

PHY-101
PULLEY, SINGLE PLASTIC
 Pulley made of polypropylene, 50 mm dia. mounted in metal frame with hooks.

PHY-102
PULLEY, SINGLE METAL
 Made of aluminium pulleys of diameter 50 mm mounted in metal frame with hooks.

PHY-103
PULLEY-DOUBLE PARALLEL PLASTIC
 With two wheels of polypropylene pulley of diameter 50 mm mounted in a metal frame with hooks.

PHY-104
PULLEY-DOUBLE PARALLEL METAL
 With two wheels of aluminium pulleys of diameter 50 mm mounted in a metal frame with hooks.

PHY-105
PULLEY-TRIPLE PARALLEL PLASTIC
 With three wheels of polypropylene pulleys of diameter 50 mm mounted in a metal frame with hooks.

PHY-106
PULLEY-TRIPLE PARALLEL METAL
 With three wheels of aluminium pulleys of diameter 50 mm mounted in a metal frame with hooks.

PHY-107
PULLEYS-DOUBLE IN LINE METAL
 Two aluminium pulleys of diameter 50 and 40 mm in metal frame with two hooks.

PHY-108
PULLEYS-TRIPLE IN LINE METAL
 Three aluminium pulleys of diameter 50, 40 and 30 mm in metal frame with two hooks.

PHY-109
PULLEY ALL PURPOSE
 Pulley 50 mm dia made of aluminium with groove for cord, mounted in metal frame. The frame is universal type with two clamping screws. The Pulley can be clamped in any position on bench, rod upto 13mm dia., wall or on table etc.

PHY-110
PULLEY, ROD TYPE
 Pulley 30 mm dia made of aluminium, mounted on light alloy rod size 150 x 10 mm.

PHY-111
PARALLELOGRAM OF FORCES APPARATUS
 To verify the relation between forces acting at a point. A board of 750 x 500 mm fitted with two pulleys 32 mm diameter with clamp for mounting in any position; four S-hooks, scale pan 100 mm diameter. Supplied with pulleys and masses.

PHY-112
WHEEL AND AXLE SIMPLE
 Two wooden wheels 150 mm and 50 mm diameter with flat bottomed grooves. Supplied with two hooks and cords but without stand or masses.

PHY-113
WHEEL AND AXLE COMPOUND
 Metal wheel 100 mm dia, axle 50 mm and 25 mm dia, mounted on adjustable steel cones in steel frame, mounted on a wooden board with 4 holes for wall mounting.

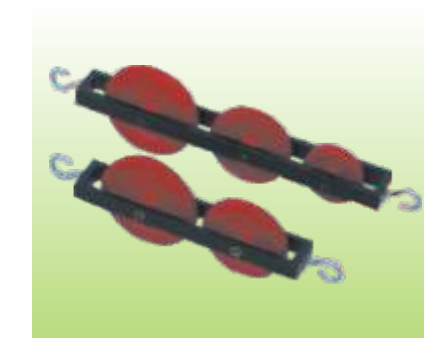
PHY-114
FORCE TABLE
 To verify the laws of composition and resolution of forces, comprising a machined aluminium table 40 cm dia., scale graduated 360°, on heavy vertical support rod and tripod base. Complete with one ring, 4 sliding clamp pulleys. Supplied with four cords with rings at one end, without masses.

PHY-115
CUBES ASSORTED MATERIAL
 10 mm side comprises of assorted material set of 6 (aluminium, copper, brass, iron, lead, zinc)

PHY-116
CUBES ASSORTED MATERIAL



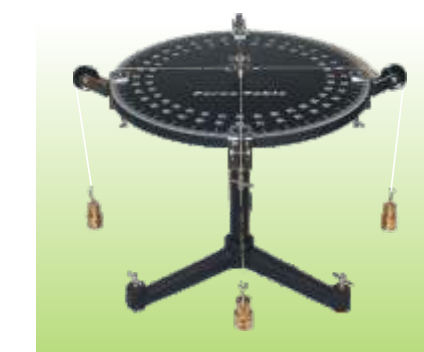
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PHY-107, 108



PHY-113



PHY-114

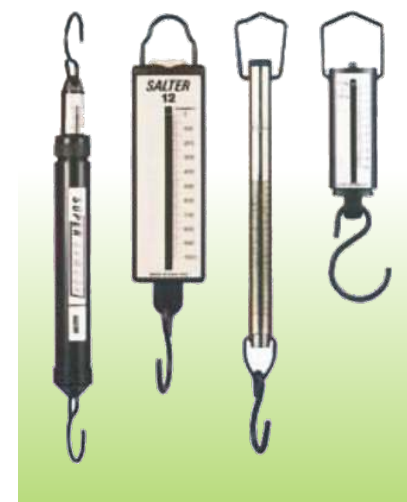




PHY-116



PHY-118



PHY-120,123,124

20 mm side comprises of assorted material set of 6 (aluminium, copper, brass, iron, lead, zinc)

PHY-117

BUCKET AND CYLINDER

To demonstrate the principle of Archimedes. Brass, bucket with suspension loop at top and a hook at bottom, with the cylinder having a suspension hook at top. Cylinder is 50 x 16 mm dia, overall length including hook and suspension loop is 110 mm approx.

PHY-118

DISPLACEMENT VESSEL, METAL

With overflow spout for specific gravity experiments; size of vessel 115 mm x 50 mm approx.

PHY-119

DISPLACEMENT VESSEL, PLASTIC

With overflow spout for specific gravity experiments, size 100 x 44 mm approx.

PHY-120

SPRING BALANCE

All metal, with thumb operated Knurled zero adjuster, suspension ring & load hook.

PHY-120.1	0 to 100 g x 1 g.
PHY-120.2	0 to 200 g x 2 g.
PHY-120.3	0 to 500 g x 5 g.
PHY-120.4	0 to 1 kg x 0.01 kg.
PHY-120.5	0 to 2 kg x 0.02 kg.
PHY-120.6	0 to 5 kg x 0.05 kg.
PHY-120.7	0 to 10 kg x 0.1 kg.
PHY-120.8	0 to 20 kg x 0.2 kg.
PHY-120.9	0 to 50 kg x 0.5 kg.
PHY-120.10	0 to 1 N x 0.01 N.
PHY-120.11	0 to 5 N x 0.05 N.
PHY-120.12	0 to 10 N x 0.1 N.
PHY-120.13	0 to 20 N x 0.2 N.
PHY-120.14	0 to 50 N x 0.5 N.

