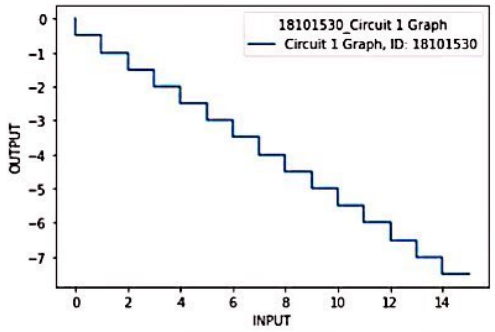
Datasheet for circuit I:

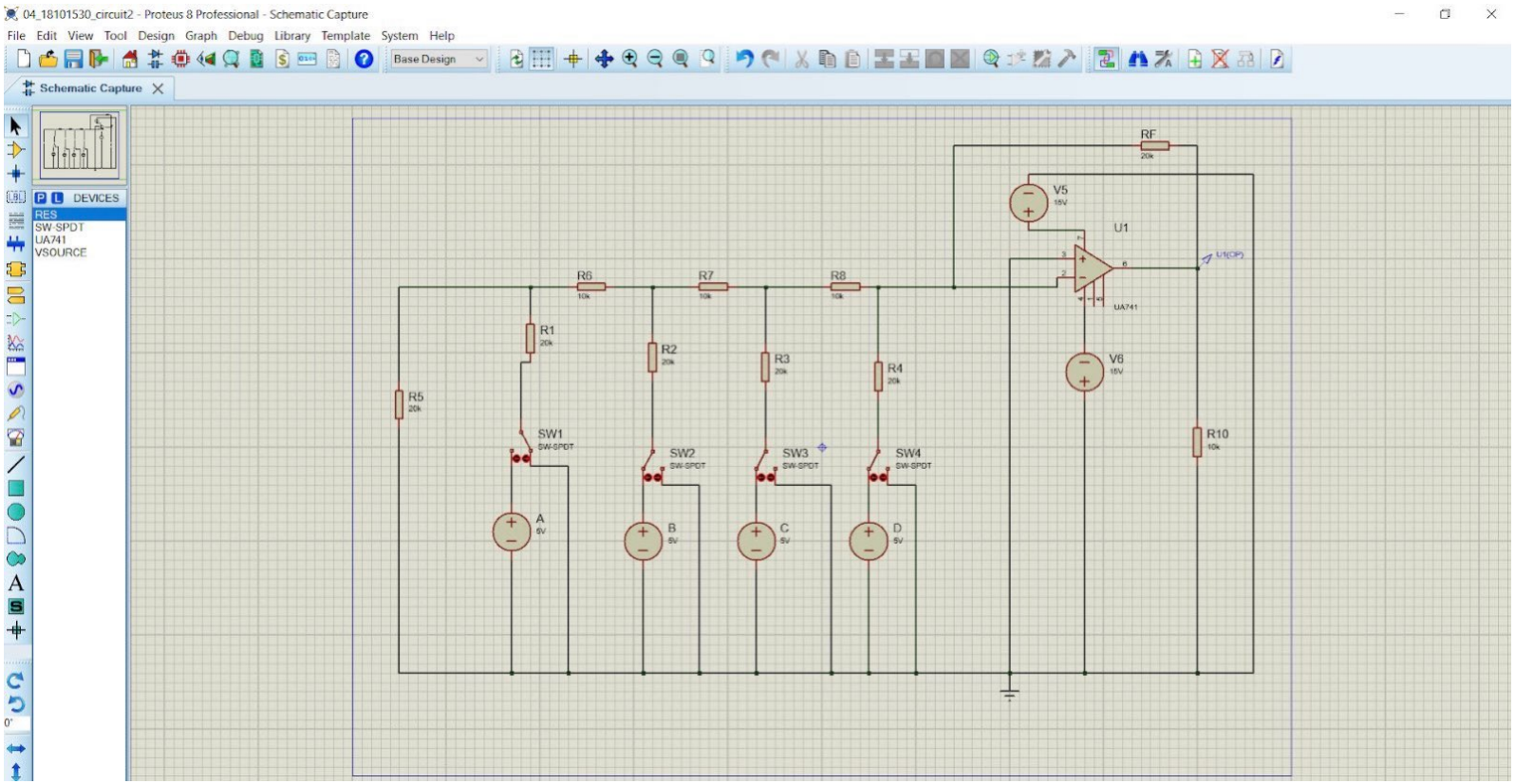
Input Configuration	D	C	B	A	Output voltage (V_0)
1	0	0	0	0	0.0027
2	0	0	0	5	-0.4973
3	0	0	5	0	-0.9972
4	0	0	5	5	-1.4972
5	0	5	0	0	-1.9971
6	0	5	0	5	-2.4971
7	0	5	5	0	-2.9971
8	0	5	5	5	-3.4971
9	5	0	0	0	-3.9969
10	5	0	0	5	-4.4968
11	5	0	5	0	-4.9968
12	5	0	5	5	-5.4968
13	5	5	0	0	-5.9967
14	5	5	0	5	-6.4967
15	5	5	5	0	-6.9967
16	5	5	5	5	-7.4966

```
import matplotlib.pyplot as plt
x=[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]
y=[0.0027,-0.4973,-0.9972,-1.4972,-1.9971,-2.4971,-2.9971,-3.4971,-3.9969,-4.4968,-4.9968,-5.4968,-5.9967,-6.4967,-6.9967,-7.4966,]

plt.step(x,y,label="Circuit 1 Graph, ID: 18101530")
plt.legend(title="18101530_Circuit 1 Graph")
plt.xlabel("INPUT")
plt.ylabel("OUTPUT")
plt.show()

#0.0027,-0.4973,-0.9972,-1.4972,-1.9971,-2.4971,-2.9971,-3.4971,-3.9969,-4.4968,-4.9968,-5.4968,-5.9967,-6.4967,-6.9967,-7.4966
#0.0049,-0.62,-1.24,-1.87,-2.49,-3.12,-3.85,-4.37,-4.99,-5.62,-6.24,-6.87,-7.49,-8.12,-8.74,-9.37
```





