PHYSICS LAB EQUIPMENTS

MAGNETS & MAGNETISM EQUIPMENTS

DIP CIRCLE

The case is made of aluminium, strongly mangetised cobalt steel needle fitted with imported hard axle rolls on knife edges agates and can be clamped when desired by a V clamp, a sensitive spirit level is provided. The tripod stand is provided with three levelling screws.

TANGENT GALVANOMETER

The plastic ring or bobbin, 162.5 mm overall diameter wound with three coils of insulated copper wire with 2, 50 and 500 turns mounted on bakelite moulded platform fitted with 4 terminals, rotating on a tripod non-magnetic metal base, supported by levelling screws. Complete with compass box (Magnetometer) mounted at the centre of the ring.

MAGNETOMETER

Comprising a stout metal box, 100mm. diameter, with aluminium dial graduated in degrees 0-90 four times, anti-parallex mirror slot.

MAGNETIC NEEDLES

Carbon steel with brass cup bearing for pivoting.

	A	B	C
Length (mm)	50	75	100

STAND, MAGNETIC NEEDLE

Non-magnetic metal pillar with carbon steel point, on stable base, overall height 110 mm.

COMPASS

A small compass in a metal case, 45 mm. dia. marked in degree with N & S indications.

RING MAGNETS, CERAMIC

Magnetised

A	32x16x8mm.
B	36x18x6mm.
C	36x18x8mm.
D	45x22x8mm.
E	45x22x11mm.
F	53x24x10mm.
G	72x32x10mm.

BAR MAGNETS

Chrome Steel, in Pairs, half Red/Blue painted with keepers. Dimensions are nominal.

Size : 37x12x5 mm.
50x12x5 mm.
75x12x5 mm.
100x12x5 mm.
150x12x5 mm.

BAR MAGNETS

Dimensions are nominal. supplied in cardboard boxes.

HORSESHOE MAGNETS

Chrome steel, with keepers, dimensions are nominal.

Size : 50x12x5 mm.
75x12x5 mm.
100x12x5 mm.
150x12x5 mm.

MAGNETS AND MAGNETISM EQUIPMENTS

HORSE SHOE MAGNETS

ALINCO, with keepers. Dimensions are nominal. Supplied in cardboard boxes.

A. 50x12x15mm.
B. 75x12x15mm.
C. 100x12x15mm.

CYLINDRICAL MAGNETS

Chrome Steel, 12mm. diameter, in Pairs.

A. Length 50mm.
B. Length 100mm.
C. Length 150mm.

U-SHAPE MAGNET

ALINCO, with keepers. Dimensions are nominal. Supplied in card board boxes.

	Size (mm)	Center Gap	Lifting Power
A.	37x13x10	18mm.	350 gms.
B.	50x13x10	18mm.	500 gms.
C.	75x13x10	18mm.	500 gms.

ELECTROMAGNET

Lifting type. Built with a coil of 300 turns of insulated copper wire. Operates on 6-12 volts and will easily lift 15 kg. when energised by a current of 6-8 amperes. Complete with disc armature.

ELECTROMAGNETISM COIL

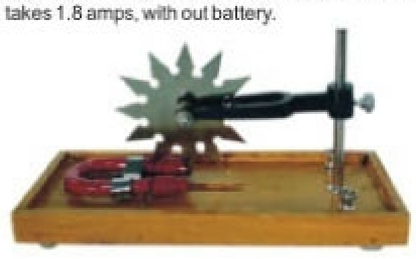
Output variable from 100V to 5KV DC at 50 A, 6.3V AC at 2A, separate earthing terminal.

DEMONSTRATION INDUCTION COIL

With primary of heavy gauge enamelled copper wire, approximate resistance 0.5 ohms wound on former 110x30 mm. length x diameter. Secondary coil of fine enamelled copper wire, approximately resistance 100 ohms on former 120 x 82 mm. length x diameter. Both coils fitted with 4 mm. sockets. Iron core 160x15 mm. length x diameter.

BARLOW'S WHEEL

For demonstrating the conversion of electric energy into mechanical energy. Star-shaped copper disc rotatable vertically on pair of adjustable centers and dipping into mercury trough between the vertical limbs of a small horseshoe magnet on a wood base. Disc adjustable vertically on metal pillar which is connected to one of two terminals mounted on base. The other terminal is connected to the mercury trough. The apparatus will operates on 4 volts at which voltage it takes 1.8 amps, with out battery.



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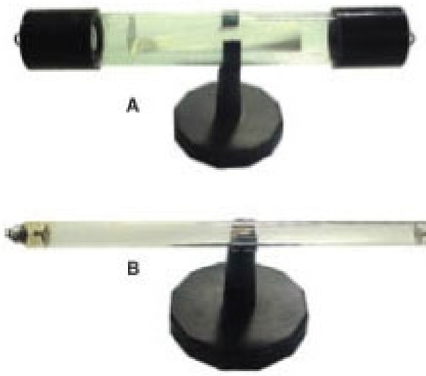
PHYSICS LAB EQUIPMENTS

ELECTROMAGNETIC APPARATUS

CATHODE RAY MECHANICAL EFFECT

Cathode Rays exert a pushing effect on objects it falls on, is shown by the rotating vanes by the force extended by cathode rays.



SHADOW EFFECT

An object star obstructing the path of cathode rays casts its shadow the fluorescent painted wall facing cathode rays.

RADIOMETER

Comprising partly evacuated glass bulb approx. 70mm diameter, containing at its center a fine pivot which supports four light weight metal arms. One side of each vane is blackened, the reverse side is bright. Mounted on round base.

ON PLASTIC BASE

SPECTRUM TUBES

Straight form, with side electrodes and 50 mm. long fine capillary in the middle. Filled with Oxygen, Neon, Helium, Air, Nitrogen, Argon, Carbon Dioxide, Hydrogen, Iodine Vapour, Sulpher water vapours Krypton, Zenon.

Size :
20 cm. long & 26 cm. long.

SPECTRUM TUBES STAND

Specially designed box holds the tube firmly while preventing you from touching the electrodes. A black panel behind the tube eliminates distracting ambient light and protects the tube from breakage. Operates on 220 Volts A.C., 50 Hz and suitable for 20 / 26 cm. Long spectrum tubes.

INDUCTION COIL

Adjustable vibrating arm, with tungsten contacts and coil with core mounted on rigid wooden base. Baised off switch to prevent continuous running. Input voltage 6V D.C. at 2A via 4 mm. socket terminals. Spark length obtainable in air 5 mm.

VAN DE GRAAF GENERATOR & WIMSHURT MACHINE

VAN DE GRAAFF GENERATOR MOTOR DRIVEN

Specially designed for electrostatic experiments and where continuous source of high voltage is required. Fitted on base with smooth running A.C. Motor, operates on 220 volts A.C. 50 Hz.

SPECIFICATIONS

Charge collecting Belt : Silicon rubber having excellent insulation resistance.
Tracking : Belt-tracking easily adjusted.
Charge collecting combs : Aluminium mesh, clearly visible.
Sphere : Aluminium 150 mm. dia.
Connections : 4 mm. sockets in dome and base.
Voltage developed : Upto 200 kV, depending on ambient conditions, with a spark length of 60 mm.
Discharger : Spherical 100 mm. dia., with insulated handle and 4 mm. sockets.

VAN DE GRAAFF GENERATOR

Hand operated on base. The generator is self exiting and charge separation occurs. A metal sphere surrounds the upper pulley assembly and charge accumulates on the sphere, which is insulated by a plastic column supporting the pulley assembly. The charge builds up untill electrical breakdown of air surrounding the sphere occurs. Supplied with a

SET OF ACCESSORIES FOR VAN DE GRAAFF

WIMSHURT MACHINE

The two plates are supported in two rigid uprights and driven by belt in opposite direction. They are heavy, high resistance plastic with sectors of aluminium sheet. Two leyden jars (condensers) made form corning glass and aluminium foil. The whole is mounted on a wooden base nicely polished.

Size :
A 200 mm. Dia.
B 250 mm. Dia.
C 300 mm. Dia

PICTURE - A

PICTURE - B

PICTURE - C

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PHYSICS LAB EQUIPMENTS

ELECTROSTATICS

NYLON ROD
Length approx. 30 cm and 12mm dia.

POLYTHENE ROD
For use as insulators. Length approx. 30 cm. and 13mm dia.

FRICTION ROD, EBONITE
Length approx. 30 cm and 12mm dia.

FRICTION ROD, COMPOUND
Half glass half-brass, length approx. 30 cm. and 13 mm dia.

WOOL CLOTH PIECES
Square size 30 x 30 cm. approx.

RUBBER SILK
Square size 30 x 30 cm. approx.

SILK CLOTH PIECES
Square size 30x30 cm. approx.

CARBON ELECTRODES, MOUNTED
Newly designed holder which can hold different type of electrodes. Complete assembly can be put on the top of the vessel/jar.

BIOTS CONDUCTOR
To demonstrate that charge resides only on outside surfaces of a conductor. Sphere of 5 cm. diameter on insulated stand, complete with hemispherical cups, having insulated handles.