PHY-121

SPRING BALANCE, GRAM SCALE

Plastic body, rectangular shape, metal scale, with zero adjuster, suspension ring and load hook.

PHY-121.1	0 to 100 g x 1 g.
PHY-121.2	0 to 200 g x 2 g.
PHY-121.3	0 to 500 g x 5 g.
PHY-121.4	0 to 1000 g x 10 g.
PHY-121.5	0 to 2000 g x 20 g.

PHY-122

SPRING BALANCE, NEWTON SCALE

Same as PHY-121, but with scales in newtons.

PHY-122.1	0 to 1 N x 0.01 N
PHY-122.2	0 to 2 N x 0.02 N
PHY-122.3	0 to 5 N x 0.05 N
PHY-122.4	0 to 10 N x 0.1 N
PHY-122.5	0 to 20 N x 0.2 N

PHY-123

SPRING BALANCES, GMS & NEWTON SCALE

Same as SMC-10119, but with scales in gms and newtons.

PHY-123.1	0 to 100g/1 N
PHY-123.2	0 to 200g/2 N
PHY-123.3	0 to 500g/5 N
PHY-123.4	0 to 1000g/10 N

PHY-124

SPRING BALANCE, TUBULAR

Most accurate brass barrel, with adjustable zero, suspension ring and hook.

PHY-124.1	100 g to x 1 g
PHY-124.2	200 g to x 2 g
PHY-124.3	500 g to x 5 g
PHY-124.4	1000 g to x 10 g
PHY-124.5	2000 g to x 20 g

PHY-125

SPRING BALANCE, TRANSPARENT

In plastic transparent body, with upper & lower suspension hooks.

PHY-125.1	1 N x 0.05 N
PHY-125.2	2 N x 0.5 N

PHY-125.3	5 N x 0.5 N
PHY-125.4	10 N x 0.5 N
PHY-125.5	50 N x 1 N

PHY-126

SPRING BALANCE, DIAL TYPE

A heavy metal body knurled zero adjusting knob; strong plated steel hanger and load hook.

PHY-126.1	0 to 5 kg x 20 g
PHY-126.1	0 to 25 kg x 100 g

PHY-127

SET OF MASSES, BRASS 100 Gms.

Set comprises a 10 gms wire hanger with nine slotted masses of 10 gms. Accuracy $\pm 3\%$, total 100 gms.

PHY-128

SET OF MASSES, BRASS 200 Gms.

Masses are made of nickel plated brass and are accurately adjusted. Housed in a wooden box.

PHY-129

SET OF MASSES, BRASS 500 Gms.

Set comprises a 50 gms wire hanger with nine slotted masses each of 50 gms. Accuracy $\pm 3\%$, total 500 gms.

PHY-130

SET OF MASSES, BRASS 1000 Gms.

Set comprises a 100 gms wire hanger with nine slotted masses each of 100 gms. Accuracy $\pm 3\%$, total 1000 gms.

PHY-131

SET OF MASSES, SLOTTED

Set comprises 20g hanger with three masses each of 20g, one of 10g, two of 5g each, brass plated total 100g.

PHY-132

SET OF MASSES, SLOTTED

Set comprises 50g hanger with 9 masses each of 20g, one of 10g, two of 5g, each, brass plated, total 250g.

PHY-133

SET OF MASSES, IRON SLOTTED

Set comprises 1 kg hanger, 4 slotted masses of 1kg each, stove enamelled total 5kg.

PHY-134

HANGERS FOR SLOTTED MASSES

PHY-134.1	20g
PHY-134.2	50g
PHY-134.3	100g

PHY-135

MASSES WITH HOOK CYLINDRICAL

Brass plated, with loop on one side and hook on the other side.

PHY-135.1	10g	PHY-133.2	20g
PHY-135.3	50g	PHY-133.4	100g

PHY-136

DYNAMICS TROLLEY

Made of wood, 300 mm long, metal reinforced ends, three low-loss ball-bearing wheels and fitted with spring loaded impulse rod. Rod has three positions to provide different impulses and is triggered by a release pin. Four removable metal legs to enable stacking of trolleys.

PHY-137

CARBON PAPER DISCS

Pack of 100.

PHY-138

TICKET TAPE

Ticker tape, width 9 mm, in rolls approximately 300 meter long.

PHY-139

TICKER TAPE TIMER-A.C.

The timer employs electromagnet, with spring loaded armature which vibrates above a support table for a carbon paper disc. Paper tape, drawn through guides on the table, is struck by a dotting screw carried on the armature. The peg on the support table is movable to allow maximum use of carbon paper discs. The ticker tape timer produces dots spaced at 1/50 or 1/60s intervals depending on main frequency. Operates on 12 V a.c. with Power supply and paper roll.



PHY-125



PHY-128



PHY-133



PHY-136





PHY-139

PHY-140

INERTIA BAR

Metallic bar of 25 cm length, discs at the ends are screwed and can be removed. Split chuck for clamping can be screwed in the middle of the bar.

PHY-141

INCLINED PLANE, SIMPLE AND FRICTION BOARD

Inclined wood plane, 600 x 75 mm, hinged to base at one end carries a pulley at the other. A movable block enables variation of inclination of plane, a friction slide of size 100 x 65 mm which is reversible and has one side cut away for half of its area. Complete with metal roller 75 x 25 mm dia, with pan but without masses.

PHY-142

INCLINED PLANE

Inclined wood plane 600 x 75 mm with pulley at one end, the other being hinged to wood base. A metal linear scale is fixed to edge of plane and a vertical, linear and an angular 0-45° scale is fixed to base, with a clamp which also serves as an index. Supplied with metal roller 75 x 25 mm length x dia a wooden block and a scale pan with cord.



PHY-142

PHY-143

INERTIA BALANCE

Comprising of two metal trays 130 x 55 x 23 mm are joined together with two spring steel strips of 10 mm width, the distance between the trays being 215 mm. One tray is drilled to accept 3 equal cylindrical masses. The other tray can be clamped to a bench horizontally or vertically. Complete with 3 masses and a 'G' Clamp.

PHY-144

SIMPLE PENDULUM, STEEL/LEAD/BRASS

Comprising a solid sphere with a small ring of suspension. Available in three sizes as listed below.

