AMIRAJ

COLLEGE OF ENGINEERING & TECHNOLOGY

LABORATORY MANUAL

PHYSICS

SUBJECT CODE :3110018

B.E. 1ST YEAR

NAME:	______________________________
ENROLLMENT NO:	______________________________
BATCH NO:	______________________________
YEAR:	______________________________

Amiraj College of Engineering andTechnology,

Nr. Tata Nano Plant, Khoraj, Sanand, Ahmedabad.

Amiraj College of Engineering andTechnology,

Nr. Tata Nano Plant, Khoraj, Sanand, Ahmedabad.

CERTIFICATE

This is to certify that Mr./Ms.-

____ Enrolment No.

___________________ of __________________ Semester Degree course in

________________________ Engineering has Satisfactorily completed his/her

term work in the subject of Physics and submitted on ___________________.

( )   ( )

Faculty Name and Signature   Head of Department

AMIRAJ COLLEGE OF ENGINEERING & TECHNOLOGY

B.E. 1ST YEAR

SUBJECT: PHYSICS

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List of Experiments

Sr. No.	Title	Date of Performance	Date of Submission	Sign	Remark

EXPERIMENT 1

FUNDAMENTAL QUANTITIES IN BASIC PHYSICS

OBJECTIVE

To study various important measurement quantities used in basic Physics.

QUANTITIES

Mass: Mass is a fundamental concept in Physics, roughly corresponding to the intuitive idea of how much matter there is in an object.

Length: Length is the long dimension of any object. The length of a thing is the distance between its ends, its linear extend as measured from end to end.

Area: Area is a quantity expressing the two dimensional size of a define part of a surface, typically a region bounded by a closed curve. The term surface area refers to the total area of the exposed surface of a 3-dimensional solid, such as the some of the areas of the exposed sides of a polyhedron.

Volume: The volume of any solid, plasma, vacuum or theoretical object is how much 3-dimenstional space it occupies, often quantified numerically. One dimensional figures(such as lines) and two dimensional shapes (such as squares) are assigned zero volume in the 3-dimenstional space.

Density: The density of material is defined as its mass per unit volume. Different materials usually have different density, so density is an important concept regarding buoyancy, metal purity and packaging.

Time: Time is a component of a majoring system used to sequence events, to compare the duration of events and the intervals between them, and to quantify the motion of object.

Frequency: Frequency is a major of the number of occurrences of a repeating event per unit time.

Velocity: In Physics, velocity is defined as the rate of change of position. It is a vector physical quantity; both speed and direction are required to define it.

In Physics, velocity is defined as the rate of change of position. It is a vector physical quantity; both speed and direction are required to define it.

Acceleration: In kinematics, acceleration is defined as the first derivative of velocity with respect to time (that is, the rate of change of velocity), or equivalent as the second derivative of position.

Force: In Physics, a force is whatever can cause an object with mass to accelerate. Force has both magnitude and direction, making it a vector quantity.

Energy: In Physics and other sciences, energy is a scalar physical quantity, an attribute of objects and system that is conserved in nature. In Physics text books energy is often define as the ability to do work.

Resistivity: Electrical resistivity (also known as specific electrical resistance) is a major of how strongly a material opposes the flow of electric current. A low resistivity indicates a material that readily allows the movement of electrical charge.

Conductivity: Conductivity may refer to: Electrical, a major of a material's ability to conduct an electric current, thermal conductivity, the intensive of a material that indicates it ability to conduct heat.

Viscosity: Viscosity is a major of the resistance of a fluid which is being deformed by either shear stress or extensional stress. In general terms it is the resistance of a liquid to flow, or its "thickness". Viscosity describes a fluid's internal resistance to flow and may be thought of as a major of fluid friction.