SPHERICAL CONDUCTOR, CONICAL CONDUCTOR CYLINDRICAL CONDUCTOR ARE ALSO AVAILABLE

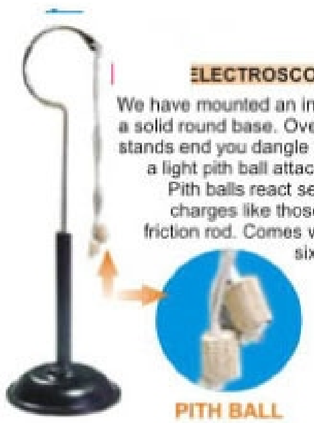
AEPINUS CONDENSER
It consists of two adjustable plates 100mm. dia. insulated handle and a glass dielectric plate.

PROOF PLANE
Consisting of an ebonite rod with brass disc of 50 mm. diameter.

DISCHARGER
Jointed, small plated brass sphered mounted on curved arms, with ebonite insulating handle. Overall length 30 cm. approx.

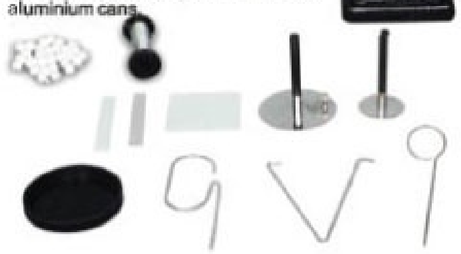
GOLD LEAF ELECTROSCOPE
A plated brass pillar mounted on bakelite base supporting two pith balls in unspun silk.

PITH BALL & ELECTROSCOPES



ELECTROSCOPE, PITH BALL
We have mounted an insulated stand on a solid round base. Over the hook at the stands end you dangle a silk thread with a light pith ball attached to each end. Pith balls react sensitively to static charges like those from a charged friction rod. Comes with 3 strings and six 8mm. pith balls.

ELECTROSTATIC KIT
Comprises of 1 electroscope, 4 metallised polystyrene spheres, 1 each reel nylon, cellulose acetate strip, polythene strip, wire stirrup, rubber cloth, wire hook, electrophorus on handle and proof plane, 2 each of polythene tiles and aluminium cans.



OPEN CASE FORM ELECTROSCOPE
Inexpensive Charge Detector with Scale Charge is indicated by deflection of an aluminized plastic straw which rotates freely on the saddle of the conducting rod. The conducting rod is recessed in the metal housing to shield against air currents.

BRAUN ELECTROSCOPE
This rugged, sensitive electroscope can accept various accessories to change its capacitance. A sensitive aluminium vane is balanced in a vertical position on a metal support which is insulated from its base. The vane is easily observed and projected on a chalkboard (Light Source, not included) on which an arbitrary scale has been marked. Height without attachments is about 9". Four attachment, each equipped with a banana plug which fits the vane system top, are included : a 1" conducting sphere; a 3" conducting sphere; a proof plane with detachable insulating handle; and an aluminium cup (Faraday ice pail). Attachments can be charged using either our Electrophorus or our Power Supply (not included). With instructions.

PRECISION PROJECTION ELECTROSCOPE
Project your measurements onto a screen for a large group to see with this well-made electroscope. Its cylindrical metal case has two parallel plane glass windows, both removable, through which you can shine a light for projection. Close fittings and quality materials insulate the leaf system so it stays charged for several days in dry weather. The case is mounted on a heavy metal base. The Precision Projection Electroscope comes complete. A metal cap is provided for shielding the projecting rod and knob, as well as a 3.5 cm. square piece of gold leaf. Includes instructions and experiments for use in projection or for direct viewing. Size : 23 cm. high case is 12 cm. diameter x 6 cm. thick.

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PHYSICS LAB EQUIPMENTS

FLUID PRESSURE APPARATUS

SPECIFIC GRAVITY BOTTLE

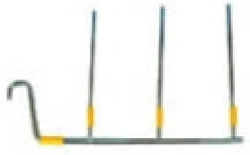
Spherical pattern not adjusted, light blown neutral glass, with flat bottom and perforated stopper
Available Capacities are **10ml, 25ml, 50ml**

HYDROMETERS

For specific gravity, shot loaded, sub-divided in 0.002mm. Overall length approx. 250mm. Range 0.80mm to 1.00mm adjusted for low surface tension, others adjusted for medium surface tension.

BERNOULLI'S TUBE

To demonstrate the Bernoulli effect produced by water flow. Comprises a Bernoulli tube, with central constriction, a constant bore gradient tube, 6 length glass tubing, 2 swan-necked outlet tubes and 8 pre-cut lengths of rubber connecting tubing. The 2 flow tubes, each 500x13mm, length 25mmx150mm spacing, extended to form 500mm manometer with the lengths of glass tubing.



U-TUBE MOUNTED

Mounted on a wooden stand and includes a scale 0-50 cm.

BOYLE'S LAW APPARATUS

Precise instrument for demonstrating the relationship between pressure and volume of a given amount of gas.
Two glass tubes, one closed at one end, and the other with both ends open are connected by a long rubber tube. Wooden meter rule permits measurement.

MANOMETER

For use at moderate pressures, fabricated from glass tubing 6mm bore, 8mm outside diameter. Glass manometer with built-in stopcock mounted on back plate. The apparatus is open at both ends and is supplied unfilled, 250mm long, 32mm wide (75mm wide including the side arm)

BOYLE'S LAW APPARATUS, DEMONSTRATION TYPE

Wide bore glass tube closed at top is mounted on a scale 0 to 600 mm. with zero corresponding to the inside of the top end. Air is trapped by coloured oil in a metal pressure chamber fitted with a Bourdon Gauge and a riffled inlet tube with stopcock. With a plastic safety screen over the tube.

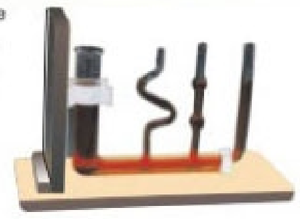
BOYLE'S LAW - FLUID PRESSURE

SPOUTING CYLINDER

For demonstrating the principle that the pressure increases with depth. Comprising of a 60 mm. metal pipe with 3 orifices of the same size at different heights down one side. The cylinder is 400 mm. high.

LIQUID LEVEL APPARATUS

To show that the level of liquid in communicating vessels is constant irrespective of the size or shape of the vessels. The apparatus comprises four glass tubes of different shapes and cross sectional area projecting vertically from a common horizontal tube. The tubes are mounted on a polished wooden base.

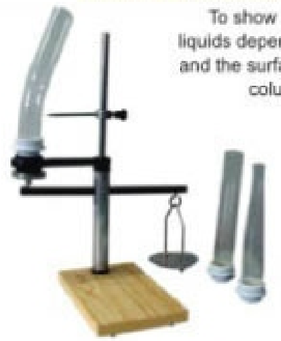


KINETIC THEORY MODEL

For simulated molecular activity in gases.
To understand and study motion and behavior of molecules in gases. An electric motor, running at 4 to 12 V DC vibrates a small platform inside a transparent tube so that a set of many small stainless steel balls is vibrated violently inside the tube. An increase in the violence of vibration simulates an increase in gas temperature and an increase in the weight of the 'float' simulates an increase in gas pressure. Supplied with balls and 2 'floats'.

PASCAL'S LAW APPARATUS

To show that the pressure of liquids depend upon their height and the surface of bottom of the columns and not on the capacities of the vessels, with plastic/glass vessels of four different shapes mounted on leak proof metallic collars, all parts of brass and chrome plated.



PASCAL'S LAW DEMONSTRATION

Pascal's apparatus ; To demonstrate pressure transmission unit, Two graduated glass syringes, pistons having capacities of 100cc and 50cc approx. with a cross sectional area ratio more than 3 to 1, mounted on suitable base.

PASCAL'S LAW DEMONSTRATION

Same as above but with Plastic syringes of 10ml. and 50ml.

BOYLE'S LAW SIMPLE FORM

Simple apparatus for demonstration of Boyle's Law, graduated, plastic syringe mounted on wooden block and; lubricated piston of the syringe mounted on another platform. Different weights can be stacked on the top and measurement of pressure volume made.

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PHYSICS LAB EQUIPMENTS

ATMOSPHERIC PRESSURE

BOURDON GAUGE

A circular gauge having overall dia of 100 mm and depth of 40 mm. The dial reads 0 to 50 Lbs / In 2 x 1 & 0 to 3.5 kg / cm 2 x 0.1 actual (total) pressure and the case has clear Perspex.

PUMP PLATE

Made of aluminium metal, with tube for connection to pump and stopcock for air regulation on central pillar. Mounted on heavy painted tripod base. Diameter of plate 175mm., 200mm., 250mm.

VACCUM PUMP

Oil Free Vacuum Pump, Exclusive oil-less construction of piston or diaphragm does not requires lubrication, practically maintenance free, portable light weight die-cast aluminium components. Balanced eccentrics provide smooth, low vibration operation. Built in micro air filter, fitted with metal round plate.

Specification

Max. Pressure	40 PSI
Vaccum	23" of Hg
Free Air	40 Ltrs/min
Delivery	(1.4 CFM)
Motor H.P.	1/3
Watts	250
Phase	Single
Current	1.8 Amps max.
Dimensions	7½"x4½x9½
Weight	7.3 kg.

FORCE PUMP ON STAND

Approx. overall height x weight (400x150mm). Made of corning glass.