		Dia in mm.
PHY-144.1	Lead	13
PHY-144.2	Lead	19
PHY-144.3	Lead	25
PHY-144.4	Brass	13
PHY-144.5	Brass	19
PHY-144.6	Brass	25
PHY-144.7	Steel	13
PHY-144.8	Steel	19
PHY-144.9	Steel	25

PHY-145

COMPOUND PENDULUM

Metallic bar 1000 x 19 x 6 mm with holes at every 50 mm along the centre line. For the suspension of the bar, a steel knife edge is mounted in a wall bracket.

PHY-146

FLY WHEEL

Made of cast iron about 20 cms in dia by 35 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 can be fixed to the wall also.



PHY-144

PHY-147

HOOK'S LAW APPARATUS

Consists of a 12 cm adjustable mirror scale mounted on a support, an adjustable hook and a spring with a weight hanger are attached to the top of the rod. Supplied without masses.

PHY-148

TORSION APPARATUS (HORIZONTAL)

Consisting of two metallic brackets are held together with connected rods. A heavy metallic pulley mounted on one bracket & is fitted with a three jaw chuck to hold one end of the test rod, the other end being held in other chuck fixed to the other bracket. Two graduated scales are mounted on the connecting rod & two pointers can be clamped in any desired position on the test rod, with one brass & one steel test rod but without masses.

PHY-149

YOUNG'S MODULUS APPARATUS, SEARLE'S PATTERN

The Instrument consisting of two frames connected by a link, which also carries a spirit level. A micrometer head reading to 0.01 mm is provided to re-adjust the spirit level. With two self centering wire pin chucks, a ceiling bracket also with two pin chucks, a counterpoise weight and supply of suitable wires and slotted masses.



PHY-147

PHY-150

SPECIFIC GRAVITY BOTTLE



Spherical pattern, adjusted light blown glass available in neutral and Borosilicate glass, with flat bottom and perforated stopper. Capacity in ml.

PHY-150.1	Neutral Glass	Cap. 25 ml
PHY-150.2	Neutral Glass	Cap. 50 ml
PHY-150.3	Borosilicate Glass	Cap. 25 ml
PHY-150.4	Borosilicate Glass	Cap. 50 ml

PHY-151

ANEROID BAROMETER

100 mm dial scale 960 to 1060 mb (28-31 in x 0.1 in). Movement mounted in a sturdy frame with glass in anodised bezel with lug for rear mounting.



PHY-149

PHY-152

FORTIN'S BAROMETER

A 6 mm glass tube contained in an brass case, mounted on a polished wooden board with plates for fixing to wall, open plate reflectors and ring and screws for vertical adjustment. The silvered scales, graduated in inches and mm are read by vernier moving by Rack and Pinion to 1/200 in and 1/10 mm and are enclosed in glass cylinder. A glass cylinder at the lower end of the Barometer is provided with an ivory point to which the level of the mercury in the cistern is adjusted before readings are taken. Fitted with thermometer with centigrade and Fahrenheit scale. Supplied without mercury.

PHY-153

MERCURY FOR BAROMETER 500 GMS

PHY-154

BAROMETER CASE

For Fortin's barometer made of wood nicely polished with three sides glass panels.



PHY-155

HARE'S APPARATUS

Comprising three limbed glass tube mounted on polished wooden stand with scale in cm and mm. Two metal sliding distance rods may be so adjusted that their lower ends just touch the surface of the liquid under experiment to facilitate column height readings.

PHY-156

BOYLE'S LAW APPARATUS

Two glass tubes 220 mm long, one is closed at the top and other one is open and connected by 1 Meter pressure rubber tubing. Both the tubes are mounted on the brackets which can be locked in any portion on the metal supporting rods. Stand carries a graduated scale 0 to 100 cm. Mercury required for this apparatus is approx. 30 cm. Supplied without mercury.

PHY-157

MERCURY FOR BOYLE'S LAW APPARATUS

PHY-158

LIFT PUMP

Glass model, with visible valves. 350 mm height working model.

PHY-159

FORCE PUMP

Made of glass, working model with visible valves, mounted on wooden stand.

PHY-160

PRESSURE OF LIQUID APPARATUS

Glass tube with plunger having a bulb at the bottom. The bulb has holes around its circumference and glass piston. The jet of the liquids from the orifices at different heights of the container demonstrate the characteristics of the pressure exerted by a liquid on the walls of its container.

PHY-161

LIQUID LEVEL APPARATUS / COMMUNICATING VESSEL

Four glass tubes of different shapes and size mounted vertically above a horizontal communicating tube for liquid level demonstrations. Vessels of different sizes on a plastic base.

PHY-161.1 Mounted on a Bakelite stand. PHY-161.2 Mounted on a Wooden stand.

PHY-162

MANOMETER

Manometer with built-in stopcock mounted on a back plate, calibrated and graduated 80-0-80 mm.

PHY-163

BOURDON GAUGE

A circular gauge having an overall diameter of 100 mm and a depth of 40 mm. Fitted on a base, with a tubule to provide connection to the pressure system.

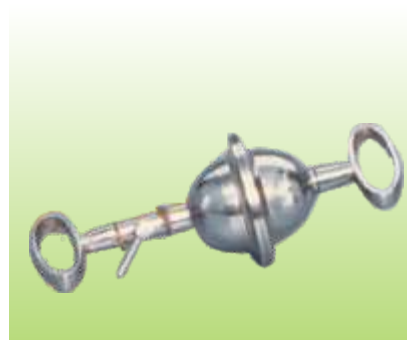
PHY-164

HEMISPHERE MAGDEBURG



PHY-156





PHY-162



PHY-163



PHY-165



PHY-171

75 mm dia approx. with stopcock and handles, one of the handle can be unscrewed.
PHY-164.1 Aluminium PHY-164.2 Brass

PHY-165

HYDROMETERS, NICHOLSON

For density experiments on solids and liquids, made of brass chromium plated, hollow body joints soldered with upper loading pan and lower loaded weighted pan.

PHY-166

HYDROMETERS, UNIVERSAL

Glass. A direct reading relative density hydrometer of streamlined form with parallel graduated stem and shot-loaded bulb. Range:- 0.700 to 2.000

PHY-167

SURFACE TENSION BALANCE, SEARLE'S

The sturdy Frame is mounted on a rod fitted to the base & carries a spring steel wire stretched across it; the tension can be adjusted by the tightening of the screw. Metal pointer with a counterpoise is attached to the centre of the wire by a clamp and a pan is hung from the 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, provided with rectangular wire frame, slide clip & 6 micro slides.

