BASIC ELECTRONICS LAB RECORD

[EXPERIMENT 1]
DATE – 06/09/2020

Study of Electronics Components

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AIM OF THE EXPERIMENT: -

Study of Electronics Components and familiarization with components.

COMPONENTS REQUIRED: -

Sl.no	Components	Device no./specification	Quantity
1	Resister	$82 \times 10^1 \pm 5\ \Omega$	1
		$82 \times 10^4 \pm 5\ \Omega$	1
		$68 \times 10^3\ \Omega$	1
		$10 \times 10^2\ \Omega$	1
2	Variable resistance	Potentiometer 4K7	1
		Preset 102	1
3	Capacitor	Electrolytic 100µF 63V	1
		Non-electrolytic 104	1
4	Diode	Germanium 1N 34A	1
		Silicon 1N 4007	1
		Zener BZX (6.2V-5.6V)	1
		LED	1
5	BJT's	BC 547	1
		SL 100	1
		CL 100	1

6	Op-Amp	IC 741	1

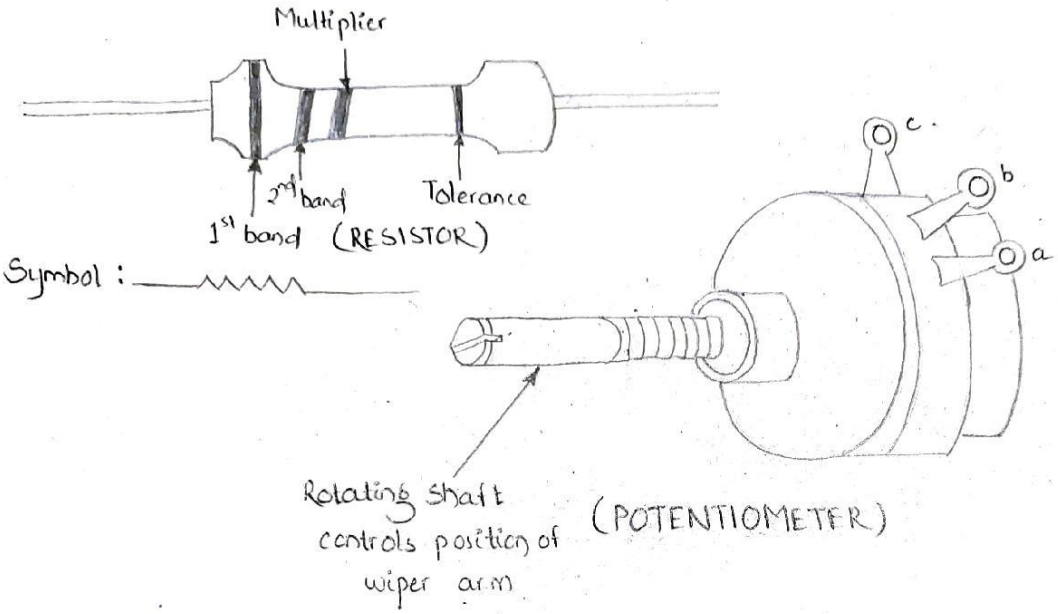
THEORY AND OBSERVATION TABLE: -

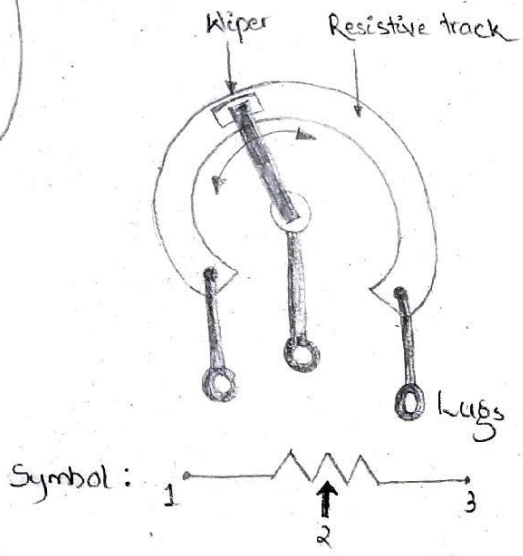
Resistor: -

It is a component of an electrical circuit that resists the flow of electrical current. It has two terminals and is designated to drop the voltage of the current as it flows from one terminal to the other. It is used to create and maintain a known safe current within an electrical component.