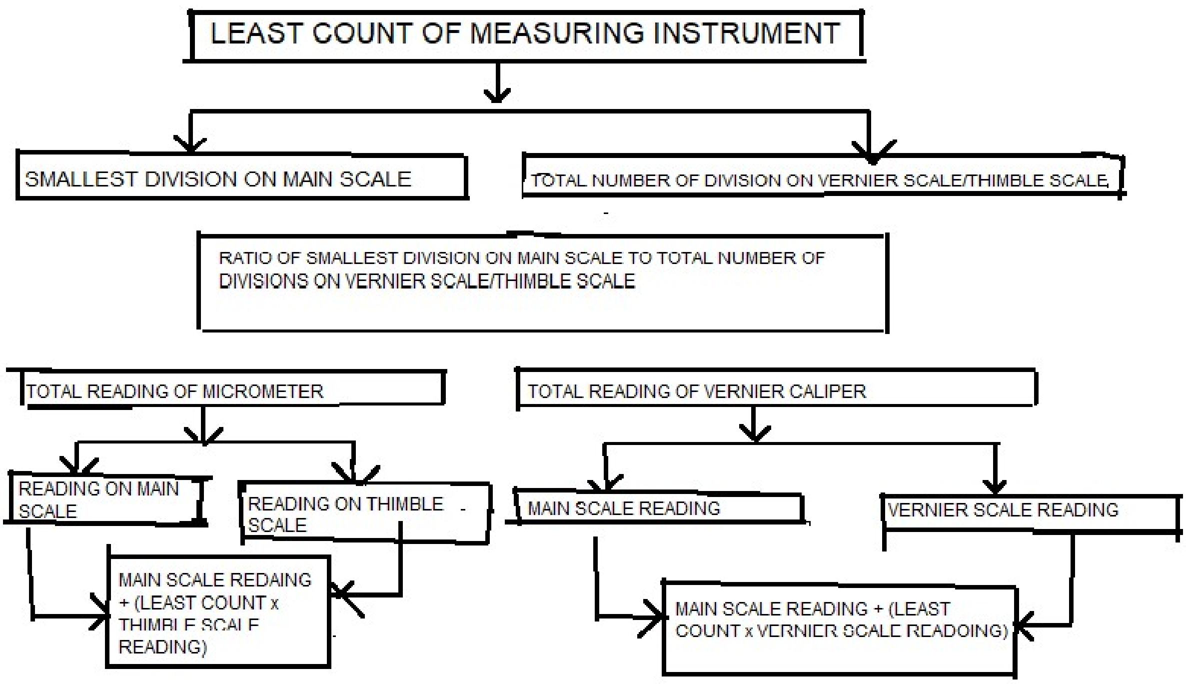
EXPERIMENT 2

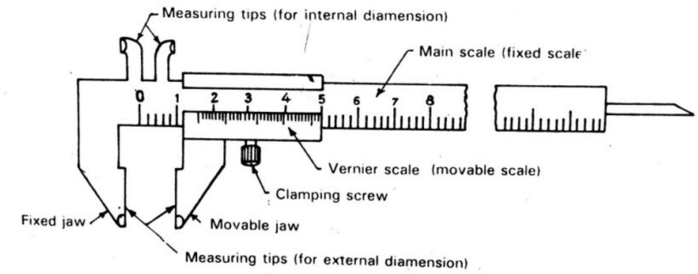
VERNIER CALIPER AND MICROMETER TO MEASURE DIMENSIONS OF GIVEN OBJECTS.

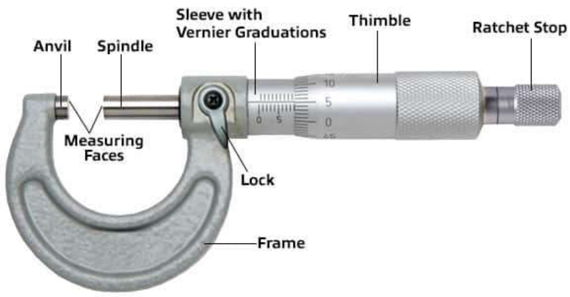
OBJECTIVE

To determine the dimensions of the given jobs

CONCEPT







PROCEDURE

Clean the work piece and instruments.

Check the vernier caliper & micrometer for errors.

If any error is presenet, correct it.

Calculate the least count of the instruments.

Hold the work piece in the measuring jaws/anvils.

Note down the readings on main scale & vernier/thimble scale.

Take the measurements for at least 3 com[ponents by vernier caliper and micrometer.

Calculate the total reading of vernier caliper and micrometer.

Complete the observation table.

OBSERVATION TABLE

Measurement using Vernier

Serial number	Dimension to be measure	Reading on main scale (MSR)	Reading on vernier scale (VSR) n X LCM	Dimension reading = MSR + VSR	Corrected reading = Dimension reading ± Correction

Measurement using Micrometer

Serial number	Dimension to be measure	Reading on main scale (MSR)	Reading on vernier scale (VSR) n X LCM	Dimension reading = MSR + VSR	Corrected reading = Dimension reading ± Correction

CONCLUSION

EXPERIMENT 3

TO STUDY THE CHARACTERISTIC OF Si- DIODE

OBJECTIVE

TO STUDY THE CHARACTERISTIC OF Si- DIODE

EQUIPMENTS

COT-01 Trainer Kit.

Power supply.

Patch cords

Multimeter

THEORY

In electronics, a diode is a two terminal electronic component that conducts electric current in only one direction.

The term usually refers to a semiconductor diode, the most common type today, which is a crystal of semiconductor connected to two electrical-terminals, a P-N junction.