PHY-168

CAPILLARY TUBE APPARATUS

Metallic frame with six glass tubes of different bores, each of 150 mm length, fitted with corks, to show different heights of water column in different bore tubes.

PHY-169

SMOKE CELL

For demonstrating Brownian motion. A short cylindrical cell, closed by a cover glass, is held vertically in an opaque channel, 90 x 90 x 30 mm. Illumination is by an integral filament bulb and cylindrical glass lens. The cell enables Brownian motion to be observed for at least 15 minutes after charging the cell with smoke / fitted 4 mm socket terminals for connection 12 V supply.

PHY-170

AIR PUMP

Made of brass, Single action pump with oiled silk valves, cylinder 20 cm. x 3.2 cm drawplate 175 mm dia, with stopcock, and inlet screw fitted on wooden polished base.

PHY-171

BALL AND RING APPARATUS

Experiment to show that the ball passes through to the ring when cold but will not pass through after being heated. Comprising a brass ball 25 mm dia, a brass ring mounted on a rod with a handle, a chain is provided to hold the ball with the ring.
171.1 Mounted on a tripod base.

PHY-172

BALL AND RING APPARATUS

Same as PHY-171 but the Ring & ball with separate handles.

PHY-173

MOTOR VACUUM PUMP

Pressure limit 10-30 Pa, Rotary speed : 1400 rpm, Air bleeding speed 1.5m³/h, power 120 W, 220V 50Hz Plate dimension 20 cm approx.

PHY-174

GUNTHER EXPANSION APPARATUS

Comprising a double metal-plastic jacket enclosing rods which are to be raised to a temperature of 100C. a micrometer mounted on one end-piece of the support shows the increase in length of the sample rod to accuracy of 0.005mm. Complete with one brass, one aluminum and one iron rod, length 500mm approx.; mounted in the double jacket. Supplied with two plastic pipes 1500mm long each.

PHY-175

BAR AND GAUGE

To show Expansion and contraction of a metal, a casted brass gauge with wooden handle, sliding fit over ends of bar and with hole in both arms, and a mild steel bar 100 x 10 mm with wooden handle.

PHY-176

BAR BREAKING APPARATUS

A heavy cast iron base with 4 uprights, on one end of which is fitted a hand nut the other drilled with holes to carry a cast iron rod of 75 x 6 mm size bearing against narrow flats, with 10 cast iron breaking rods.

PHY-177

LINEAR EXPANSION APPARATUS

The elongation of rod is measured by a micrometer screw. The brass tube is 50 cms x 2.5 cm C.P. With inlet and outlet tubes for steam and opening for thermometer and reading to 1° x 110° C. The binding posts are provided on the supports for connecting a bell, buzzer of galvanometer for indicating the exact point of contact of the screw. Provided with three rods of brass, iron and aluminium without bell and battery.

PHY-178

EXPANSION OF LIQUIDS APPARATUS

Made up of 5 glass bulbs with stem, total height of 400mm approx. Mounted on panel with 5 graduated on panel scales in mm. Complete with metal trough for the uniform and simultaneously heating of the 5 glass bulbs. To show different liquids have different thermal expansions. The frame has clamps to secure it to the trough and two cross members, the lower cross member having holes and upper tubules to locate the bulb tubes in bungs complete with 35 mm dia bulbs and 15 cms scales etc.

PHY-179

HYPSONOMETER

Hypsometer Regnault's is double walled copper cylinder size 340 x 60 mm, mounted on steam boiler, with thermometer tubule at top and side outlets for manometer and draining.

PHY-180

COMPOUND BI METALLIC STRIP

For showing the differential expansion of two different metals. Brass & iron size 200 x 25 mm provided with wooden Handle.

PHY-181

HOPE'S APPARATUS

To determine maximum density of water, made of iron sheet cylinder mounted on a base having 2 tubulatures for thermometers, with a gallery for placing mixture of ice and salt. The respective temperatures of water at the top and bottom of the inner cylindrical vessel are measured over a period as the water cools. Complete with bungs and thermometers.

PHY-181.1 50 mm dia x 300 mm

PHY-181.2 50 mm dia x 200 mm

PHY-182

CHARLE'S LAW APPARATUS

With a glass U tube with a bulb and tap at the upper end of one limb and other limb open. From the bottom of the 'U' is an outlet tube which passes through a bung and terminates in a tap. The stem below the bulb is graduated 3 x 0.1 ml, an inlet tube with Mohr clip also passes through the bung. The glass water jacket encloses the U tube. All glass parts made of borosilicate glass required only 20 ml mercury. Without mercury

PHY-183

CALORIMETER COPPER

Made of Copper, one piece spinning with parallel sides and rolled rim.

PHY-183.1 75 x 50 mm

PHY-183.2 100 x 75 mm

PHY-184

CALORIMETER ALUMINIUM

Made of aluminium, one piece spinning with parallel sides and rolled rim.

PHY-184.1 75 x 50 mm

PHY-184.2 100 x 75 mm

PHY-185

CALORIMETER SET

Set consisting of a joint less copper calorimeter 75 x 50 mm on rubber supports, spun outer copper vessel of 100 x 75 mm dia. copper lid for outer vessel with central tubule for thermometer and slit for copper stirrer, complete with copper stirrer.

PHY-186

CALORIMETER SET

Copper calorimeter 75 x 50 mm, insulated, outer vessel of 100 x 65 mm size with a plastic cover having holes for thermometer and stirrer. Holder for thermometer is fixed to the outer vessel. Complete with stirrer.

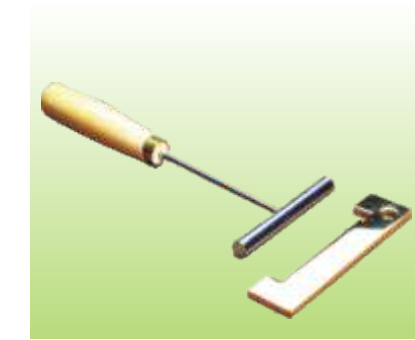
PHY-186.1 With Copper outer vessel

PHY-186.2 With Aluminium outer vessel

PHY-187

CALORIMETER, JOULES

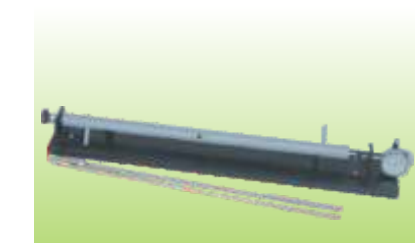
Polished outer wooden base, aluminum container placed with thermometer, plastic top fitted with two terminals for heating coil and a hole for thermometer.