resistor	calculation	first band	second band	third band	fourth band	Measurement value of digital multimeter
Sample 1	Color name	grey	red	brown	golden	822 Ω
	Position value	8	2	1	5%	
	Calculated value	$82 \times 10^1 \pm 5\%$ Ω				
Sample 2	Color name	grey	red	yellow	golden	822 KΩ
	Position value	8	2	4	5%	
	Calculated value	$82 \times 10^4 \pm 5\%$ Ω				

Sample 3	Color name	blue	grey	orange	-	68 KΩ
	Position value	6	8	3	-	
	Calculated value	68×10^3 Ω				
Sample 4	Color name	brown	black	red	-	1 KΩ
	Position value	1	0	2	-	
	Calculated value	10×10^2 Ω				





Variable resistance: -

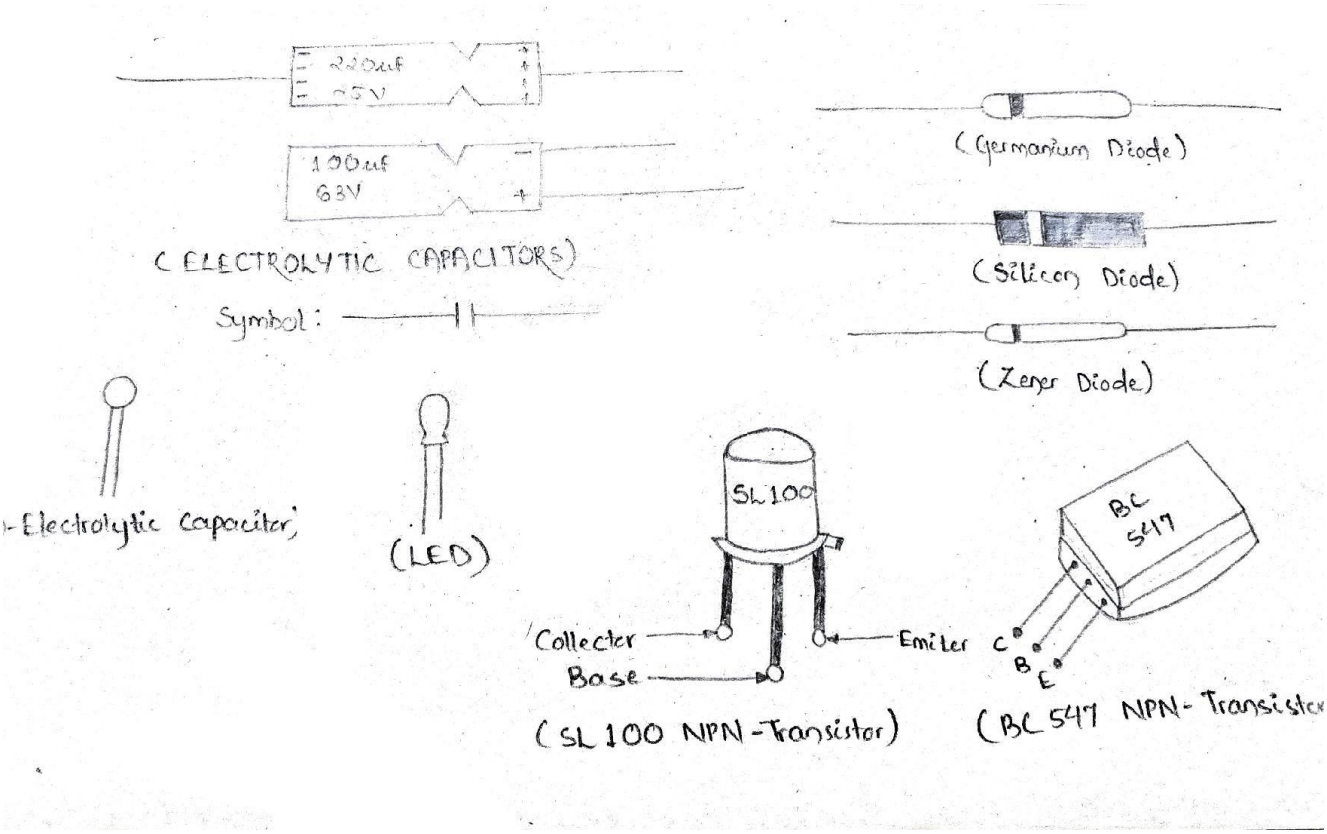
These variable resistors consist of a resistance track with connections at both the ends and a wiper which moves along the track as you turn the spindle. These can be used as potentiometer.