The most common function of a diode is to allow an electric current in one direction (called the diode’s forward direction) while blocking current in the opposite direction (the reverse direction). This unidirectional behavior is called rectification, and is used to convert alternating current to direct current, and remove modulation from radio signals in radio receives.

A semiconductor diode is a P-N junction diode. It conducts only in one direction. It is a unidirectional device.

Forward Bias:

When Anode (P-side) of the diode is connected to battery positive terminal and cathode (N-side) is connected to negative terminal, the diode is said to be forward biased. The forward resistance of the diode is small.

Reverse Bias:

When Anode (P-side) of the diode is connected to battery negative terminal and cathode (N-side) of the diode is connected to the battery positive terminal, the diode is said to be reverse biased. The forward resistance of the diode is very high.

PROCEDURE

1. Make the connections as shown in the following circuit diagram on COT-01 board.
2. Apply dc voltage to forward bias the diode and vary the voltages as per the observation table.
3. Note down the corresponding forward voltage V_F across the diode and the forward current $I_{F.}$
4. Similarly, make the connection as shown in the following circuit diagram on COT-01 board.
5. Apply dc voltage to reverse the bias the diode and vary the voltages as per the observation table.
6. Note down the corresponding reverse bias voltage V_R, across the diode and the reverse bias current, I_R.
7. Plot the forward and reverse biased voltage Vs current graph.

DESIGN

Diode= 1N4007
Resistance= 220 E / 5W

CIRCUIT DIAGRAM

OBSERVATION TABLE

Sr. no.	DC Voltage source	Diode Forward Characteristic		Diode reverse characteristic	
	Vin	V_F(V)	I_F	V_R(V)	I_R

CALCULATION FROM GRAPH

Cut in voltage= _________ volt

Break down voltage= ______ Volt

CONCLUSION

EXPERIMENT 4

TO STUDY THE CHARACTERISTIC OF ZENER DIODE

OBJECTIVE

TO STUDY THE CHARACTERISTIC OF ZENER DIODE

EQUIPMENTS

COT-01 Trainer Kit.

Power supply.

Patch cords

Multimeter

THEORY

A zener diode is a type of diode that permits current in the forward direction like a normal diode, but also in the reverse direction if the voltage is larger than the breakdown voltage known as “Zener knee voltage” or “Zener voltage”.

The device was named after Clarence Zener, who discovered this electrical property.

A Zener diode is specially designed to have a greatly reduced breakdown voltage, so called Zener voltage.

A reverse-biased zener diode will exhibit controlled breakdown and allow the current to keep the voltage across the Zener diode at the zener voltage. A heavily doped P-N junction diode which has a sharp breakdown voltage is called Zener diode. It is normally operated in reverse bias.

Forward Bias:

When Anode of the diode is connected to battery positive terminal and cathode is connected to negative terminal, the diode is said to be forward biased.

Reverse Bias:

When Anode of the diode is connected to battery negative terminal and cathode of the diode is connected to the battery positive terminal, the diode is said to be reverse biased.

Break down voltage:

At some reverse voltage the voltage across the zener diode remains constant and current through it increases sharply. This voltage is known as Zener break down voltage (Vz).

OBSERVATION TABLE

Sr. no.	DC Voltage source	Diode Forward Characteristic		Diode reverse characteristic	
	Vin	V_F(V)	I_F	V_R(V)	I_R

CALCULATION FROM GRAPH

Cut in voltage= _________ volt

Break down voltage= ______ Volt

CONCLUSION

EXPERIMENT 5

TO STUDY THE CHARACTERISTIC OF LED

OBJECTIVE

TO STUDY THE CHARACTERISTIC OF LED

EQUIPMENTS

COT-01 Trainer Kit.

Power supply.

Patch cords

Multimeter

THEORY

A light emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting.

LEDs emitted low intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelength, with very high brightness.

The LED is based on the semiconductor diode. When a diode is forward biased (switched on), electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence and the color of the light (corresponding to the energy of the photon) is determined by the energy gap of the semiconductor.

An LED is usually small in areas (less than 1mm) and integrated optical comp[onents are used to shape its radiation pattern and assist in reflection.

LEDs present many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved robustness, smaller sixe faster switching, and greater durability and reliability.

Forward Bias:

When Anode (P-side)of the LED is connected to battery positive terminal and cathode (N-side) is connected to negative terminal, the LED is said to be forward biased.

Reverse Bias:

When Anode (P-side)of the LED is connected to battery negative terminal and cathode (N-side) of the LED is connected to the battery positive terminal, the LED is said to be reverse biased.