PHY-175



PHY-176



PHY-177



PHY-180



PHY-182





PHY-186

PHY-188

CALORIMETER, JOULES

Copper calorimeter of size 63 x 63 mm enclosed in an outer vessel of 80 x 90 mm size, with lid having terminals, a heating coil suitable for 3-6 V supply and holes for thermometer and stirrer, nickel plated. With stirrer but without thermometer.

PHY-189

BLOCK CALORIMETER

Metal, for experimental determination of specific heat of different metals, cylindrical metal blocks 1 kg \pm 2%. Each block has a central hole for a special immersion heater and a smaller hole for thermometer.

PHY-189.1 Aluminium alloy

PHY-189.2 Mild steel

PHY-189.3 Copper

PHY-189.4 Brass

PHY-190

CYLINDERS SET EQUAL IN SIZE

A set of six metal cylinders 40 x 10 mm dia of copper, brass, iron, zinc, lead and aluminium.

PHY-191

CYLINDERS SET EQUAL IN MASS

A set of six metal copper, brass, aluminium, zinc, iron and lead each of 100gms \pm 10%.

PHY-192

STEAM BOILER WITH WATER GAUGE

A copper vessel having a cylindrical body with a short neck for a bung. Fitted with a finger loop handle, G.I. sheet.

Capacity

PHY-192.1 1 Litres

PHY-192.2 2 Liters



PHY-187

PHY-193

STEAM HEATER

Made from thick Copper sheet cylinder vessel 180 x 100 mm with steam vent and a vertical tube terminating in chute passing through side of vessel. A brass tube sliding fit in the central tube, with lower angle cut to seal the chute, enabling heated material to be transferred to calorimeter without heat loss.



PHY-193

PHY-194

INGEN-HOUZS APPARATUS

Consist of metal tank and rods of five different metals and woods, fitted along one side of a metal tank. To demonstrate different conductivities of different metals.

PHY-195

CONDUCTIVITY APPARATUS

Four metal strips of copper, brass, aluminium, iron having small grooves at outer ends for holding phosphorous and screwed on a wooden ring of outer dia 125 mm out side dia, strips meeting in the centre.

PHY-196

SEARLE'S THERMAL CONDUCTIVITY APP.

Copper bar 230 x 25 mm, steam heated, with a steam chamber at one end, the other end having a copper coil for cold water with inlet and outlet tubes. With two thermometer pockets. In box with insulated lagging, removable cover, without thermometers.

PHY-197

LEE'S DISC APPARATUS

For measuring thermal conductivities of poor conductors, 3 cylindrical blocks of aluminium 50 mm diameter 12.5 mm thick, with radial holes for thermometers, are clamped in a wooden frame by a screw, with 2.5 W, 6 V heating element and a set of 3 bad conductor discs.

PHY-198

CONSTANT LEVEL TANK

Comprising a brass 100 x 75 mm dia with 3 tubes for water inlet, outlet and overflow with a boss head and stand.

PHY-199

CONVECTION TUBE

To show convection of heat in water, comprising a 350 x 200 mm approx. rectangle of 18 mm glass



PHY-194



tubing, with short funnel at top.

PHY-200

LESLIE'S CUBE

130 mm sides, galvanised iron box with vertical faces are blackened dull, blackened bright, white and polished respectively, with a tubule at top.

PHY-201

ETHER THERMOSCOPE

For detecting thermal radiation with bulb 30 mm dia approx. one bulb painted matt. black. Partially evacuated. Mounted on wooden stand.

PHY-202

CROOKES RADIOMETER SINGLE

Mounted on a bakelite stand, a set of four mica vanes, with one side of each blackened, in a partially exhausted glass bulb, with stand

PHY-203

CROOKES RADIOMETER DOUBLE

Mounted on a bakelite stand, a two sets of mica vanes placed in two separate bulbs, blackened in such a way that rotations are in opposite directions.

PHY-204

FRICITION CALORIMETER UNIT

Comprises of copper calorimeter 60 x 6 mm with integral pulley of 20 mm dia. rotates in a boss, mounted on base and the friction brake consists of cork lined jaws on pillar, both mounted on base.

PHY-205

STEAM ENGINE UNIT

Working model, with boiler, safety valve, whistle, steam chamber and flywheel, on base, to drive dynamo models etc.

PHY-206

HAND WHEEL DRIVING UNIT

Two 75 mm dia pulleys, one is driving and other is output pulley. With the pulley and the intermediate pulleys are both 75mm diameter, and intermediate pulley is 20mm diameter. Pulley shafts are mounted on base.

PHY-207

LAMP UNIT, TRIPLE

Three M.E. S. lamp sockets connected in parallel. Supplied complete with three lamps of 1.25 V 0.25 A

PHY-208

LINE SHAFT UNIT

Steel shaft mounted in brackets. One end carries an aluminium "V" pulley 70 mm diameter and the other over handing end, is fitted with a cord anchoring collar.

PHY-209

SWITCH UNIT

Double-pole throw knife switch for connecting the motor.

PHY-210

STORAGE BATTERY UNIT

Glass jar, 250 ml with plastic screw cap, carrying 4 mm socket terminals connected to two lead plates. To demonstrate principle of lead/acid accumulator.

PHY-211

TURBINE/PUMP UNIT

Impeller linked with 20 mm dia and pump chamber fitted with inlet and outlet tubes. Transparent front cover with ring seal. Inlet is in use when pumping, a short length of tubing with clip closes this inlet during turbine operation, mounted on base.

PHY-212

WATER TURBINE WITH DYNAMO

Showing conversion of mechanical energy into electrical energy. Turbine with transparent cover, inlet and outlet tubes directly connected to a dynamo. Mounted on base.