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Data sheet for circuit 2:

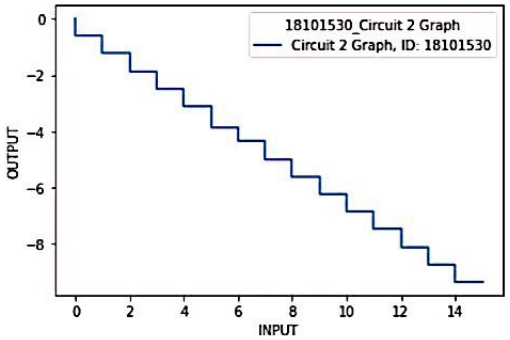
Input configuration	D	C	B	A	Output Voltage V_o(V.)
1	0	0	0	0	0.0049
2	0	0	0	5	-0.62
3	0	0	5	0	-1.245
4	0	0	5	5	-1.87
5	0	5	0	0	-2.49
6	0	5	0	5	-3.12
7	0	5	5	0	-3.74
8	0	5	5	5	-4.37
9	5	0	0	0	-4.99
10	5	0	0	5	-5.62
11	5	0	5	0	-6.24
12	5	0	5	5	-6.87
13	5	5	0	0	-7.49
14	5	5	0	5	-8.12
15	5	5	5	0	-8.74
16	5	5	5	5	-9.37

Code + Text

```
import matplotlib.pyplot as plt
x=[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]
y=[0.0049,-0.62,-1.24,-1.87,-2.49,-3.12,-3.85,-4.37,-4.99,-5.62,-6.24,-6.87,-7.49,-8.12,-8.74,-9.37]


plt.step(x,y,label="Circuit 2 Graph, ID: 18101530")
plt.legend(title="18101530_Circuit 2 Graph")
plt.xlabel("INPUT")
plt.ylabel("OUTPUT")
plt.show()

#0.0027,-0.4973,-0.9972,-1.4972,-1.9971,-2.4971,-2.9971,-3.4971,-3.9969,-4.4968,-4.9968,-5.4968,-5.9967,-6.4967,-6.9967,-7.4966
#0.0049,-0.62,-1.24,-1.87,-2.49,-3.12,-3.85,-4.37,-4.99,-5.62,-6.24,-6.87,-7.49,-8.12,-8.74,-9.37
```



Report:

1) ~~Can~~ we can not get output higher than 15V in D2A converters.