LIFT PUMP

Height 355mm approx. Made of corning Glass

MAGDEBURG HEMISPHERES

To demonstrate pressure of atmosphere fitted with stopcock and handle. Made of steel.

MAGDEBURG HEMISPHERES, LARGE

Magdeburg nickle plated, 100 mm. dia with non returnable valve and nozzle to connect to vaccum pump.

BELL IN BELLJAR

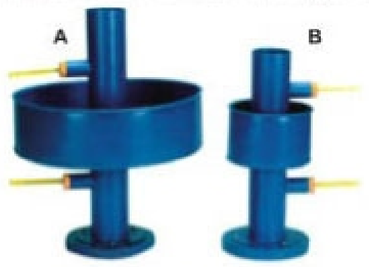
For use on pump plate not less than 15 cm. dia. Electric Bell operating 4-6 volts AC/DC, suspended on rubber cord in bell jar. Fine coiled wire connections to terminals mounted in rubber bung sealing the jar. Sizes : 9"x6" and 8"x4"

HEAT CONDUCTION AND HEAT CONVECTION

HOPE'S APPARATUS

To show the maximum density of water. Sheet iron cylinder 203x50mm (height x dia.), mounted on a base and encircled midway along its length by a gallery 63x100 mm (height x dia.) Fitted with tubular's to carry thermometers and rubber stoppers.

A Hope's Apparatus, Superior
B Hope's Apparatus, Economy
Thermometers for above in set of 2, Range 0-50°C

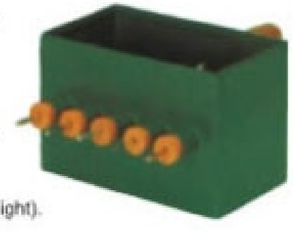


EXPANSION OF LIQUIDS APPARATUS

For demonstrating the different thermal expansions of various liquids. Comprising five bulb tubes mounted in a frame and supported in a water trough. The frame has a special sliding arrangement with clips to hold glass bulbs with tubes. The bulbs can be easily removed and fixed, and have a funnel formation on top for easy filling.

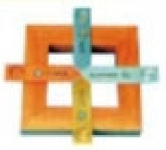
CONDUCTIVITY APPARATUS

Metal rods 150x3 mm. (length x dia.), one each of aluminium, brass, copper, glass and iron, embedded along one side of a metal tank size 150x90x100 mm. (length x width x height).



THERMAL CONDUCTIVITY OF METAL APPARATUS

Comprising strips of copper, iron, aluminium and brass fixed on wooden ring meeting in the centre, outer ends of the strips formed with small cups.



Thermal Conductivity of Metal Apparatus is available in square & round shape.

CONDUCTOMETER

To demonstrate relative thermal conductivity of brass, copper, nickle, aluminium and iron. A rod of each metal is radially spaced equally on a brass hub. Each of the rod has a cavity at the outer end for holding paraffin. Using the wooden handle, hold the brass hub over a flame, the wax will melt at different times.

THERMAL CONDUCTIVITY OF COPPER, SEARLE'S APPARATUS

Cylindrical copper rod about 300mm. length 25mm. diameter, one end containing a steam chamber connected to inlet and outlet tubes, other end of copper rod has cavity connected via thermometer pockets to water inlet and outlet tubes. Through two thermometers support tubes 75mm. apart are inserted in the rod for finding the temperature at two points. Fitted in teakwood polished case packed with felt with removable front, without thermometers.

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PHYSICS LAB EQUIPMENTS

HEAT CONVECTION & RADIATION

LATENT HEAT OF STEAM APPARATUS

The apparatus comprises a thick brass calorimeter approximately 90x65 mm. diameter, a bung with steam inlet and outlet tubes, a felt cover, and a 1100 cm3 tinplate boiler with bung to take the steam tube which a connects to the calorimeter.

THERMOPILE

It consists of 12 pairs of Bismuth and Antimony bars joined together is series with insulation between them. The couples thus arranged are enclosed in a brass frame having two terminals connected to the Bismuth and Antimony poles. Complete with nickle-plated brass cone and mounted on an adjustable stand.

CONVECTION TUBE

To show the convection of heat in a liquid. Glass tube 20mm outer diameter bent into rectangle approx. 380x300mm, fitted with funnel. Made from corning glass.

CHARLE'S LAW APPARATUS

Comprising glass U-shape 15mm dia., with one plain limb 220mm long one graduated limb, overall length 120mm. Limb graduated 25 to 35 x 0.2ml terminating in a bulb 37mm dia. with third limb 185x6mm (length x bore), jointed at right angles to the plain of the other two. Short length of the rubber tubing with two pinch clips of on short length of glass tubing mounted in end of wide-bo plain limb with rubber bung. With tall farm beaker 1000ml capacity and stirrer. All glass parts made from corning glass.

VENTILATION APPARATUS

Comprising metal box, 220x100x165mm. length x width x height, with sliding front, two glass chimney, standing over tubulure at top of box, candle holder fixed top the base of box beneath the left hand chimney. Without candle.

CALORIMETER COPPER & ALUMINIUM

With parallel sides and rolled rim, without stirrer.

Dimensions are in mm.
75x50 diameter **100x75 diameter**

CALORIMETER SET

A complete set in copper comprising : 1 inner vessel carried on cork supports; 1 outer vessel diameter 1 lid for out vessel with central tubule for thermometer and slit for 1-stirrer.

CALORIMETERS

HEATER IMMERSION

12 volts, 50 watts heater specially designed for use with metal block calorimeter. Electrical connection is via 30 cm. leads with heat resisting insulation, terminating in 4 mm. sockets.

PR-166 HEATER IMMERSION

Heater Immersion with lid as shown in the picture. Two different colour coded sockets are mounted on a lid. This is an improved model.

CALORIMETER, JOULE'S

For determination of the specific heat capacity of a liquid by the electrical method. The apparatus comprises a nickle-plated copper calorimeter 75x50 mm, fitted with a cork and a heating coil of thin Constantan wire. The resistance of the coil is 6 ohms and the recommended working current is 0.5 A with a maximum of 1A. Electrical connection is by means of a pair of barrel connectors. ***Supplied without thermometer.***

CALORIMETER

Polished **Copper,** 75x50 mm. diameter resting on felt pad inside an outer vessel, 100x75 mm. diameter. Outer vessel fitted with detachable cliptype thermometer support. Complete with stirrer.

CALORIMETER WITH WOODEN BOX

Copper, 75x50 mm., height x diameter, resting on felt pad inside wooden polished box, which is provided with a brass nickle plated thermometer holder, with copper stirrer.

CALORIMETER JOULE'S

For determination of the specific heat capacity of as liquid by the electrical method. Comprises a nickle-plated copper calorimeter 75x50 mm. lagged and enclosed within an outer vessel 100x75 mm. A close fitting ebonite lid is provided with a wire stirrer, and a pair of 4 mm. socket terminals connected to a constantan wire heating coil. The resistance of the coil is approximately 6 ohms and should be used with a current of 0.5A with a maximum of 1A. supplied WITHOUT thermometer.
Calorimeter Joule's
Thermometer 50x0.1°C, extra for above

STEAM GENERATOR

Cylindrical copper vessel 180x115 mm (height x dia.), with filling tube, steam vent and vertical tube terminating the chute passing through side of vessel. Brass tube, a sliding fit in the central tube, to carry thermometer. Lower end cut at an angle to seal the chute.

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PHYSICS LAB EQUIPMENTS

SURFACE TENSION & VISCOMETER

JAEGER'S SURFACE TENSION

Having a wide mouth reagent bottle fitted with a cork having two holes, in one hole a dropping funnel is fitted. Complete with manometer, capillary tube. All mounted on suitable wooden stand. Without aspirator.

RISING TABLE WITH CAPILLARY TUBE

The apparatus comprise metal frame, on which four capillary tubes of 10cm. long and of different internal diameters are clamped with the help of small metal brackets. The 9 mm. rod is also attached to metal plate, so that complete clamp can be held in any stand for determining the surface tension of liquid by capillary rise method. Its having a cast aluminium 4" dia table with adjustable stand. Maximum height capacity 12".

RISING TABLE

Having a cast aluminium 4" dia table with adjustable stand. Maximum height capacity 12". All metal having brass table of 10 cm. dia with three leveling screws. Coarse and fine height adjustment are provided, very superior and an ideal apparatus.

EXPANSION APPARATUS

Comprising two cast-iron uprights, height 18 cm. linked by two nickel plated rods supporting on expansion bar, length 38 cm. fixed to one upright and resting on a friction pointer placed at the other. With scale reading 0 to 90 deg. With one each aluminium, brass and iron expansion bars.

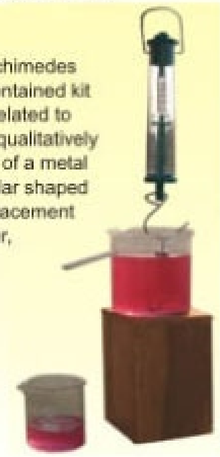
VISCOMETER SEARLE'S PATTERN

It is used for measuring viscosity of very viscos liquids. The outer cylinder can be clamped at any desired height and the inner cylinder is graduated in mms and slot is covered by a transparent cover. Complete with scale pans and releasing pin.