PROCEDURE

1. Make the connections as shown in the following circuit diagram on COT-01 board.
2. Apply dc voltage to forward bias the LED and vary the voltages as per the observation table.
3. Note down the corresponding forward voltage V_F across the LED and the forward current $I_{F.}$
4. Similarly, make the connection as shown in the following circuit diagram on COT-01 board.
5. Apply dc voltage to reverse the bias the LED and vary the voltages as per the observation table.
6. Note down the corresponding reverse bias voltage V_R, across the LED and the reverse bias current, I_R.
7. Plot the forward and reverse biased voltage Vs current graph.

DESIGN

Diode= Green LED 5 mm

Resistance= 470 E / 5W

CIRCUIT DIAGRAM

OBSERVATION TABLE

Sr. no.	DC Voltage source	Diode Forward Characteristic		Diode reverse characteristic	
	Vin	V_F(V)	I_F	V_R(V)	I_R

<u>CONCLUSION</u>

EXPERIMENT 6

STUDY OF NUMERICAL APERTURE OF OPTICAL FIBER

OBJECTIVE

To determine numerical aperture of optical fiber.

THEORY

Numerical aperture refers to the maximum angle at the light incident on the fiber and is totally internally reflected and is transmitted properly along the fiber.

The cone formed by the rotation of this angle along the axis of the fiber is the cone of acceptance of the fiber. The light ray should strike the fiber and within its cone of acceptance, hence it is reflected out of the fiber core.

CONSIDERATIONS IN NUMERICAL APERTURE MEASUREMENT

It is very important that the optical source should be properly aligned with the cable and the distance from the launched point and cable be properly selected to ensure that the maximum amount of optical power is transferred to the cable.

This experiment is the best performed in a less illuminated room.

EQUIPMENTS

Fiber link-C kit

3 meter fiber cable

N.A.Jig

Steel rule

Power supply

NOTE: KEEP ALL SWITCH FAULTS IN OFF POSITION

PROCEDURE

Make connections as shown in the fig. Connect the power supply to Link-C kit. While connecting this, ensure that the power supply OFF.

Keep the jumpers JP1, JP2 & JP4 shorted and JP3 towards pulse position.

Keep switch SW2 towards V1 position.

Switch ON the power supply.

Take the plastic fiber of length 3 meter and insert one end into the LED SFH 756V until it is seated, then lightly tighten the fiber optic locking cinch nut.

Keep the bias pot P6 at maximum (fully clockwise position).

Insert the other end of the fiber into the numerical aperture measurement Jig. Hold the white sheet facing the fiber. Adjust the fiber such that its cut face is perpendicular to the axis of the fiber.

Keep the distance of about 10 mm between the fiber tip and the screen. Gently tighten the screw and thus fix the fiber in the place.

Now observe the illuminated circular patch of light on the screen.

Measure the exact distance. Also measure the vertical and horizontal diameters MR and PN as indicated in the fig.

Mean radius is calculated using the following formula, [r=(MR+PN)/4].

Find the numerical aperture of the fiber using the formula

$NA = \sin \Theta_{max} = r / \sqrt{(d^2 + r^2)}$

Where Θ_{max} is the maximum angle at which the light incident is properly transmitted through the fiber.

THEORITICAL CALCULATION OF NA

Core Refractive index-n1= ____________________

Clad Refractive index-n2= ___________________

NA(Theoritical) = $\sqrt{n1^2 - n2^2}$

OBSERVATIONS

d= ___________ cm

vertical diameter MR = ____________ cm

Horizontal diameter PN = ____________ cm

Mean Radius r = [(MN + PN)/4]

NA (practical)= sin $\Theta_{max} = r/\surd(d^2 + r^2)$

<u>CONCLUSION</u>

NA (FROM THEORY)= ___________

NA (FROM PRACTICAL)=_____________

<u>EXPERIMENT 7</u>

<u>TO STUDY ABOUT CATHODE RAY OSCILLOSCOPE</u>

<u>OBJECTIVE</u>

To study about cathode ray oscilloscope (CRO).

<u>APPARATUS</u>: CRO, CONNECTING LEADS, POWER SUPPLY.

<u>THEORY</u>:

An oscilloscope is a test instrument which allows us to look at the 'shape' of electrical signals by displaying a graph of voltage against time on its screen. It is like a voltmeter with the valuable extra function of showing how the voltage varies with time. A graticule with a 1cm grid enables us to take measurements of voltage and time from the screen.