2) Full step output = reference voltage * the voltage v0 [LSB]

for Binary weight D2A,

Full ~~set~~ step output = 15 * 0.47
= 7.455

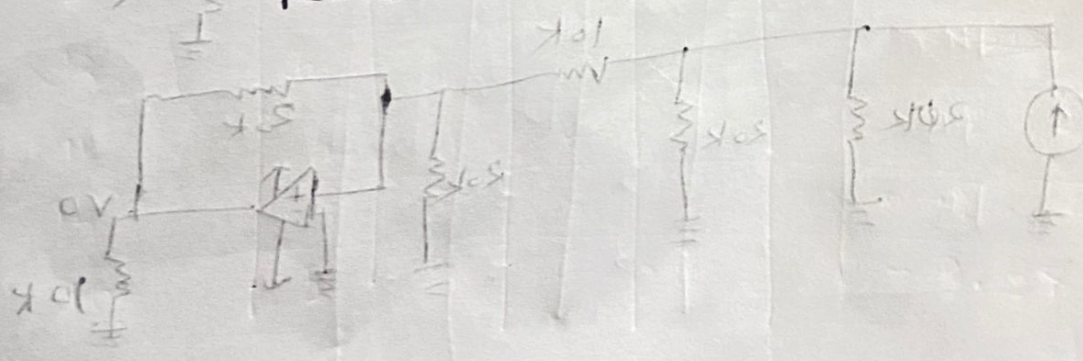
For ~~read~~ R and 2R D2A,

Full step output = 15 * 0.620
= 9.3

The resolution will be the ~~change~~ change of the output of LSB.

