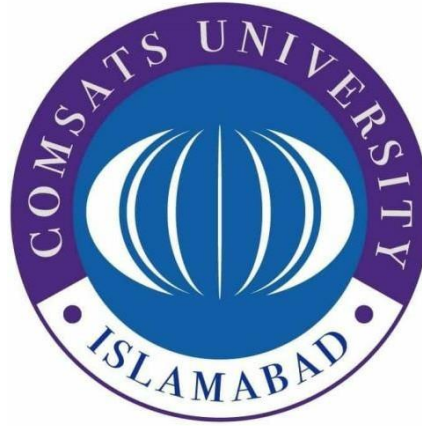


# LAB REPORT No. 02



## ECA- 1

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### SUBMITTED To:

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## Lab 02: Experimental verification of ohm's law through simulation software (LTSPICE/circuit maker)

### Objective:

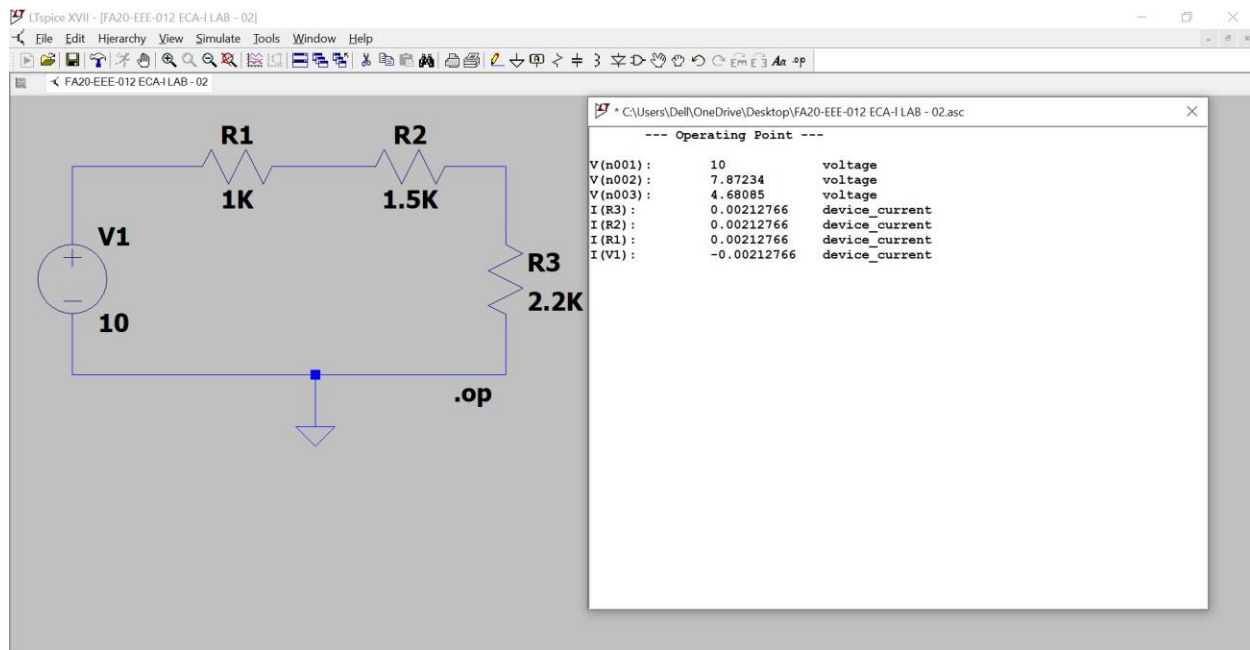
1. To verify Ohm's law experimentally and to find the relationship between voltage, current, and resistance in a circuit.
2. To learn how to create and simulate the circuits in LTSPICE.

