Physics Lab

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Pictorial View
Vernier Caliper

**Objective**
To determine the Volume of a Solid Cylinder and Capacity of test tube using a Vernier caliper.

**Description**
The students learn to use the Vernier caliper to measure internal diameter, external diameter and the depth of an object as well as include zero error in their reading, if any.
**Objective**
To determine the volume of a small sphere and the area of cross section of a wire using micro meter screw gauge.

**Description**
The students learn to use rachet, learn how to use spindle scale and main scale as well as avoid zero error in the readings.
Objective
To verify the validity of Hook’s law.

Description
In this experiment, the students determine the validity of Hooke’s law for two helical springs with different spring constants. The elongation of the helical spring is observed by loading the springs with the supplied weights. For comparison, a rubber band is subjected to the same forces and the students observe that there is no proportionality between applied force and the elongation. Finally, it is concluded that not all materials follow Hooke’s law.
Objective

- To verify the validation of parallelogram law of forces.
- Resolving Forces into their components.
- Investigation of the equilibrium of moments.
- To find out torque of nonparallel forces.
- To find out the time period of simple pendulum.
- To develop an understanding of levers and to find out mechanical advantage and leverage of all 3 classes of levers.
Bourdon Gauge Calibration

Objectives
• To calibrate the Bourdon Guage against a standard applied pressure.

Description
Students note down the cross-sectional area of the piston which exerts pressure on the liquid transmitted to the gauge. Then, they add the masses and the applied pressure is calculated and compared with the reading of the gauge for various pressures. As a standard rule, if the error is with in ±5% of the actual applied pressure then it is safe for practical engineering applications.
**Viscosity**

*Objective*
To determine the coefficient of viscosity of given liquid (Glycerin) by Stoke’s method.

*Description*
In this experiment we determine the coefficient of viscosity of a liquid (glycerin) by using Stoke’s law. We gently place a ball on the surface of the liquid. As the ball is immersed into the liquid three different forces act on the ball. These forces are the weight of the ball, buoyancy force of the liquid on the ball and drag force on the ball due to viscosity of the liquid. After some calculations we determine the viscosity of the liquid.
Spectrometer

Objective
To determine the refractive index of the material of a prism using spectrometer.

Description
A spectrometer (spectrophotometer, spectrograph or spectroscope) is an instrument used to measure properties of light over a specific portion of the electromagnetic spectrum, typically used in spectroscopic analysis to identify materials. When a ray of light passing through a prism it suffers refraction. The angle of deviation depends upon angle of incidence. A prism refracts the light into single spectrum.
**Objective**
Variation of magnetic field due to current flowing in the solenoid.

**Description**
In the first experiment, the students connect the Solenoid directly with dc power supply of 4.5 V then Switch on the power supply and then observe it attracting different materials.

In the second experiment, with the power supply off, the students move the permanent magnet far away from the solenoid then they Connect 220Ω and 2Ω resistors in series with the solenoid. Finally, they measure the voltage and current across each resistor, analyze the response on oscilloscope.
Photovoltaic cell

Objective
To study the spectral characteristics of photovoltaic cell.

Description
The students observe voltage generated by different wavelengths of light and different angle of incidence. It is observed that the highest voltage is generated when the angle of incidence is 90°.
Power supply

**Objective**
To study the basic function of power supply.

**Description**
A power supply is an essential part of most electronic systems. It typically takes available AC voltage or DC battery voltage and synthesizes the appropriate well-regulated DC voltage required by integrated circuit chips (i.e., LM741 op-amp, 7805, 7812 etc.) in this lab students investigate the various elements that compose a regulated power supply and learn how different component work.

A DC supply consists of the following parts: A transformer to change the voltage as required and to isolate the DC circuit from the line. A rectifier consisting of one or more diodes, to change AC to DC. A smoothing circuit using inductors and capacitors. An electronic stabilizer which improves the stability of the voltage and/or current.
Function generator

**Objective**
To study the basic function of Function generator.

**Description**
Simple function generators usually generate triangular waveform whose frequency can be controlled smoothly as well as in steps. This triangular wave is used as the basis for all of its other outputs. The triangular wave is generated by repeatedly charging and discharging a capacitor from a constant current source. This produces a linearly ascending or descending voltage ramp. As the output voltage reaches upper and lower limits, the charging and discharging is reversed using a comparator, producing the linear triangle wave.

In this LAB students will look at the types of signals available from a generator and explore the basic controls of the function generator. Students observe that how A Function Generator combines two separate function generators in one instrument: A main function generator and a modulation generator. The frequency range of the main generator is 0.1 Hz to 13 MHz in eight decade ranges producing sine, triangle, and square wave output voltages of approximately 20 V (pk-pk) into an open circuit load or 10 V (pk-pk) into a 50[Ω] load. This generator can also produce a constant DC Voltage < 10 [V], to Which you can superimpose (add) any of the time-dependent AC voltages.
Objective
To learn the operational features of the Oscilloscope and how to use them.

Description
The screen of an oscilloscope consists of a cathode ray tube. The electron
beam emitted by the heated cathode at the rear end of the tube is
accelerated and focused by one or more anodes, and strikes the front of the
tube, producing a bright spot on the phosphorescent screen. The signal to be
displayed is connected to the input. The AC/DC switch is usually kept in the DC
position (switch closed) so that there is a direct connection to the Y-amplifier.
In the AC position (switch open) a capacitor is placed in the signal path. The
trigger circuit is used to delay the time base waveform so that the same
section of the input signal is displayed on the screen each time the spot moves
across. The effect of this is to give a stable picture on the oscilloscope screen,
making it easier to measure and interpret the signal.

In this lab students perform oscilloscope function with input sensitivities up to
2 [mV/div] and with 1% voltage and timing accuracy. This instrument is
designed to be used by personnel who have had experience using 2-channel
oscilloscopes.