So, Binary weighted D2A, resolution = 0.497

R and 2R D2A, " = 0.626



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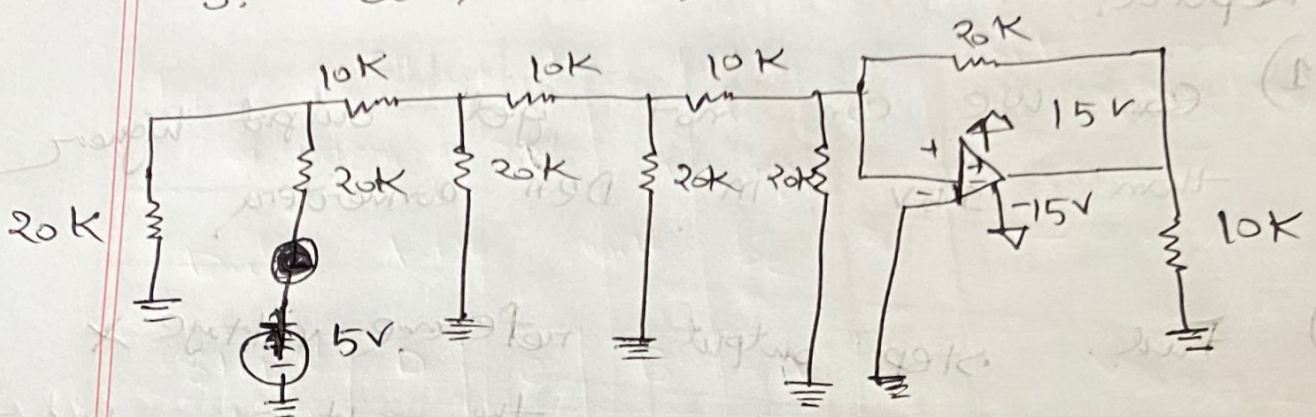
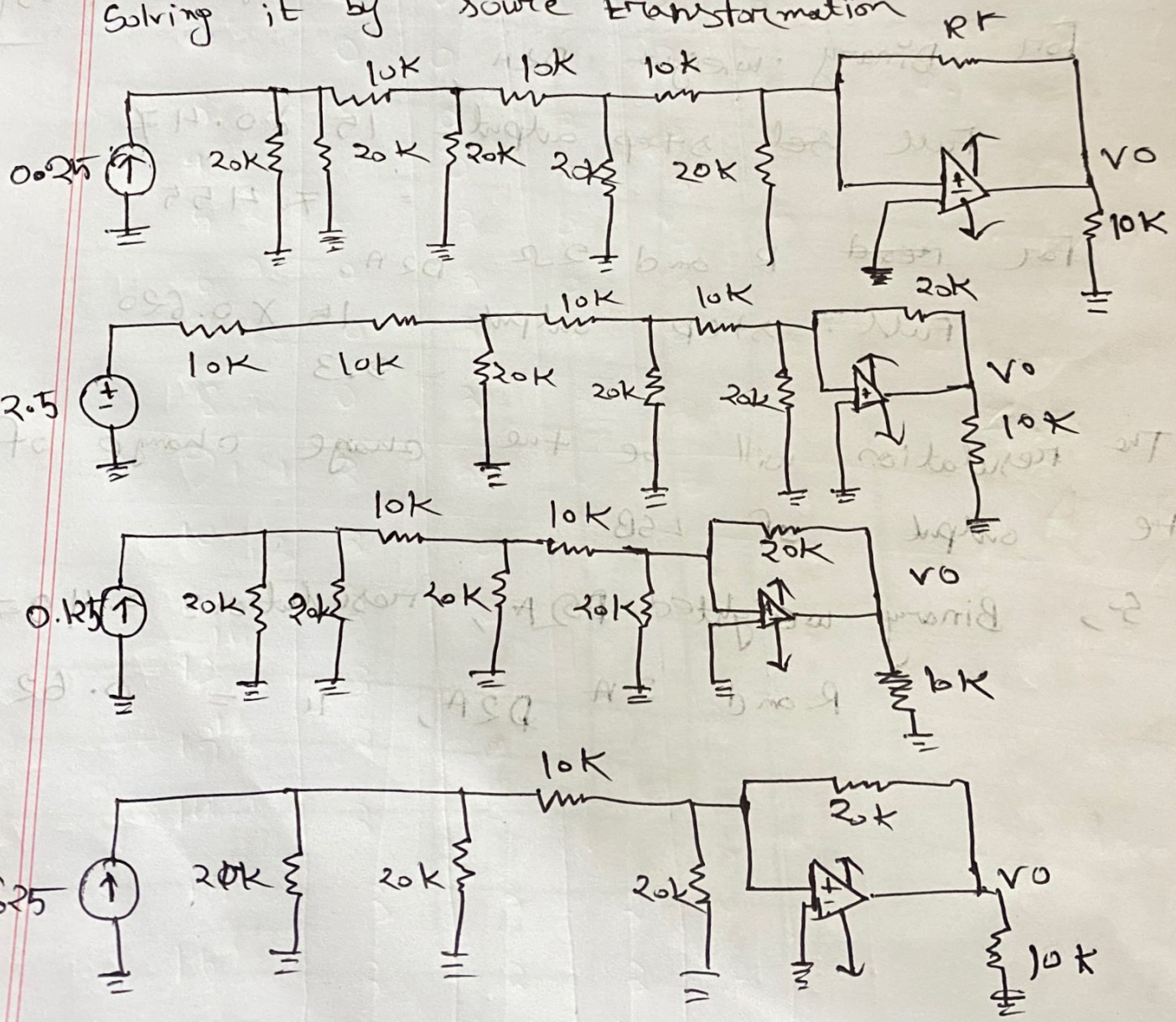
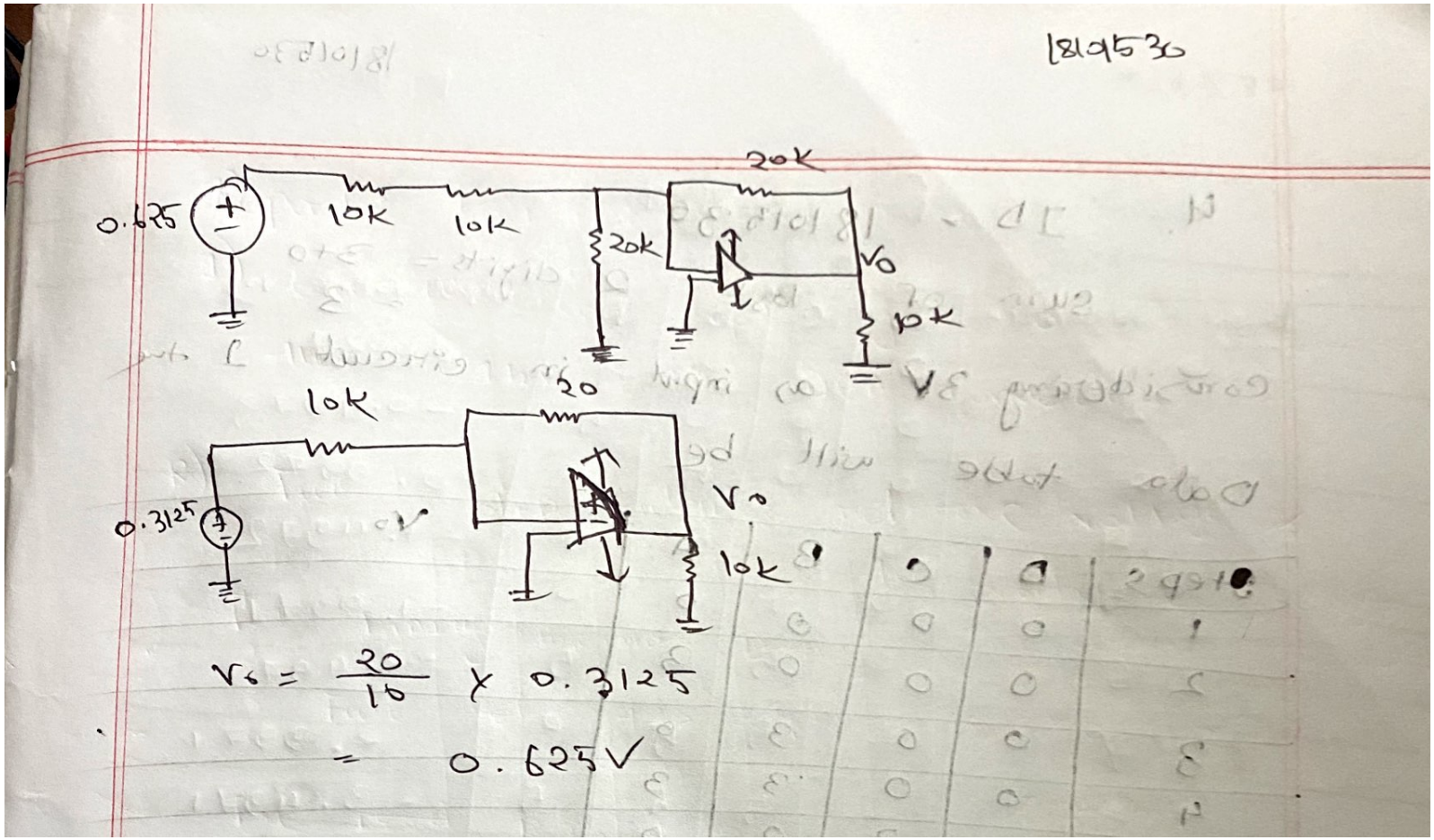
3. Let, A = 5V, B = C = D = 0V



Solving it by Soure transformation





$$V_o = \frac{20}{10} \times 0.3125$$

$$= 0.625V$$

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4. ID - 18101536

sum of last 2 digits = 3+0
= 3

Considering 3V as input in circuit 1 the Data table will be

Steps	D	C	B	A	V_o
1	0	0	0	0	0.00272
2	0	0	0	3	0.297726
3	0	0	3	0	0.597724
4	0	0	3	3	0.897238
5	0	3	0	0	1.1.972
6	0	3	0	3	1.149719
7	0	3	3	0	-1 .7971
8	0	3	3	3	-2.09716
9	3	0	0	0	-2.397021
10	3	0	0	3	-2.69770
11	3	0	3	0	-2.99699
12	3	0	3	3	-3.29698
13	3	3	0	0	-3.59694
14	3	3	0	3	-4.19691 -3.8969
15	3	3	3	0	-4.19691
16	3	3	3	3	-4.4969

5. We know, 1810530

value of current $= \frac{V_o}{RE}$

RF X value of current $= V_6$

From the above equation we can say that it is in a proportional for. If value of Feedback resistance (RF) get increased output voltage will also increased.

So, the step size will increase with the increment of RF.