Variable resistance	Measure the standard value (written on the device surface)	Measure the multimeter value (two end terminal)
Potentiometer	4K7 = 4.7 KΩ	5.932 KΩ
Preset	$102 = 10 \times 10^2$ Ω	1.266

Capacitor: -

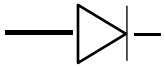
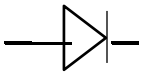
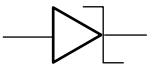
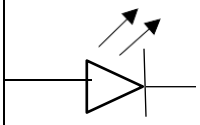
A capacitor is a passive electronic component that stores energy in the form of an electric field. There are two types of capacitor i.e. polarized and non-polarized depending upon whether electrolyte is used or not.

Capacitor	Measure the standard value / calculate the value written on device surface	Measure the LCR meter value
Electrolytic capacitors	100 µF 63V	98.546 µF
Non-electrolytic Capacitors	$104 = 10 \times 10^4$ pF	0.0984 µF



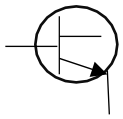
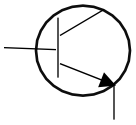
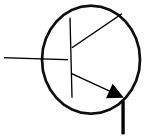
Diode: -

A p-type semiconductor diffused in a n-type semiconductor with a property to conduct electricity in only one direction is called a diode.
PN-junction diodes are of two types i.e. germanium and silicon.
Zener diode is used to maintain a fixed voltage and LED is the visible light.

Type of diode	Symbol	Device no.	Forward voltage	Reverse voltage	Determine anode and Cathode
Germanium diode (Ge)		1N - 34A	0.645	0	The terminal near the black ring is cathode and other is anode
Silicon diode (Se)		1N - 4007	0.557	0	Grey ring denotes cathode and other is anode
Zener diode		BZX (6.2V x 5.6)	0.754	–	The terminal near black ring is cathode and other is anode
LED			1.88	0	The longer terminal is anode and shorter one is cathode.