PROPERTIES OF LIQUIDS AND GASES

ARCHIMEDES PRINCIPLE KIT

To explain and calculate Archimedes principle. A complete self contained kit for exploring the concepts related to Archimedes principle, both qualitatively and quantitatively. Consists of a metal regular shaped solid, irregular shaped solid, beaker to collect displacement liquid, beaker. Newton meter, displacement vessel.



GUINEA AND FEATHER APPARATUS

Unevaluated glass tube 50 cms. long, 16mm dia. Made from hard glass, with two rubber bungs, one carrying brass and 40 cm. long pressure rubber tubing to connect to vaccum pump.

EQUALITY OF PRESSURE IN LIQUIDS

To demonstrate the equal transmission by liquids of pressure in all directions. Comparing glass flask with holes and glass piston.

FLUID PRESSURE APPARATUS

Demonstrates the phenomenon of transmissibility of fluid pressure. For the same force exerted, pressure is inversely proportional to the surface area. The apparatus comprises of the plated brass cylindrical tubes of different diameters, each fitted with piston and connected to each other through a brass tube at their bottom. Pistons have circular disc at the top for loading masses (masses not included). Complete apparatus mounted on a wooden base.

TORSION APPARATUS, HORIZONTAL

Searle's pattern. For investigating the torsional rigidity of rods of different materials and to demonstrate that the angle of twist of a given rod over a fixed length is proportional to the applied force. The apparatus consists of two parallel metal support rods with heavy cast metal legs at their either end. One of the legs has ball bearing mounted pulley wheel at its outer side with its spindle carrying split collect chuck for holding one end of test rod while other end of the test rod supported to clamping block on the other leg. When loaded with masses through the nylon cord wound on the pulley wheel, twisting couple if applied to the test rod. Two aluminium scales, graudated 30°-0-30° x 1°, fixed on pillar supports are mounted on the metal supports rods along its length. Also included are two pointers, which when clamped to the test rod along its length and adjacent to the scale, indicates the torsion produced in the rod at that point. Supplied complete with two test rods, one each of brass and steel, nylon cord and hook for carrying masses, but without masses.

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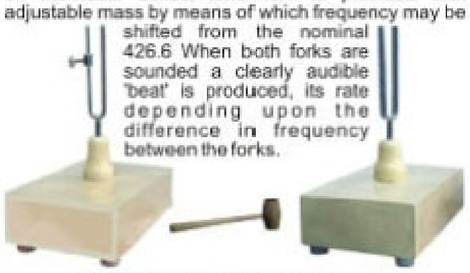
PHYSICS LAB EQUIPMENTS

TUNNING FORKS

PAIR OF TUNING FORK IN A RESONANCE BOX

For demonstrating the production of beat frequencies. Comprises two nickel plated forks A (426.6) mounted on individual boxes. One fork is provided with adjustable mass by means of which frequency may be shifted from the nominal 426.6 When both forks are sounded a clearly audible 'beat' is produced, its rate depending upon the difference in frequency between the forks.



RESONANCE APPARATUS

Comprising two aluminium tubes telescoping into each other so that the column of air within the tube may be altered from 30 cm. To 53 cm. outer tube fits into a removable wooden base.

POWELL'S WAVE MACHINE

For demonstrating longitudinal and transverse motion.
Consisting of a number of eccentric disc supporting a series of metal rods on revolving the handle, transverse waves are obtained. Longitudinal waves are obtained with bent rods running in metal guide on metal base.

TUNING FORK, ELECTRICALLY MAINTAINED

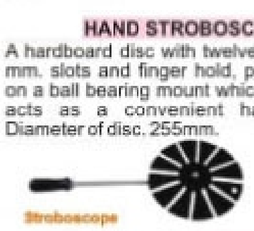
On sturdy streamlined base with provision for horizontal or vertical use. Forks are manufactured from selected steel. Prong is 10 x 25 x 300 mm. accurate frequency adjustment, chrome plated, vibrations rate 60 per seconds. Electromagnet can work on 6 Volts. The amplitude of vibration can vary by sliding the electromagnet inside prongs. Complete with styled, mirror and counterpoise.

MELDE'S APPARATUS

Designed to show the effect of vibrations in a stretched cord, and investigate the relationship between frequency, tension and density. In addition the provision of electrical contacts, opened and closed by the vibrating armature, allow the apparatus to be used as high speed changeover switch in. Comprises a thin steel rod armature, mounted in a clamp formed by a pair of 4 mm. socket terminals, so that its free length may be adjusted as desired. An A.C. energizing coil surrounds the armature and a permanent magnet provides the necessary magnetic polarization. The free end of the armature equipped with a small boss and clamping screw for attachment of the cord and also serves as the moving contact when the apparatus is operating as a changeover switch. The complete apparatus is carried upon a box type base 150x80 mm.

HAND STROBOSCOPE

A hardboard disc with twelve 50x3 mm. slots and finger hold, pivoted on a ball bearing mount which also acts as a convenient handle. Diameter of disc. 255mm.



Stroboscope

Stroboscope, improved model

STROBOSCOPE

This Stroboscope is small in size, light in weight, easy to carry. Although complex and advanced, it is convenient to use and operate. Its ruggedness will allow many years of use.

Specifications : Display : 10 mm (0.4") LCD (Liquid Crystal Display) with function annunciation.

Parameters Measured	:	FPM (Falshes Per Minute)
Ranges	:	2350 A : 50 12,000 FPM
Resolution	:	0.1 FPM (50 999.9 FPM) 1 FPM (over 1000 FPM)
Accuracy	:	± (0.05%n+1d)
Sampling Time	:	0.4 second
Operating Temp	:	0 40°C, Power supply 220V A.C. (default) 110V A.C.
Size	:	220x130x115mm (8.6x5.1x4.5 inch), Weight about 1000 g.

SURFACE TENSION & VISCOMETER

ORGAN PIPE

Stopped, varnished wood, with movable piston marked with the chromatic scale from C (512) to (1024). Overall length when fully extended 840mm. May be used for investing the phenomenon of beats in conjunction with a second pipe of the

BELL IN VACCUM

For use on pump plate not less than 15 cm. dia. Electric Bell operating on 4-6 volts AC/DC, suspended on rubber cord in bell jar. Fine coiled wire connections to terminals mounted in rubber bung sealing the jar.

WAVE FORM, HELIX

Steel wire close-wound helix 20mm. diameter, closed length 3 meters extending to approx. 9 meters, with looped ends.

WAVE FORM, HELIX (SILINKY)

For demonstrating wave motion. Helical coil of flat section tempered steel wire. Coil diameter 7.5 cm. length closed 10 cm. fully extended 3 meters.

RIPPLE TANK & POWER SUPPLY

The ripple tank is a device to illustrate the laws which govern all wave phenomenon using ripples on the surface of water as the prototypes of all transverse waves. Ripple tank illustrates important wave motions like rectilinear and circular. It can also demonstrate refraction, diffraction and interference of water waves. Tank is supported by four legs having levelling screws. Size of the tank is 595x510x70mm supplied complete with rippler assembly, two straight obstacles 130mm long, one straight obstacle 40mm long, curved reflector 200mm radius, transparent refraction plate, wooden wave roller, one pack of rubberbands, water dropper, sponge, illuminator, hand stroboscope and suitable power supply. It is supplied with instruction manual.

RIPPLE TANK POWER SUPPLY

This unit provides current in the Ripple Tank Motor. Supplied with a detachable mains lead.

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PHYSICS LAB EQUIPMENTS

PULLEYS, WHEEL, AXLE & PROPERTIES OF SOLIDS

PULLEY SINGLE

Bench mounting, aluminium, 50 mm. diameter, in metal frame for clamping to benches or boards up to 25 mm thick.

PULLEY ROD MOUNTING

Comprising a 50 mm. diameter pulley carried on an aluminium boss, 20x20x110 mm. long provided with a hole and clamping screw to accommodate rods up to 13 mm. diameter. Tapped holes are provided so that the pulley may be fitted on to the boss with its axis of rotation in any one of the three planes.

PULLEYS DIFFERENTIAL TRIPLE

One-piece aluminium of 38, 50 and 62 mm. mounted in metal frame with hook.

WHEEL AND AXLE, SIMPLE FORM

Consisting of a wooden double wheel with flat bottomed grooves, 150 and 50 mm. diameter respectively. The wheel is pivoted on a spindle 10 mm. diameter which projects for a distance of 100 mm. so that the apparatus may be clamped to a normal retort stand. The apparatus is supplied complete with two hooks and 6 meters of whipcord, but WITHOUT masses and stand.

FLY WHEEL

About 20 cm. in dia. and 45 mm. wide turned and carefully balanced, mounted on a horizontal shaft, held in ball bearings. The wheel is marked and pointer is fixed to the bracket. The bracket has four holes and can be fixed to the wall.

HOOK'S LAW APPARATUS

Consists of a mirror scale 12 cm. long and supports spring, a weight holder and slotted weights of 250 gms. capacity.

HOOK'S LAW STUDENT

This complete apparatus has a 15 cm. adjustable mirror scale, to prevent parallax error, and is graduated in millimeters and mounted on sturdy 30 cm. support rod. A hook supporting a coiled spring with a mass hanger and indicator is attached to the rod. Supplied with slotted weight of 250 gm. capacity.