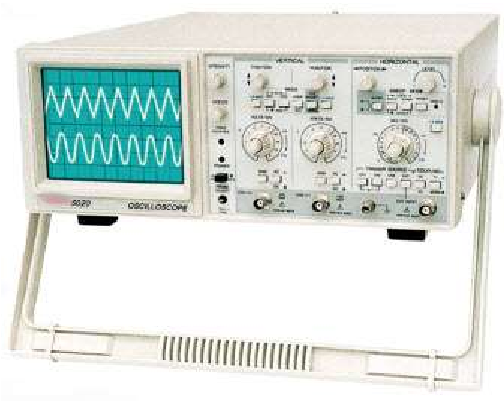
The cathode-ray oscilloscope (CRO) is a common laboratory instrument that provides accurate time and amplitude measurements of voltage signals over a wide range of frequencies. Its reliability, stability, and ease of operation make it suitable as a general purpose laboratory instrument. The heart of the CRO is a cathode-ray tube.

The graph, usually called the trace, is drawn by a beam of electrons striking the phosphor coating of the screen making it emit light, usually green or blue. This is similar to the way a television picture is produced.

Oscilloscopes contain a vacuum tube with a cathode (negative electrode) at one end to emit electrons and an anode (positive electrode) to accelerate them so they move rapidly down the tube to the screen. This arrangement is called an electron gun. The tube also contains electrodes to deflect the electron beam up/down and left/right.

The electrons are called cathode rays because they are emitted by the cathode and this gives the oscilloscope its full name of cathode ray oscilloscope or CRO.

A dual trace oscilloscope can display two traces on the screen, allowing us to easily compare the input and output of an amplifier for example. It is well worth paying the modest extra cost to have this facility.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OSCILLOSCOPE

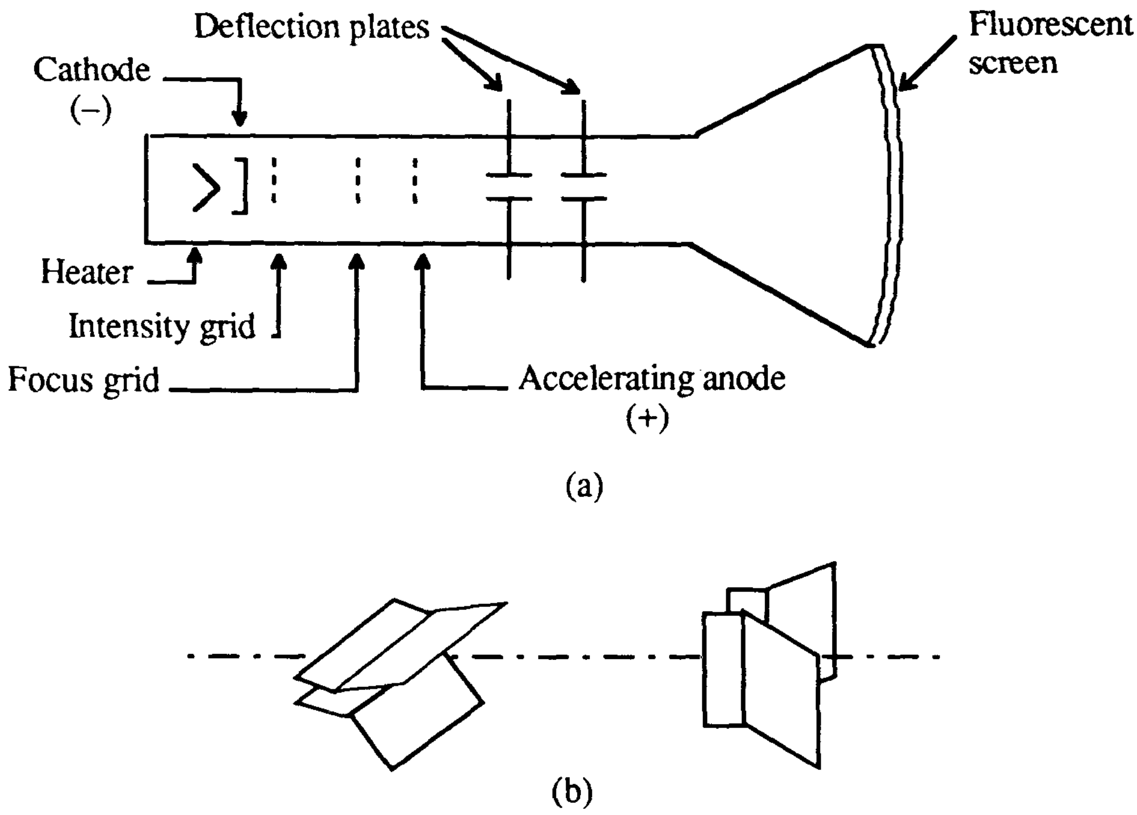


Figure 1. Cathode-ray tube: (a) schematic, (b) detail of the deflection plates.

Setting up an oscilloscope:

Oscilloscopes are complex instruments with many controls and they require some care to set up and use successfully. It is quite easy to 'lose' the trace off the screen if controls are set wrongly.