PHY-213

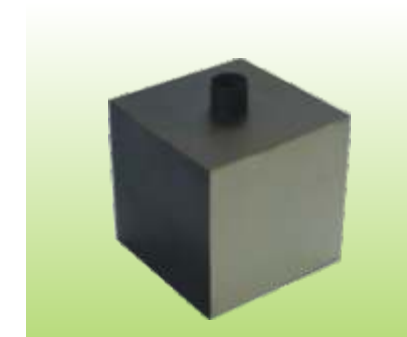
MODEL OF STEAM ENGINE (SECTIONAL DEMONSTRATION MODEL)

Locomotive design showing cross section of the piston and sliding valve as positioned in the steam chamber (Cylinder), clearly visible through air tight glass plate with forward and reverse motion, smooth enough to demonstrate working even by blowing. Other parts are also clearly visible such as crankshaft, valve control, drive wheel etc. Mounted on heavy metal base.

PHY-214



PHY-198



PHY-200

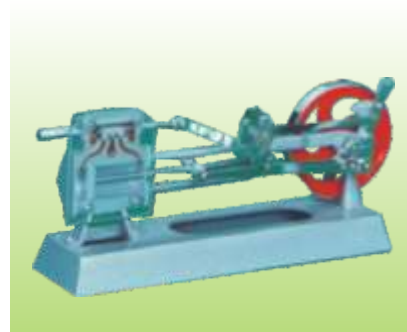


PHY-201



PHY-202





PHY-213

FOUR-STROKE PETROL ENGINE

All parts made in aluminium alloy and gun metal. Four stroke, with operation of valves clearly shown. Mounted on a base with schematic diagram.

PHY-215

TWO-STROKE PETROL ENGINE

Two stroke with operation clearly shown internal structure and operating principles of a simple piston air cooled two stroke engine. Mounted on a base with schematic diagram.

PHY-216

SECTIONAL MODEL FOR 2-STROKE CYCLE DIESEL ENGINE

Two stroke diesel engines with operation clearly shown, all parts made in aluminium alloy and gun metal. Ignition is shown by means of a miniature bulb, Fuel supply also sectioned. With crank handle for manual operation. Fitted on base.



PHY-214

PHY-217

MIRROR PLANE, GLASS, UNMOUNTED

Back silvered, with protective coating, rectangular ground edges.

	Size, mm
PHY-217.1	175 x 25 mm
PHY-217.2	100 x 25 mm
PHY-217.3	150 x 25 mm
PHY-217.4	75 x 50 mm
PHY-217.5	100 x 50 mm
PHY-217.6	150 x 50 mm

PHY-218

MIRROR SUPPORT BLOCK

Simple wooden block 50 x 50 x 50 mm with slot to take mirrors.



PHY-215

PHY-219

CYLINDRICAL, MIRROR *CONCAVE*

Semi circular mirror, 150mm dia x 25mm height. Made of stainless steel.

PHY-220

CYLINDRICAL, MIRROR *CONVEX*

Semi circular mirror, 150mm dia x 25mm height. Made of stainless steel.

PHY-221

CONCAVE MIRROR

Optically worked, back silvered, with protective coating.

	Dia	Focal length
PHY-221.1	50 mm	75 mm
PHY-221.2	50 mm	100 mm
PHY-221.3	50 mm	150 mm
PHY-221.4	50 mm	200 mm
PHY-221.5	50 mm	300 mm
PHY-221.6	75 mm	100 mm
PHY-221.7	75 mm	150 mm
PHY-221.8	75 mm	200 mm
PHY-221.9	75 mm	300 mm



PHY-216

PHY-222

CONVEX MIRROR

Optically worked, back silvered, with protective coating.

	Dia	Focal length
PHY-222.1	50 mm	75 mm
PHY-222.2	50 mm	100 mm
PHY-222.3	50 mm	150 mm
PHY-222.4	50 mm	200 mm
PHY-222.5	50 mm	300 mm
PHY-222.6	75 mm	100 mm
PHY-222.7	75 mm	150 mm
PHY-222.8	75 mm	200 mm
PHY-222.9	75 mm	300 mm

OPTICS



PHY-223

LENSES, SET OF SIX

Lenses Made of glass 50 mm diameter with ground and polished faces and ground edges. Set comprises of one each of the following: Double convex, Plano-Convex, concavo-convex, convexo-concave, and double concave, Plano-concave. Supplied in a velvet lined box.

PHY-224

LENS, DOUBLE CONVEX, SPHERICAL

Optically worked, ground edges.

	Dia (mm)	FL (mm)	Power
PHY-224.1	25	100	+10D
PHY-224.2	25	150	+6.6D
PHY-224.3	38	50	+20D
PHY-224.4	38	100	+10D
PHY-224.5	38	150	+6.6D
PHY-224.6	38	200	+5D
PHY-224.7	50	50	+20D
PHY-224.8	50	100	+10D
PHY-224.9	50	150	+6.6D
PHY-224.10	50	200	+5D

PHY-225

LENS, DOUBLE CONCAVE, SPHERICAL

Optically worked, ground edges.

	Dia (mm)	FL (mm)	Power
PHY-225.1	38	50	-20D
PHY-225.2	38	100	-10D
PHY-225.3	38	150	-6.6D
PHY-225.4	38	200	-5D
PHY-225.5	50	50	-20D
PHY-225.6	50	100	-10D
PHY-225.7	50	150	-6.6D
PHY-225.8	50	200	-5D

PHY-226

LENSES, CYLINDRICAL, PLANO-CONVEX

Ground and polished faces, edges, ground. Size 50mm high x 50 mm wide.

	FL (mm)	Power (mm)
PHY-226.1	60	+16.7D
PHY-226.2	75	+13.3D
PHY-226.3	100	+10D
PHY-226.4	150	+6.6D

PHY-227

LENS, CYLINDRICAL, PLANO-CONCAVE

Ground and polished faces, edges, ground. Size 50mm high x 50mm wide.