Picture - B Picture - A

YOUNG'S MODULUS OF WIRE APPARATUS

Searle's Pattern. Spirit level mounted in two rectangular cast iron frame with one end resting on point of micrometer screw, fitted in one frame, the second end of spirit level pivoted in the second frame. The micrometer is provided with vertical scale 10 mm. on either sides of the zero and vernier reading 0.01 mm. Complete with ceiling bracket having two self-centering chucks and tension weight. Supplied in case.

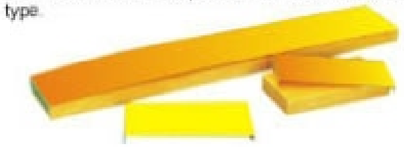
DYNAMICS

INCLINED PLANE WITH ANGLE MEASURER

Hardwood comprising, cut-away base to allow cord to hang freely and hinged plane 60x7.5 cms. with aluminium pulley 28mm diameter, and stepped lower face to accommodate wood block for setting at angles between 24° & 45° approximately with cylindrical metal roller and scale pan.

FRICTION BOARD APPARATUS

Wooden friction board 490 x 75 x 20 mm. a wooden slider with hook 140 x 70 x 20 mm. a plain aluminium slider and an aluminium slider with rubber backing. A further long aluminium slider is provided which fits over the friction board to provide an alternative surface type.



INCLINED PLANE WITH ANGLE MEASURER

Wooden friction board a wooden slider with hook and plain glass slider A further long glass slider is provided which fits over the friction board to provide an alternative surface type.

INCLINED PLANE WITH ANGLE MEASURER

Hardwood comprising, cut-away base to allow cord to hang freely and hinged plane 60x7.5 cms. with aluminium pulley 28mm diameter, and stepped lower face to accommodate wood block for setting at angles between 24° & 45° approximately with cylindrical metal roller and scale pan.

PARALLELOGRAM OF FORCES APPARATUS

To verify the relationship between forces action at a point. Comprises board 65x50cm, with two aluminium pulleys 50mm dia., on clamp, for mounting in any position. Complete with three hangers iron nickel plated 50 gm, and 12 slotted weights of 50 gms. each.

FORCE TABLE

To verify the law of composition and resolution of forces consisting of a aluminium table 40cm in dia. its raised rim has a engine divided scale, graduated in 360° mounted on heavy vertical support rod & tripod base provided with leveling screws. Body under study in a ring in center of the table fastened by cords passing over four pulleys attached with the table. Complete with four pulleys, four weights hangers twelve weights (2x10gm, 2x20gm, 4x50gm, 4x100gm.)

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PHYSICS LAB EQUIPMENTS

MASSES AND WEIGHTS

BALANCE WEIGHTS

Polished brass, supplied with wooden block, as illustrated.

A. **Capacity 500 gm.**
Comprising 1x200 gm, 2x100gm, 1x50gm, 1x20gm, 2x10gm, 1x5 gm, 2x2 gm, 1x1 gm

B. **Capacity 1000 gm.**
Comprising 1x500 gm, 1x200 gm, 2x100 gm, 1x50 gm, 1x20 gm, 2x10 gm, 1x5 gm, 2x2 gm, 1x1 gm.

A

C. **Capacity 2000 gm.**
Comprising 1x1000 gm, 1x500gm, 1x200gm, 2x100gm, 1x50gm, 1x20gm, 2x10gm, 1x5gm, 2x2gm, 2x2gm, 1x1gm.

B

C

BALANCE WEIGHTS

Polished brass, in hardwood case with hinged lid. Divided compartment with dust cover holds nickel-silver and aluminum fractions. With chrome plated brass forceps.

A Capacity **1 mg to 100gm.**
B Capacity **1 mg to 200gm.**
C Capacity **1 mg to 500gm.**
D Capacity **1 mg to 1000gm.**
E Capacity **1 mg to 2000gm.**

A

B

MASSES, SLOTTED

Solid brass, Accurate machined masses placed on a plastic and metal rack with handle.

Set of 8 1x10 gm, 2x20 gm, 1x50 gm, 1x100 gm, 2x200 gm, and 1x500 gm, Total 1100 gm.

Set of 10 1x10 gm, 2x20 gm, 1x50 gm, 5x100 gm, 1x500 gm, Total 1100 gm.

Set of 12 1x1 gm, 2x2 gm, 1x5 gm, 1x10 gm, 2x20 gm, 1x50 gm, 1x100 gm, 2x200 gm, 1x500 gm, Total 1110 gm.

Set of 14 1x1 gm, 2x2 gm, 1x5 gm, 1x10 gm, 2x20 gm, 1x50 gm, 5x100 gm, 1x500 gm, Total 1110 gm.

SET OF MASSES, BRASS

Set comprises masses of brass with slots, brass hangers with hook. Fine finish, masses removable and replaceable on hanger.

A Set of 9 weights, one hanger each of 10 gm. Total weight 100 gm.
B Set of 9 weights, one hanger each of 25 gm. Total weight 250gm.
C Set of 4 weights, one hanger each of 50 gm. Total weight 250gm.
D Set of 9 weights, one hanger each of 100gm. Total weight 1000gm.
E Set of one hanger 20 gm. three weights 20 gm. Total weight 100gm.
F Set of one hanger 50 gm, nine weights 20 gm. One weight 10 gm. and two weights 5 gm. Total 250 gm.

Spare slotted weights and Hangers 5gm., 10gm., 20gm., 50gm., and 100 gm. are also available.

A

B

Above masses are also available in M.S. Chrome Plated.

WEIGHTS AND BALANCES

MASSES ALUMINIUM

Set comprises masses of aluminium with slots, aluminium hanger with hook. Fine finish, masses removable and replaceable on hanger.

SLOTTED MASS SET-CAST IRON

A set of slotted iron masses suitable for use with sono-meters or other applications where a large load is required. The masses and hanger are finished in black color.

A Hanger and Mass each of 500 gm. Total weight 2.5kg.
B Hanger and Mass each of 1 kg. Total weight 5 kg.

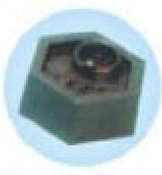
SLOTTED MASS SET IRON

Made from iron shaft with slots painted in black color. Hanger and Mass each of 500 gm. Total weight 2.5 kg. Hanger and Mass each of 1 kg. Total weight 5 kg.

MASSES, IRON

Hexagonal with lifting ring, Within international tolerance.

Weights are 50gm, 100gm, 200gm, 500gm, 1000gm, 2000gm, 5000gm.



WEIGHTS

Weights of brass, Set of five, with hooks on both sides.

ELECTRONIC SCALE "DIGITAL"

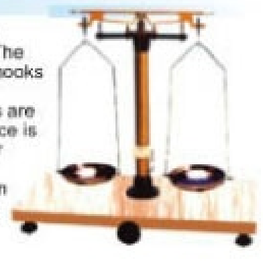
- Strain Gauge Precision Technology
- Capacity x Readability : 5000g x 1g, 3000g x 1g., 2000g x 1g., 1000g x 0.5g, 500g x 0.1g, 200g x 0.1g
- Display Modes : g and oz (optional, upto four units)
- Easy-View LCD Display
- Low Battery Indication/Over-Load Indication
- Auto / Manual Shut - Off
- Powered By 4 x AAA Battery or DC 6V / 220V Adaptor

BABY WEIGHING BALANCE

A single beam scale, robust steel body with epoxy powder coated parts. The beam carries a sliding weight to indicate the weight from 0 to 5kg in divisions of 20 grams each. One hanger and one slotted mass is provided to increase the capacity of the balance. When only the hanger is suspended from the end of the beam the capacity increases to 10 kg and the reading starts from 5 kg onwards on the scale up to 10 kg. On adding the slotted mass on to the hanger the capacity increases to 15 kg and the reading starts from 10 kg onwards on the scale up to 15 kg. The tray is detachable and can be easily replaced in position by sliding on to fixed plate. Second scale is provided which reads 0 to 1 kg in division of 10 gms. Making the total capacity of balance 16 kg in to 10 gms.

BALANCE

Basic general purpose balance for students. The hangers have double hooks for specific gravity experiments, and pans are detachable. The balance is finished in black colour with chrome plated fittings and mounted on polished wooden base with leveling screws.



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PHYSICS LAB EQUIPMENTS

SPRING BALANCES, NEWTON & METRIC

BALANCE LEVER

A direct reading, single pan balance with its scale in the form of a quadrant. The arc scale is graduated in dual ranges of 0-250x 1 gm and 0-1000x5gm which can be set using the weight arm provided. Cast aluminium frame with all steel parts chrome plated. Levelling screw for zero adjustment.

Balance Lever, Single range
Balance Lever, Dual range

BALANCE SPRING

Dial type, circular scale, 6 inches with suspension and load hooks, with zero adjuster.

Capacity	Sub-division
10kg	50 gm.
25kg	100 gm.
50kg	200 gm.
100kg	500 gm.

Compression Balance is also available

BALANCE SPRING

Polystyrene bodies with large, easily read flat scales, zero adjustable device having anodized metal scale is provided.

	Capacity	Subdivision
A	100	1
B	200	2
C	250	2.5
D	500	5
E	1000	10
F	2000	20

BALANCES SPRING

In graduated tubular aluminium, with zero adjustment, provided with top suspension loop and hook, with dual scale in Metric and Newton range.