There is some variation in the arrangement and labeling of the many controls. So, the following instructions may be adapted for this instrument.

1. Switch on the oscilloscope to warm up (it takes a minute or two).
2. Do not connect the input lead at this stage.
3. Set the AC/GND/DC switch (by the Y INPUT) to DC.
4. Set the SWP/X-Y switch to SWP (sweep).
5. Set Trigger Level to AUTO.
6. Set Trigger Source to INT (internal, the y input).
7. Set the Y AMPLIFIER to 5V/cm (a moderate value).
8. Set the TIMEBASE to 10ms/cm (a moderate speed).
9. Turn the time base VARIABLE control to 1 or CAL.
10. Adjust Y SHIFT (up/down) and X SHIFT (left/right) to give a trace across the middle of the screen, like the picture.
11. Adjust INTENSITY (brightness) and FOCUS to give a bright, sharp trace.

The following type of trace is observed on CRO after setting up, when there is no input signal connected.

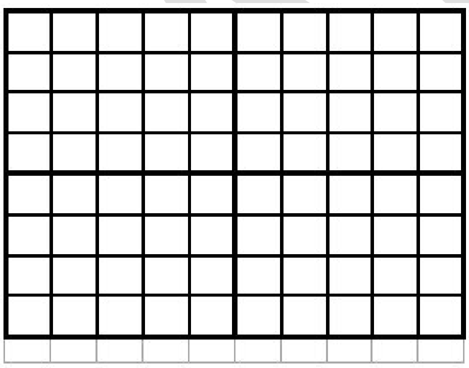
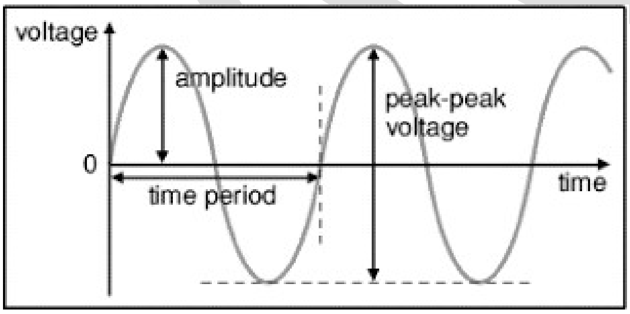


Fig. Oscilloscope probes and leads

Measuring voltage and time period

The trace on an oscilloscope screen is a graph of voltage against time. The shape of this graph is determined by the nature of the input signal. In addition to the properties labeled on the graph, there is frequency which is the number of cycles per second. The diagram shows a sine wave but these properties apply to any signal with a constant shape



Amplitude is the maximum voltage reached by the signal. It is measured in volts.

Peak voltage is another name for amplitude.

Peak-peak voltage is twice the peak voltage (amplitude). When reading an oscilloscope trace it is usual to measure peak-peak voltage.

Time period is the time taken for the signal to complete one cycle. It is measured in seconds (s), but time periods tend to be short so milliseconds (ms) and microseconds (µs) are often used. 1ms = 0.001s and 1µs = 0.000001s.

Frequency is the number of cycles per second. It is measured in hertz (Hz), but frequencies tend to be high so kilohertz (kHz) and megahertz (MHz) are often used. 1kHz = 1000Hz and 1MHz = 1000000Hz.

Frequency = 1 / Time period

Time period = 1 / Frequency

A) Voltage: Voltage is shown on the vertical y-axis and the scale is determined by the Y AMPLIFIER (VOLTS/CM) control. Usually peak-peak voltage is measured because it can be read correctly even if the position of 0V is not known. The amplitude is half the peak-peak voltage.

Voltage = distance in cm × volts/cm

B) Time period: Time is shown on the horizontal x-axis and the scale is determined by the TIMEBASE (TIME/CM) control. The time period (often just called period) is the time for one cycle of the signal. The frequency is the number of cycles per second, frequency = 1/time period.

Time = distance in cm × time/cm

RESULT: Thus we have studied about CRO.

EXPERIMENT 8

TO FIND THE EFFICIENCY OF A SOLAR CELL

Objective

The objective of this experiment is to explore solar cells as renewable energy sources and test their efficiency in converting solar radiation to electrical power.

Theory

Solar Power

The sun produces 3.9×10^{26} watts of energy every second. Of that amount, 1,386 watts fall on a square meter of Earth's atmosphere and even less reaches Earth's surface. This energy can be used to generate electricity without producing pollution or dangerous wastes. Solar cells generate electrical power by converting solar radiation into direct current electricity. Currently solar cells generate a tiny fraction of the total global power-generating capacity from all sources. However, it is one of the fastest growing power-generation technologies in the world. Developing solar power is a critical part of sustainable energy policy, particularly as the costs and consequences of burning fossil fuels increase.