	FL (mm)	Power (mm)
PHY-227.1	60	-16.7D
PHY-227.2	150	-6.6D
PHY-227.3	300	-3.3D

PHY-228

LENS, CYLINDRICAL, DOUBLE CONVEX

Ground and polished faces, ground edges. Size 50mm high x 50 mm wide

	FL (mm)	Power (mm)
PHY-228.1	80	+12.5D
PHY-228.2	150	+6.6D
PHY-228.3	200	+5D

PHY-229

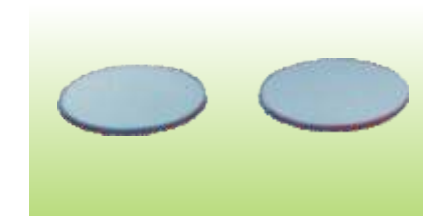
LENS, CYLINDRICAL, DOUBLE CONCAVE

Ground and polished faces, edges ground. Size 50mm high x 50 mm wide

	FL (mm)	Power (mm)
PHY-229.1	70	-14D



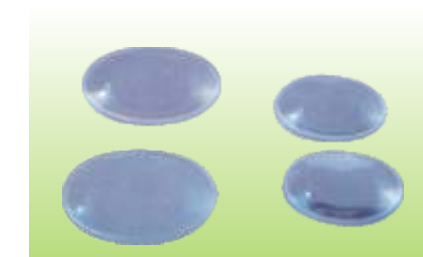
PHY-217



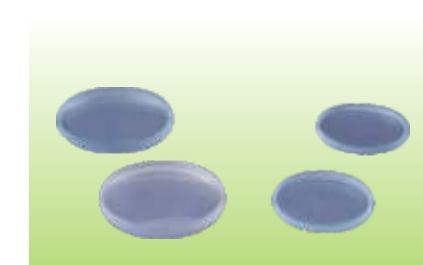
PHY-223



PHY-224



PHY-225



PHY-226





PHY-130

PHY-229.2	150	-6.6D
PHY-229.3	200	-5D

PHY-230

LENS HOLDER WOODEN

To take spherical lenses and Mirror upto 75 mm dia, comprising a wooden upright 100mm high, with a "V" shaped slot to hold convex or concave lenses or mirrors mounted on a rectangular wooden base.

PHY-231

LENS HOLDER

To take cylindrical lenses of 50 x 45 mm lenses. Spring locating strips hold lens firmly in place.

PHY-232

SPHEROMETER

Brass dial head 40mm dia with steel screw head divided in 100 divisions, vertical scale 10.0-10 mm, Distance between legs 40 mm.

PHY-232.1	Screw pitch 1 mm
PHY-232.2	Screw pitch 0.5 mm

PHY-233

SPHEROMETER DOUBLE DISC

Brass dial head 40 mm dia with steel screw, divided and marked in 100 divisions, vertical scale 10.0-10 mm, fitted on heavy brass disc, distance between pointed legs 40 mm

PHY-233.1	Screw pitch 1 mm
PHY-233.2	Screw pitch 0.5 mm

PHY-234

MAGNIFIER, READING GLASS ALL METALLIC

Chromium plated frame and handle, all metallic.

	Dia, mm	FL, mm	Magnification
PHY-234.1	40	100	x3.5
PHY-234.2	50	120	x3
PHY-234.3	50	150	x2.5
PHY-234.4	60	150	x2.5
PHY-234.5	75	150	x2.5
PHY-234.6	75	200	x2.25
PHY-234.7	100	150	x2.5
PHY-234.8	100	200	x2.25

PHY-235

MAGNIFIER, WITH BAKELITE HANDLE

Abiconvex lens 3X magnification mounted on a black plastic/bakelite handle.

	Dia, mm	FL, mm	Magnification
PHY-235.1	50	100	x3.5
PHY-235.2	60	150	x2.5
PHY-235.3	75	160	x3.0
PHY-235.4	75	200	x2.25
PHY-235.5	100	150	x2.5
PHY-235.6	100	200	x2.25

PHY-236

MAGNIFIER, PLASTIC FRAME

Fitted in plastic frame, with handle, dia 75 mm.

PHY-237

MAGNIFIER, FOLDING

Pocket type, double lens in plastic mount, metal case, lens dia 19 mm, magnification x8.

PHY-238

MAGNIFIER, TRIPOD

Metallic frame with adjustable screw top, dia 38 mm

	Magnification
PHY-238.1	x4
PHY-238.2	x6
PHY-238.3	x10

PHY-239

BLOCK, GLASS RECTANGULAR

Without bubbles made from sheet glass. All sides polished.

PHY-239.1	75 x 50 x 18 mm
PHY-239.2	115 x 60 x 18 mm

PHY-240

GLASS BLOCK MOULDED GLASS



PHY-235, 236



Made from moulded glass all sides polished.

PHY-240.1	75 x 50 x 18 mm
PHY-240.2	100 x 60 x 25 mm

PHY-241

BLOCK, ACRYLIC

Made of acrylic, rectangular, clear, all sides polished.

PHY-241.1	100 X 45 X 18 mm
PHY-241.2	115 X 65 X 20 mm

PHY-242

BLOCK GLASS, SEMI-CIRCULAR

16 mm thickness, 90 mm dia.

PHY-243

BLOCK ACRYLIC, SEMI-CIRCULAR

16 mm thickness, 90 mm dia.

PHY-244

TRIANGLE, ACRYLIC

Equilateral, 60° x 60° x 60°, 57 mm side

PHY-245

PRISM, GLASS, EQUILATERAL

Made from moulded glass, equilateral. Each angle of 60°

	Length x Face
PHY-245.1	25 x 25 mm
PHY-245.2	38 x 38 mm
PHY-245.3	50 x 50 mm

PHY-246

PRISM, GLASS, RIGHT ANGLE

Made from moulded glass, polished, right angle 90° x 45° x 45°.

	Hypotenuse x Length
PHY-246.1	35 x 25 mm
PHY-246.2	50 x 38 mm
PHY-246.3	70 x 50 mm

PHY-247

PRISM, ACRYLIC EQUILATERAL

Equilateral, polished surface 60° x 60° x 60°

PHY-247.1	25 x 25 mm
PHY-247.2	25 x 38 mm
PHY-247.3	38 x 38 mm

PHY-248

PRISM, ACRYLIC RIGHT ANGLE

Right angle, 90° x 45° x 45°

	Hypotenuse x Length
PHY-248.1	35 x 25 mm
PHY-248.2	50 x 25 mm
PHY-248.3	70 x 40 mm

PHY-249

SPECTROMETER PRISMS

Optically worked working sides, equilateral

Borosilicate crown glass, refractive index 1.510

	Length x Face
PHY-249.1	25 x 25 mm
PHY-249.2	38 x 38 mm

Hard crown glass, refractive index 1.519 to 1.523

	Length x Face
PHY-249.3	25 x 25 mm
PHY-249.4	38 x 38 mm

Dense flint glass, refractive index 1.620 to 1.623

	Length x Face
PHY-249.5	25 x 25 mm
PHY-249.6	38 x 38 mm

PHY-250

PRISM GLASS, HOLLOW

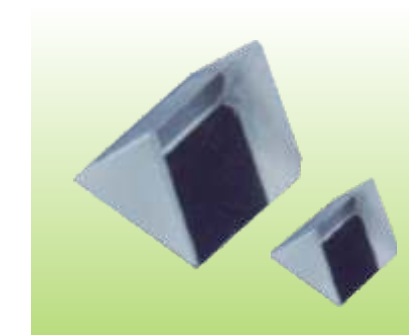
Equilateral, cemented with hole and stopper at top. Size 50 mm x 50 mm.