	Capacity	Sub-division
A	100gm./1N	1 gm.
B	250gm./2.5N	5gm.
C	500gm./5N	10gm.
D	1000gm./10N	20gm.
E	2000gm./20N	40gm.
F	3000gm./30N	50gm.
G	5000gm./50N	100gm.
H	10kg./100N	200gm.

NEWTON METERS

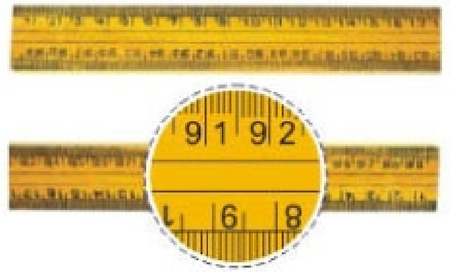
Plastic, tubular Newton spring balances. Each range is colour coded for convenience, and is graduated in both grams and Newtons. The spring mechanism is clearly visible and zero adjustment is incorporated.

	A	B	C	D	E	F
Range	250gm. 2.5 N	500gm. 5N	1 Kg. 10N	2 Kg. 20N	3 Kg. 30N	5 Kg. 50N

LAB MEASURING INSTRUMENTS

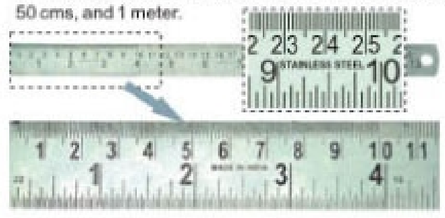
METER SCALE, HARDWOOD

Horizontal reading, length one meter and width 25 mm. Double scale, one edge divided in inches and tenths and other in centimeters and millimeters also available graduated in vertical readings.



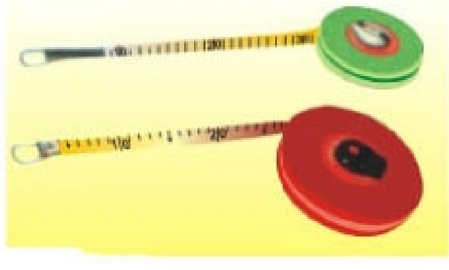
RULES STEEL

Made of steel, graduated in centimeters and millimeters. Rule Steel is available in size 30 cms, 50 cms, and 1 meter.



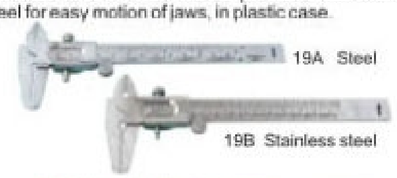
TAPE MEASURES

Both sides metric, or one side metric and other in feet-inches Fiber glass with PVC covering. Non-conducting, waterproof, washable, and water-resistant. Case made of zinc-coated steel sheet, covered with vinyl, & fitted with a flush winding handle. all metal fittings are chrome-plated. The Tape Measures are provided in size 5 meters, 10 meters, 15 meters, 20 meters, 25 meters, 30 meters.



VERNIER CALLIPER

Plated steel, Columbus type calliper enabling the user to read either inside, outside or depth measurements. With dual scale 0-12.5 cm. x 0.1 mm. Imperial scale graduated to 5 x 1/128 inches provided with thumb wheel for easy motion of jaws, in plastic case.



/ERNIER CALLIPER

IME type, Improved design plated steel with dual scale 0-15 cm. x 0.1mm and 6x1/128 inches, provided with thumb movement for easy motion of jaws, in velvet lined box / plastic case.

MICROMETER (SCREW GAUGE)

Made of nickle plated brass, with ratchet top, accurately machined stainless steel rod, range 0-25 x 0.001 mm., supplied in plastic case.

MICROMETER (SCREW GAUGE)

All specifications same as per Model PR-21 but with a lock.

SPHEROMETER

For accurate measurement of the radius of curvature of spherical lenses.
Three - pronged **aluminium** table with three pointed legs carries a vertical main scale from 10-0-10mm on one of the prongs, and a micrometer scale on an Aluminium disc with 100 divisions. The table has a screw at its center with a pitch of 1mm. Giving a least count of .01mm.

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PHYSICS LAB EQUIPMENTS

PROPERTIES OF MATERIAL

SET OF GEOMETRICAL MODELS

Consists of 16 pieces, contains various geometrical models and figures. Made of hard wood and supplied in wooden box.

24/1 size 40mm x 25mm
24/2 size 50mm x 30mm

GEOMETRICAL SHAPES

Set of geometrical shapes, each of circle, triangle, semi-circle, squares and rectangular. Available in Plastic or Wooden.

CONE, DISSECTIBLE

Hardwood, polished, 24 H x 15 cm. base dia. Four different sections- circle, ellipse, parabola, and hyperbola held together by a pin and easily taken apart for demonstration. Can be dissected in 5 parts.

SPECIFIC GRAVITY SPECIMEN CYLINDERS WITH HOOKS

For specific gravity determinations. Each cylinder is 5 cm. long and 13 mm. diameter. Metals included are of aluminium, steel, brass and copper. Available in set or individually.
Set of Four 13mm.
A Aluminium
B Copper
C Brass
D Steel

SPECIFIC GRAVITY BLOCKS

Consisting one block each of brass, aluminium, steel and copper. Set of Four **(A) Aluminium , (B) Copper , (C) Brass, (D) Steel.** The sizes of the blocks are 50x13x13 mm.

CUBES FOR DENSITY INVESTIGATION

Cubes for density investigation, 20mm. Brass, Lead, Steel, Copper, Aluminium, Iron, Tin. Set of 6.

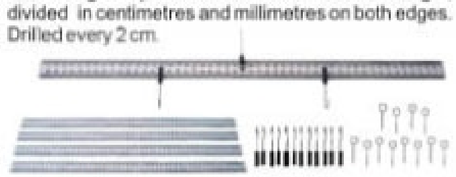
MATERIALS KIT SOLIDS

A variety of materials in the form of rectangular blocks, intended to familiarize the students with the appearance, 'feel', texture hardness and density of a range of common substances. Kit comprises two of each seventeen blocks as below. Blocks, 50x40x30mm.
Softwood, hardwood, paraffin wax, aluminium, Iron, foamed polystyrene Blocks, 20x20x100mm. Perspex, glass, slate, aluminium, softwood, Marble.
Blocks other sizes : Lead 50x50x20mm, Aluminium 50x50x80mm, Hardwood 50x50x200mm, Brass 20x20x50mm, Iron 40x40x20mm.

See also sets of Springs on Page No. 6. Useful for Properties of Materials.

LEVER SIMPLE FORM

For introducing the concept of equilibrium leading to an appreciation of the principle of the beam balance. Consisting of a polished boxwood rule .5m in length, divided in centimetres and millimetres on both edges. Drilled every 2 cm.



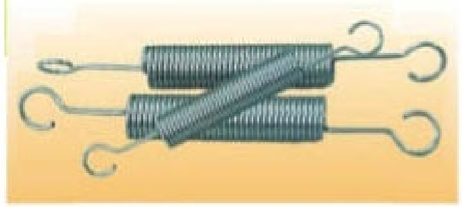
LEVER APPARATUS

Consisting of a graduated meter, rule figured 50-0-50 fitted into a grooved stand with two hangers of 50 gms. each.

ARCHIMEDES APPARATUS

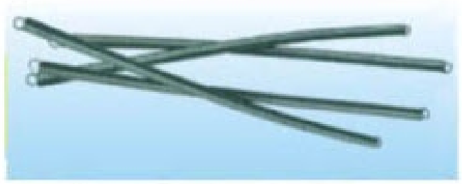
SET OF SPRINGS

Set of springs are flexible with hooks on both sides.



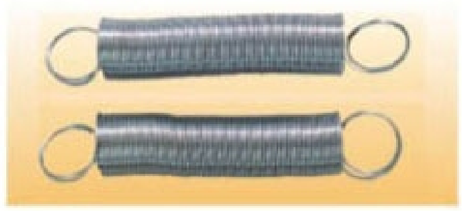
SPRING EXTENSION, STEEL

SET OF SPRINGS



SPRING EXTENSION, STEEL

For demonstrating Hook's Law.
Spring Extension 15x55 mm. length.



DISPLACEMENT VESSEL

Metal, size 115mm x90 mm (HxD) with spout for specific gravity experiments. Also available following two sizes : **100mm x 50mm**
225mmx125mm

DISPLACEMENT VESSEL

Made of glass, for class demonstration with spout for specific gravity experiment, available in following sizes :
A) 250ml B) 500ml.

DISPLACEMENT VESSEL

Aluminium, seamless constructions. This is used for experiments involving volumetric displacement of liquids.

CATCH BUCKET

Made of aluminium, with handle. Used for collecting the liquid overflow flowing from displacement vessel.

BUCKET & CYLINDER

For demonstrating Archimedes principle, this is a simple form in brass, suitable for class demonstration or individual use. The bucket has suspension loop at the top and hook at the bottom. The cylinder has a suspension hook at one end. Size 6 cm long, overall length when extended 16 cm.
A Bucket and Cylinder
B Bucket and Cylinder Large

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PHYSICS LAB EQUIPMENTS

MECHANICAL LAB INSTRUMENTS

DIGITAL STOP CLOCK

Timer, showing normal time, hours, minutes, seconds. Days, dates, months are displayed, 1/100th second. With alarm.