### Equipment Required:

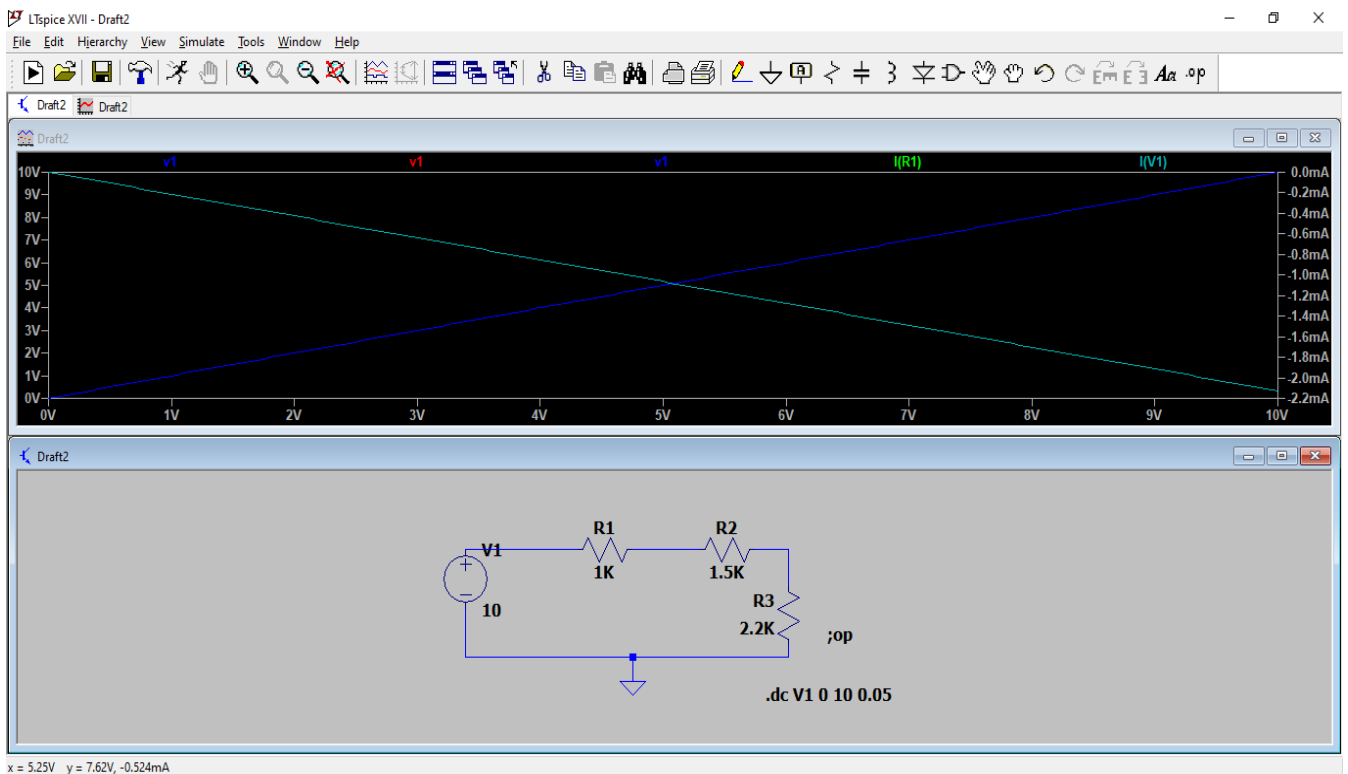
Resistors, DMM, DC power supply, breadboard and connecting wires.

## TASK - 1

### Simulating a Simple Circuit to Obtain DC Bias Point

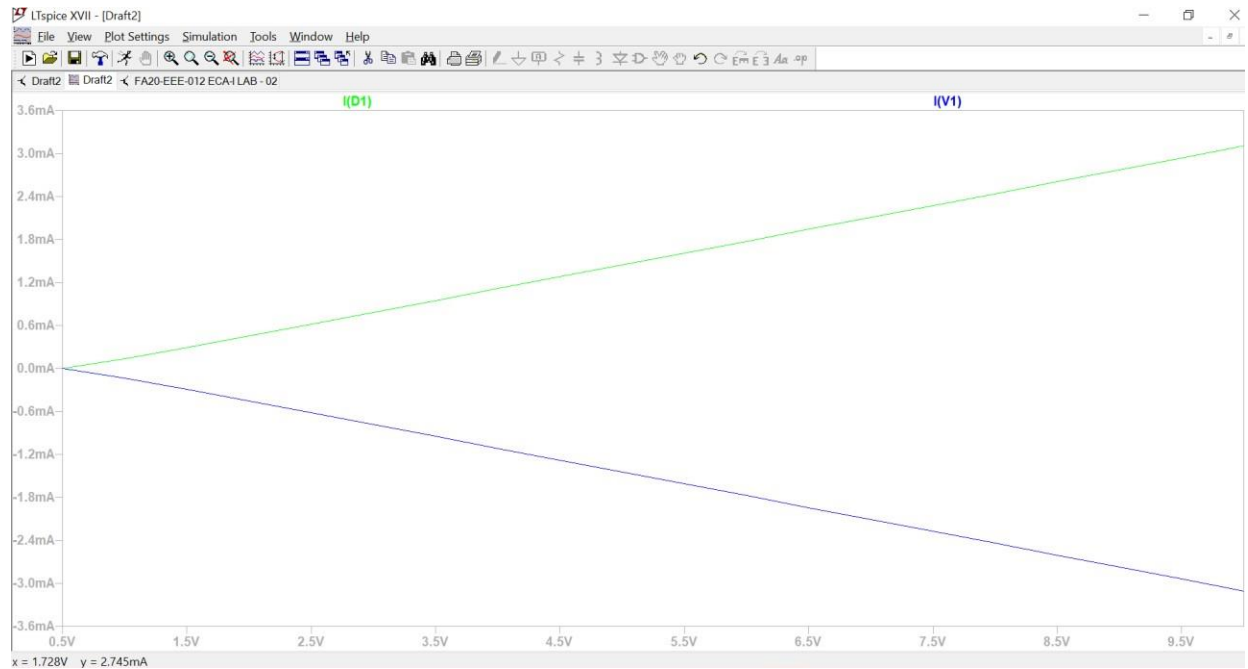
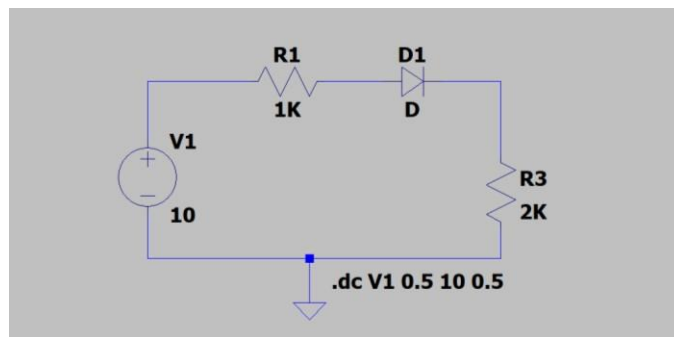