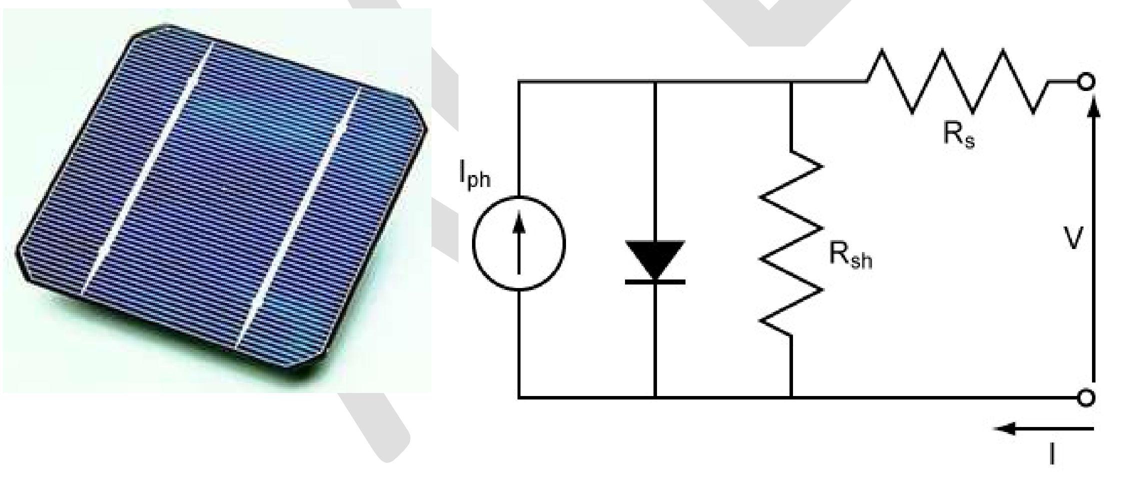


Figure 1: Solar cell

Solar cell uses the energy in a photon of sunlight to separate a positive charge from a negative charge. It collects those positive and negative charges on two different terminals so they can be used to do work in an electric circuit.

Solar cell efficiency

Solar cell efficiency is the ratio of the electrical output of a solar cell to the incident energy in the form of sunlight. The energy conversion efficiency (η) of a solar cell is the percentage of the solar energy to which the cell is exposed that is converted into electrical energy. This is calculated by dividing a cell's power output (in watts) at its maximum power point (P) by the input light (E, in W/m^2) and the surface area of the solar cell (A in m^2).

$$n = \frac{P}{E \times A} \times 100 \qquad \_\_\_\_\_\_\_\_\_\_ \ (1)$$

Solar cell's power output is found by multiplying the cell's current and the cell's voltage:

$$P(W) = V \times I \qquad \_\_\_\_\_\_\_\_\_ \ (2)$$

By convention, solar cell efficiencies are measured under standard test conditions (STC) unless stated otherwise. STC specifies a temperature of 25 °C and an irradiance of 1000 W/m^2 with an air mass 1.5 spectrum. These conditions correspond to a clear day with sunlight incident upon a sun-facing 37°-tilted surface with the sun at an angle of 41.81° above the horizon. In this experiment, we are going to use a 100 W desk lamp to simulate the solar radiation. In an ideal case the irradiance of a 100 W light bulb at a distance of 0.15 m is around E= 350 W/m^2 . We are going to use this value in our solar cell efficiency calculations.

First we should get familiar with the equipment we are going to use in this experiment.

Equipment

Solar cell
Variable Resistor
Digital Multimeter (DMM)
Electric motor
Desk lamp
Protractor
Vernier Caliper

Safety

Electric current safety

When unplugging a power cords, pull on the plug, not on the cable. Keep fluids, chemicals, and beat away from instruments and circuits. Report any damages to equipment, hazards, and potential hazards to the laboratory instructor.

Desk lamp safety

Do not use desk lamps in close proximity of paper, cloth or other combustible materials that can cause a fire hazard.

Lamps are very fragile. Do not drop, crush, bend or shake them.

Do not touch the bulb surface or inside reflectors with your bare hands. Oils from skin can lead to breakage or shorten the life of the lamp.

Never touch the lamp when it is on, or soon after it has been turned off, as it is hot and may cause serious burns.

Do not look directly at the operating lamp for any period of time; this may cause serious eye injury.

Always turn off the electrical power before inserting, removing, or cleaning the lamp.