STOP WATCHES

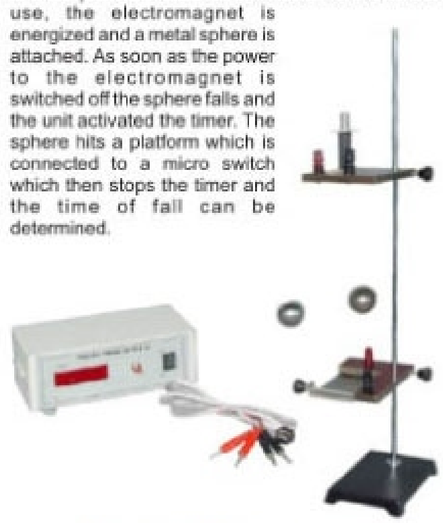
Chrome plated steel case, non-rusting, dust and damp-proof, 7- Jewelled lever movement bold figures, white dial and black steel hands. With start, stop and resent arrangement.

1/5th seconds 30 minutes
1/10th seconds 60 minutes

CENTI SECOND METER

'GRAVITY' BY FREE FALL APPARATUS

For determination of 'gravity' by free fall method. The apparatus consists of an electromagnet which is housed in a plastic moulded case. with socket connections provided to energize the magnet and another pair of sockets for connection to the timers. In use, the electromagnet is energized and a metal sphere is attached. As soon as the power to the electromagnet is switched off the sphere falls and the unit activated the timer. The sphere hits a platform which is connected to a micro switch which then stops the timer and the time of fall can be determined.



LABORATORY TIMER

This is a versatile timer quartz crystal controlled for very high accuracy, which can be used for conducting experiments related to timing and motion with high accuracy. Can be used for G by free fall liner air tracks, dynamic trolleys etc. This timer has an in built power supply for the coil for G by free fall apparatus and lamps for photo gates.

Range : 0.001, 0.01, 0.1 Sec.

The above timer has a built in power source for photo gates and the coil for 'G' by free fall apparatus.

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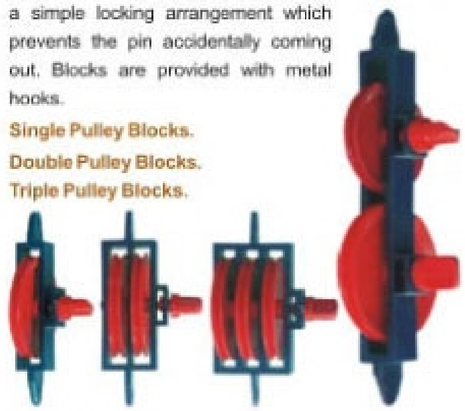
PULLEYS

PULLEY BLOCKS

50mm. diameter plastic pulleys are carried in tough plastic frames. Dearing pin is easily removable and has a simple locking arrangement which prevents the pin accidentally coming out. Blocks are provided with metal hooks.

Single Pulley Blocks.
Double Pulley Blocks.
Triple Pulley Blocks.



PULLEY BENCH CLAMP FITTING

Pulley carried on a two part plastic frame, designed primarily for clamping to the edge of a bench, table etc. With the pulley overhanging the edge and in a vertical plane. The two different sizes are shown in the picture below.

PULLEYS WITH UNIVERSAL CLAMP

A 5 cm. aluminium pulley has a universal frame and can be clamped in any position to a wall, bench, drawing board, corner / edge of a table, or fitted to a retort stand rod of diameter 12.5 mm. Its two clamping screws have bakelite knobs for easy working.

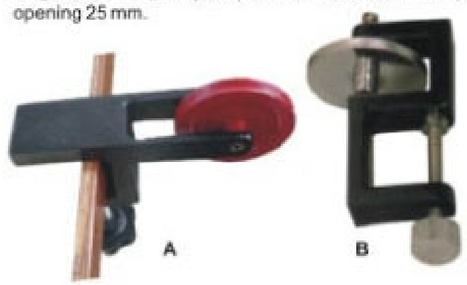
PULLEYS

Mounted in metal frame, with two hooks and accurately centered alingned.

Single	2 Hooks
Double	Parallel
Double	Long
Triple	Parallel
Triple	Long

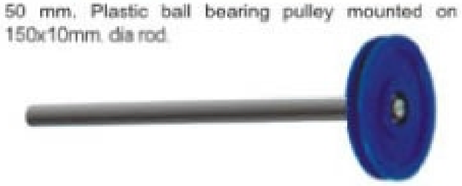
PULLEYS BENCH CLAMP FITTING

Comprising a 50 mm. diameter pulley, carried on a two part aluminium frame, designed primarily for clamping to the edge of a bench, table etc. With the pulley overhanging the edge and in a vertical plane. Overall length of frame (pulley bar) 110 mm. Maximum clamp opening 25 mm.



PULLEY ROD MOUNTED

50 mm. Plastic ball bearing pulley mounted on 150x10mm. dia rod.



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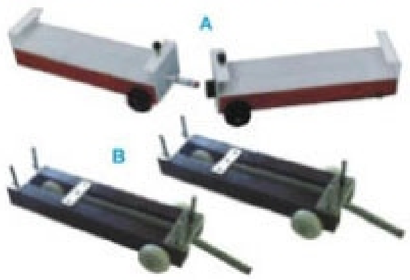
PHYSICS LAB EQUIPMENTS

DYNAMICS

GYROSCOPE

The brass wheel is 7.5 cm. in dia. 3 cm. at its rim, carefully balanced and all three pairs of pivots are adjustable. Complete fitted on stand.

DYNAMIC TROLLEY, WOODEN ARE ALSO AVAILABLE IN OTHER TWO MODELS AS SHOWN IN THE PICTURES (A & B) ARE GIVEN BELOW.



DYNAMIC TROLLEY, WOODEN

A pair of identical wooden trolleys (300mm long), mounted on three wheels. A spring loaded rod is fitted to give impulse when released. It has a provision for stacking the trolleys on top of each other with removable pins. Supplied complete with 3 elastic rings, 3 springs, 8 pins (for stacking), 2 rubber corks 2 needles and 1 releasing pin.

FALLING BODIES APPARATUS

L-Section launcher with holes for locating two 19mm. diameter steel balls which act as projectiles. Launcher is released by push button and projects one ball forward while allowing the other to fall freely Launching mechanism mounted on wooden block, 180x60x30mm. which may be clamped by bench and has a convenient storage pocket for the balls. Complete with two steel balls.

COLLISION IN TWO DIMENSIONS

For demonstrating the principle of conservation of momentum and showing that momentum is a vector quantity having direction as well as magnitude. The apparatus comprises the following items.

1. A curved wooden runway and its highest point, having a groove down which a steel ball may be rolled.
2. An object sphere support. This is an adjustable device which attaches to the mounting plate of the runway and will support a ball either exactly opposite the end of the runway for head-on collision or slightly offset for oblique impacts.
3. A plumb-bob for making the plumb line.
4. Two spheres (steel ball bearing 19 mm. diameter.

MECHANICAL INSTRUMENTS

SURFACE TENSION BALANCE, SEARLE'S

A horizontal frame is mounted on a rod fitted to a base & carries a steel wire stretched across it, the tension of which can be adjusted by a tightening screw. A light metal pointer with a counterpoise is attached to the centre of the wire clamp. A pan is hung from a notch in the pointer and has a hook at its underside from which can be suspended a light weight rectangular frame or a metal clip to hold a micro slide edge. The tip of the pointer moves over a graduated scale. With rectangular wire frame, slide clip, six micro slides & 3 meters of spare wire.

TICKER TAPE TIMER

For the measurement of velocity and acceleration, using timing marks made on a moving paper tape by a vibrating striker. Designed to operate on a 12V A.C. supply and uses the mains frequency as its timing standard. The unit is housed in a moulded case including mounting flanges. The top of the case caries a tape guide which incorporates a carbon paper disc support and an adjustable anvil for the striker point. All moving parts are fully enclosed and a pair of 4mm sockets are provided on the side of the case for connection of the electrical supply. Supplied with a roll of self marking paper tape.

A. Paper tape : 100m of paper tape, 9.5mm wide.
B. Carbon Paper Discs : 40mm diameter, with 3mm hole, cut from long life plastic film type carbon paper.

POWER PACK FOR TICKER TAPE TIMER

STOP CLOCK, MECHANICAL

Two sweep hands, one indicating seconds, the other recording minutes. Start-stop lever on the left hand side, zero reset lever on right hand side. Movement housed in metal case. Runs for 24 hours on one winding. Diameter of dial 100 mm. divided 0-60 x 1. In white powder coated metal case.

DIGITAL STOP CLOCK

This sturdy, lightweight stopwatch has multiple functions you'll use every day, including time and date mode, stopwatch mode, and an alarm ! Digital Stop Clock has 1/100 Sec. (upto 10 Hrs.)* Big Digit, Time, Timer Alarm.

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PHYSICS LAB EQUIPMENTS

MECHANICAL LAB INSTRUMENTS

LINEAR AIR TRACK

Angular section aluminium alloy track, length 255cms, with staggered air holes, supported on two light alloy castings positioned 45 cm from each end of the track. One support has a two- point contact and other one-point contact for lateral and horizontal adjustments for which a knurled screw is provided. Large catapult arms with slots for elastic bands are fitted to each end of the track. A fully fitted to one end of the track enables experiments involving acceleration under a constant force. Identical end caps enable air to be introduced from either end of the track, bung being supplied to close the end not being used. The vehicle buffer attachments and clamping screws are matt black to help interpretation of stroboscopic photographs.