### DC SWEEP ANALYSIS:



## TASK 2

### Plotting the V-I curve of a real diode



## IN - LAB

### Measurement Section

#### Task-1

V (volts)	R = 1K $\Omega$			R = 2.2K $\Omega$			R = 5K $\Omega$		
	I (mA) Measured	I (mA) Calculated	I (mA) Simulated	I (mA) Measured	I (mA) Calculated	I (mA) Simulated	I (mA) Measured	I (mA) Calculated	I (mA) Simulated
0.5	0.539	0.5	0.5	0.28	0.22	0.22	0.118	0.1	0.1
1.0	1.02	1	1	0.47	0.45	0.45	0.212	0.2	0.2
1.5	1.45	1.5	1.5	0.70	0.68	0.68	0.294	0.3	0.3
2.0	1.948	2.0	2	0.95	0.90	0.90	0.391	0.4	0.4
2.5	2.414	2.5	2.5	1.12	1.13	0.13	0.463	0.5	0.5
3.0	2.875	3.0	3	1.40	1.40	1.40	0.585	0.6	0.6
3.5	3.35	3.5	3.5	1.61	1.61	1.61	0.679	0.7	0.7
4.0	3.792	4.0	4	1.85	1.76	1.76	0.765	0.8	0.8
4.5	4.60	4.5	4.5	2.10	2.10	2.10	0.881	0.9	0.9
5.0	5.13	5.0	5	2.31	2.31	2.31	0.985	1.0	1.0

## POST – LAB

### QUESTION- 2

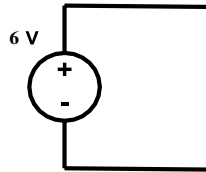
WHAT ARE ADVANTAGES OF  
LTSPICE?

#### ANSWER

- Easy to use circuit designing software.
- Used to analyses any type of circuit.
- Less time consuming and all circuits can be executed accurately.
- Also provide graphical representation of circuits as well.

### QUESTION 2 (b)

What would happen if a wire having no resistance at all ( $0\ \Omega$ ) was connected directly across the terminals of a 6 volt battery? How much current would result, according to Ohm's Law?



#### ANSWER

According to ohms Law  $V=IR$

$$R=0$$

$$V=6$$

$$V$$

$$I=V$$

$$/R$$

So,

$$I=6/0$$

$$I=\infty$$

(answer)

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## QUESTION 2: (C)

How would you place a DC current source with downward direction on LTSPICE schematic?

## ANSWER

If we want to place a DC source with downwards direction in LTSPICE from components select voltage source and press “ CTRL + R “ twice the equipment shall flip which shall cause the polarity of the source to invert

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## QUESTION 2: (D)

When you simulate the circuit (Figure 2.6) in LTSPICE, the magnitude of current through all elements is same; however, negative sign appears with current through voltage source. What is the reason?

## ANSWER

-ve sign appears with current through voltage source because the actual direction of current is opposite to pre-determined assume direction. (Due to passive sign convention)

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## CONCLUSION/ANALYSIS:

THESE EXPERIMENTS LEADS TO THE WORKING OF LTSPICE. IT DESCRIBES DIFFERENT FUNCTIONS / ANALYSIS DONE WITH THE HELP OF LTSPICE LIKE DC SWEEP, DC BIAS POINTS. ALSO IT CLEARS THE CONCEPT OF PASSIVE SIGN CONVENTION.

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