<u>EXPERIMENT 9</u>

<u>STUDY OF LOGIC GATES</u>

Theory:

Computers work on an electrical flow where a high voltage is considered a ‘1’ and a low voltage is considered a ‘0’. The data are represented using these high and low voltages called logic levels. Logic gates are the basic building blocks of any logic circuit. They have one or more inputs and one output. Combinations of logic gates form circuits designed for specific tasks. For example, logic gates are combined to form circuits to add binary numbers (adders), set and reset bits of memory (flip flops), multiplex multiple inputs, etc. The basic logic gates are: **AND, OR and NOT**. In addition to other gates, **NAND, NOR, XOR** and **XNOR** which all work according to certain logic.

1. The **AND** gate requires at least two inputs and one output. The output of AND gate is high’1’ when both the inputs A and B are high, otherwise the output is low ‘0’. Figure 1 represent the symbol of the AND gate, the inputs on the left side and the output on the right side. The logic equation of AND gate, Y = A.B

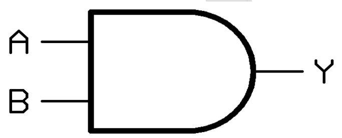


FIG 1

2. The **OR** gate requires at least two inputs and one output. If either or all of the inputs are a 1, the resulting output value is a 1. The output is low ‘0’ when all inputs are low ‘0’. Figure 2 represent the symbol of the OR gate, the inputs on the left and the output on the right. The logic equation of OR gate, Y = A+B

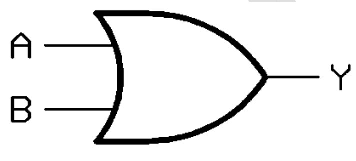


FIG 2

3. The **NOT** gate is also known as an inverter; simply it inverts the input (change the input into opposite). The NOT gate accepts only one input and the output is the opposite of the input.

Figure 3 represents the symbol of the NOT gate, the input on the left and the output on the right. The logic equation of NOT gate,

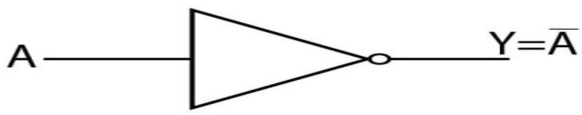


FIG 3

4. The letter X in the **XOR** gate stands for "exclusive". The XOR gate that accepts two inputs will produce output high '1' if one of the inputs is '1' and the other is '0'. Otherwise the output is '0'. Figure 4 represents the symbol of the XOR gate. The logic equation of XOR gate, $Y=(A \oplus B)$.

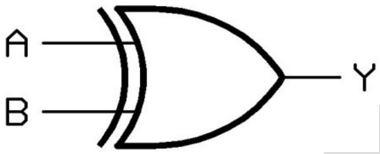


FIG 4

5. **NAND**: NAND gate is AND gate followed by NOT. Figure 5 represents the symbol of the NAND gate. The logic equation, $Y = \overline{A.B}$

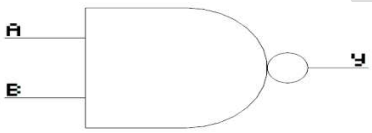


FIG 5

6. **NOR**: NOR gate is OR gate followed by NOT. Figure 6 represents the symbol of the NOR gate. The logic equation, $Y = \overline{(A + B)}$

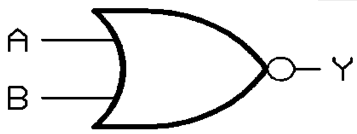


FIG 6

7. **X-NOR**: XNOR gate is XOR gate followed by NOT. Figure 7 represents the symbol of the XNOR gate. The logic equation, $Y= \overline{(A \oplus B)}$

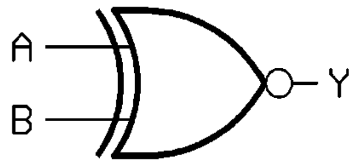


FIG 7

Procedure:

For each logic gate do the following steps:

1. Place the IC of AND gate in the proper location in a breadboard.
2. Give biasing to the IC (i.e. wire the IC to ground (0V) and power supply (+5 V).
3. With the help of IC's datasheet of AND gate, connect the input pins of the gate to data switches and the output pin to LED indicator.
4. Make the truth table for that logic gate.
5. Write down in the truth table the output logic levels for every possible combination of input levels, with help of LED indicator.
6. Repeat for all other gates.

Truth Table of AND Gate			Justify the output Y
A	B	Y	

Truth Table of OR Gate			Justify the output Y
A	B	Y	

Truth Table of NOT Gate			Justify the output Y
A	B	Y	

Truth Table of XOR Gate			Justify the output Y
A	B	Y	

Truth Table of NAND Gate			Justify the output Y
A	B	Y	

Truth Table of NOR Gate			Justify the output Y
A	B	Y	

Truth Table of XNOR Gate			Justify the output Y
A	B	Y	