PHOTO GATES & LEADS

These pair of photo gates is housed in tough moulded cases giving them excellent durability. The lamps operate on 6 Volts with a special built in circuitry which prevents lamps from damage in case higher voltage is applied accidently. The photo gates can be connected by 4 mm. sockets to a timer and power supplies.

ELECTRIC BLOWER

The blower is supplied with the standard hose, length 2m, and the integral 2-core mains cable, length 5m. The cylinder has a completely insulated outer case rendering an earth connection unnecessary.

BAR AND GAUGE

For illustrating expansion by heating and contraction by cooling comprising a mild steel bar 110x10mm (lenght), on rod with wooden handle, overall length approx. 280mm. with metal cast gauge, sliding fit over ends of bar and with hole 10mm bore in one arm.

RING AND BALL

An apparatus for demonstrating thermal expansion, comprising a captive brass ball secured to a mounted brass ring by a chain. Ring mounted on rod with a wooden handle. The ball passes through the ring when cold but will not pass through after being heated. Ball dia. 25 mm.

HEAT AND ENERGY TRANSFER APPARATUS

DRINKING BIRD

A classic toy that is really a heat engine. The bird operates because evaporation is a cooling process. After placing bird in motion, it will continue to drink as long as there is water in the cup and the room temperature is above 65°F.

LINEAR EXPANSION APPARATUS

Consisting of a metal rod, 500mm in length and 4.5mm diameter, enclosed in a well lagged, nickle plated brass tube with three tubules for steam, inlet, outlet and thermometer. The metal rod to be studied is supported in the steam jacket by detachable conical cups situated at each end of the tube. The apparatus is carried on a heavy gauge channel base, at one end of which is an adjusting screw. At the opposite end is a micrometer screw reading to 0.01mm for measuring the expansion. Supplied complete with copper, brass & iron rods but without thermometer.

COMPOUND BAR

To show the differential expansion of metals in a bimetallic strip. Comprising a length of bimetal strip 150x15mm mounted in a wooden handle. The strip is only 1mm thick so that very little heat is required to produce considerable bending. Length overall 270mm approx.

BAR BREAKING APPARATUS

To show the forces which can be exerted during thermal expansion or contraction. Comprising a heavy cast iron frame 340x120x100mm with slotted end pillars to carry a stout iron bar. The bar is threaded at one end for a large tensioning nut and has holes at the other end to accommodate the cast iron breaking bars. Supplied complete with ten breaking bars.

ENERGY TRANSFER APPARATUS

The Malvern energy transfer kit comprises a number of separately available units, which enable the user to show qualitatively energy conversion from one form of energy to another in a variety of different ways. All units are carried on a standard base and provided with socket terminals where appropriate.

FLY-WHEEL UNIT

For use with a large motor/generator and a lamp unit to demonstrate the conversion of electrical energy to kinetic energy and then back again. Comprising an iron flywheel, mounted in cast brackets with bearings. The shaft has an aluminium 'V' pulley for driving with the spring belt supplied.

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PHYSICS LAB EQUIPMENTS

ENERGY TRANSFER

SPRING UNIT OF MECHANICAL MODEL

For showing potential energy in a wound-up spring and its conversion to electrical energy by driving a dynamo and lighting a lamp. May also be used to wind up a weight on a cord showing the change from potential energy to kinetic and back to potential in the raised weight. The steel shaft carries a clock spring with a free wheel device and winding ratchet, also an aluminium 'V' pulley 56 mm. diameter. One end of the shaft overhangs the base for use as line shaft when winding up a weight. Dimensions 220 x 100 x 100 mm. high. Supplied complete with driving belt.

LAMP UNIT, TRIPLE

For use with motor/generator to give an indication of their output when used as dynamos. The lamp-holders are connected in parallel. Supplied with three lamps 3.5 V 0.25 A, M.E.S.

LINE SHAFT UNIT

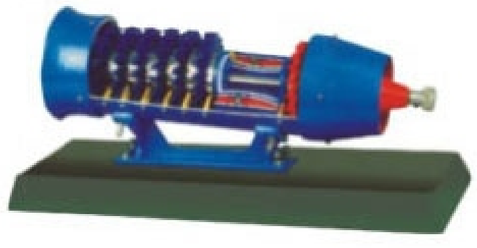
For showing the conversion from electrical energy via mechanical, to potential energy by winding up a weight on a cord. One end of the 6mm. steel shaft carries an aluminium 'V' pulley 56 mm. diameter, and the other end is fitted with a cord anchoring collar. Supplied complete with driving belt.

TURBINE / PUMP UNIT

For use as a water turbine to drive a generator producing electricity or for use as a pump driven by a motor and raising a head of water to produce potential energy. The rotor has eight 'bucket' blades and is housed in a block turbine chamber with a clear Perspex front. Two inlet tubules (for turbine and pump operation respectively) and one outlet tubule are provided, and the shaft carries a 15 mm. diameter pulley. With driving belt.

GAS TURBINE / TURBOJET ENGINE

The cut section is constructed model is of light and strong metal showing air intake, axial flow, double stage compressor, fuel supply, combustion chamber, turbine rotor, jet thrust, exhaust etc. Complete on base.



MODEL ENGINE & DYNAMO DEMONSTRATION

DEMONSTRATION ELECTRIC MOTOR

A model of the simplest form of D.C. electric motor, having 2-pole armature wound with enamelled copper wire, and a permanent magnetic field provided by a removable bar magnet. A disc-type commutator is incorporated and external connection to the phosphor-bronze bushes is by means of a pair of 4 mm. sockets. The motor will operates on 6-8 Volts D.C.

DEMONSTRATION DYNAMO

This model uses the same basic assembly as the motor, but is mounted on a baseplate 230 x 90 mm. approx. which also carries a hand-drive pulley 120mm. diameter coupled to the smaller dynamo pulley by a rubber belt to give a step-up ration. Electrical output is via a pair of 4mm. sockets. The model may also be used as a motor on a 6-8 V D.C. supply.

MILLIKAN'S OIL DROP APPARATUS

Determination of charge on a electron by measuring a known distance on the basis of number of times of fall under gravity, and of rise in uniform vertical electrostatic field in a series of charged oil drops.

APPARATUS TO SHOW ON CONDUCTOR IN A MAGNETIC FIELD

Comprising a strong U-shaped magnet and a pair of brass rails with 4 mm socket terminals. A brass axle with plastic discs is free to roll along the rails and completes the electrical contact between them. When the axle is placed on the rails between the poles of the magnets, and power supply unit is connected, the axle is repelled and rolls along the rails away from the center of magnetic field. Dimensions 175x60x58 mm.

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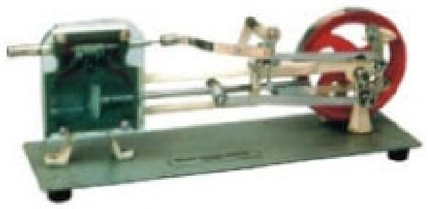
PHYSICS LAB EQUIPMENTS

MODEL ENGINE

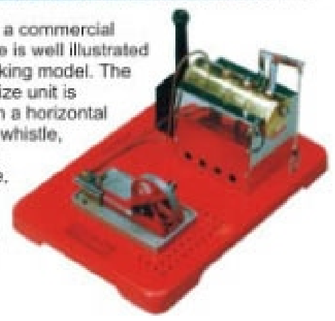
STEAM ENGINE MODEL

Operation of a commercial steam engine is well illustrated with this working model. The extra large size unit is provided with a horizontal boiler with a whistle, safety valve, steam gauge, on metal base. Operates on 220V A.C. 50 Hz.



STEAM ENGINE MODEL WITH BOILER

Operation of a commercial steam engine is well illustrated with this working model. The extra large size unit is provided with a horizontal boiler with a whistle, safety valve, steam gauge, on metal base. Operates on 220V A.C. 50 Hz.



FOUR-STROKE DIESEL ENGINE MODEL

A model of four stroke water -cooled diesel engine. This is of the chain-driven overhead camshaft type and all functional components like camshaft, rock-arms, tappets etc. are clearly demonstrated. The functioning of fuel injection system is also represented. Ignition is shown by means of a maniature bulb. Mounted on base.

TWO STROKE DIESEL ENGINE MODEL

A model of two-stroke diesel engine made in aluminium alloy and gun metal. Ignition is shown by means of a miniature bulb. Fuel supply is also sectioned. With hand crank, provided for manual operation. Mounted on base.

FOUR STROKE PETROL ENGINE MODEL

Represents internal structure and operating principles of an air cooled two-stroke engine. All parts in aluminium alloy. Ignition is shown by means of a miniature bulb. Carburetter and fuel supply also sectioned. Mounted on base, with printed diagram showing working.
Two-Stroke Petrol Engine
Four-Stroke Petrol Engine are also available.

TWO STROKE PETROL ENGINE MODEL

Represents internal structure and operating principles of an air-cooled two-stroke engine. All parts in aluminium alloy. Ignition is shown by means of a miniature bulb. Carburetter and fuel supply also sectioned. Mounted on metal base.

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