Transistor: -

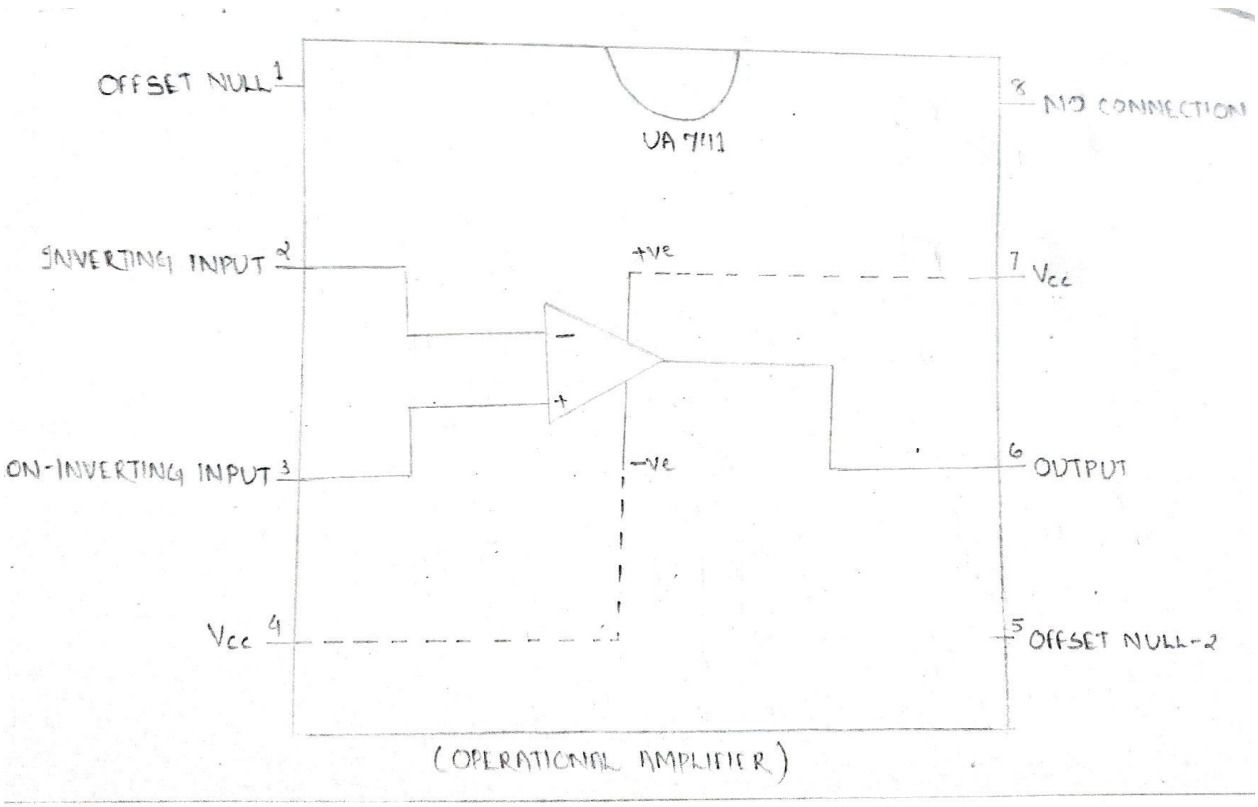
It is a semiconductor device used to amplify and switch electronic signal and power. It is composed of a semiconductor material with at least three terminals for connection to an external circuit.

Type of transistor	pnp or npn	symbol	device no.	voltage 1 to 2	voltage 2 to 3	voltage 1 to 3	voltage 3 to 1	voltage 3 to 2
BC 547	npn		CT - BC 547	0	0.698	0	0	0.7
SL 100	npn		S 400 B	0	0.66	0	0	0.66
CL 100	npn		CL 100 S	0	0.67	0	0	0.67

Op – Amp: -

An Op – Amp or Operational Amplifier is fundamentally a voltage amplifying device, designed to be use with external feedback components such as resistors and capacitors between its output and input terminals. Those feedback components determine the resulting function or ‘operation’ of the amplifier and by virtue of the different feedback configurations whether resistive, capacitive or both, the amplifier can perform a variety of different operations, giving rise to its name of “operational amplifier”.

An operational amplifier is basically a three terminal device which consists of two high impedance inputs. One of the inputs is called the inverting input, marked with a negative or “minus” sign (-). The other input is called the non-inverting input, marked with a positive or “plus” sign (+).



The IC 741 Op-Amp looks like a small chip. The representation of 741 Op-Amp comprises of 8 pins. The most significant pins are 2,3 and 6; where pins 2 and 3 denote inverting and non-inverting terminals respectively and pin 6 denotes output voltage. The triangular form in the IC signifies an Op-Amp integrated circuit. The current version of the chip is denoted by the famous IC 741 Op-Amp. The main function of this IC 741 is to do mathematical operation in various stages of transistor which commonly have 3 stages like differential i/p, a push-pull o/p and an intermediate gain stage.
The differential Op-Amps comprises a set of BJTs.

Wire: -

A single strand copper wire was tested in a multimeter in the continuity mode and was found to be continuous.

CONCLUSION: -

Characteristic property of various electronic components was measured and we get familiarized with all the basic components.