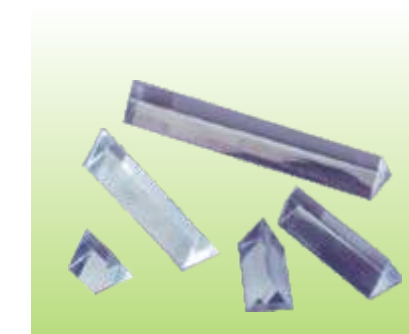
PHY-237



PHY-244

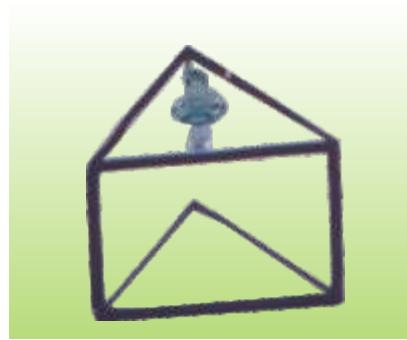


PHY-245

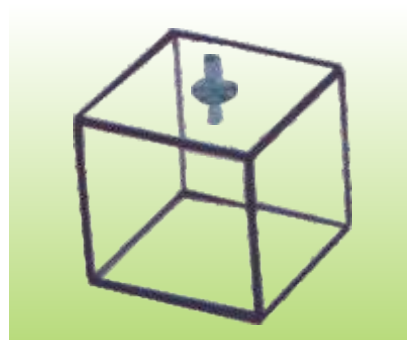


PHY-247





PHY-250



PHY-251



PHY-253



PHY-256

PHY-251

GLASS CUBE, HOLLOW

Made of optically flat plates cemented together. Stopper at the top, 50 mm side.

PHY-252

GLASS CUBE, SOLID

Sides 32 mm.

PHY-253

SET OF ACRYLIC PLASTIC BLOCKS

Clear acrylic plastic blocks 20 mm thick all sides surfaces fully polished. The set comprises seven block packed in a velvet case.

Type

.01	Rectangle	75 x 50 mm
.02	Triangle	90°x45°x45°, 75mm hypotenuse
.03	Triangle	60°x60°x60°, 57mm side
.04	Semi-Circle	75 mm diameter
.05	Bi-Convex	75 mm long, curved faces 115 mm radius
.06	Bi-Convex	75 mm long, curved faces 145 mm radius

PHY-254

REFRACTIVE INDEX OF A LIQUID BY CRITICAL ANGLE METHOD

The apparatus consists of a metal bridge fitted with air cell holder, knob and graduated circular scale, with one air cell, 50 x 50 mm size.

PHY-255

RAY OPTICS BOX

Black finish metal box made of die-cast alloy, with 12 V 24 straight filament lamp. To provide a simple means of producing single or multiple rays of light for use in elementary optics. The ray box has an open front and vertical internal grooves to accommodate a lit plate and a cylindrical lens. Supplied complete with a metal plate having single and triple slits.

PHY-256

RAY OPTICS KIT

Kit consists of two lamps and two stands, 1 pair housing shields, 2 combined single and triple slit plates, 2 multiple slit combs, 2 holders for combs and slit plates, 4 wooden light barriers, four each Plano convex cylindrical lenses, 50 x 50 mm, respectively. Plano convex +10D, +17D, Plano concave -17D.

PHY-257

PINHOLE CAMERA

Two rectangular open-ended light proof wood boxes. One slides in to the other and contains a ground glass screen upon which image is formed. Other box has pinhole opening at closed end.

PHY-258

PERISCOPE, WOODEN

To show principle of reflection, with two plane mirrors fixed at 45° overall size 250 x 45 x 45 mm, polished wood.

PHY-259

TELESCOPE MODEL ASTRONOMICAL

To show the working of astronomical telescope, comprising a plano convex lens dia. 38 mm. fl 100 mm, mounted in a metallic tube which slides in an outer tube of 400 x 42 mm, size, with a convex lens objective dia. 50 mm fl 500 mm, packed in case.

PHY-260

ASTRONOMICAL TELESCOPE

Reflecting type, fitted with about 45 mm dia achromatic objective having focal length of about 45 cm. Focussing is provided by rack and pinion. Complete in carrying case with the metallic three legged folding type tripod stand.

PHY-261

TELESCOPE TERRESTRIAL

Same as PHY-261, but with one extra special terrestrial eye piece for viewing erect image of the object.

PHY-262

READING TELESCOPE

Designed for general laboratory work. Fitted with an achromatic objective aperture of 25 mm and focal length 175 mm. The focussing is done by rack and pinion arrangement. Mounted on heavy metal stand.

PHY-263

OPTICAL BENCH, WOODEN

Comprising a wooden base board with one meter scale divided into mm, all the components have the same optical centre height provided with following accessories:

White face object and receiving screens each 150 x 100 mm, with aperture, mounted on wooden base with an index mark.

Plane mirror 150 x 100 mm mounted.

Lens holder wooden V shaped.

Needle mounted in a wooden rod, on base.

Candle holder on base.

PHY-264

OPTICAL BENCH WOODEN, 1.5 METERS

Comprising a wooden base board with a 1.5 m scale divided in millimeters plus six sliding moulded metallic base 100 x 50 mm each with engraved line, brass pillar with screw for locking.

230 V white lamp with lamp house.

Metal object white screen 75 mm dia with gauze.

Metal object white receiving screen 100 x 75 mm.

Needle mounted in rod.

Plane mirror 100 x 75 mm.

All the accessories mounted on a 6 mm brass rod which fits into the pillars and is adjustable for height.

PHY-265

OPTICAL BENCH METALLIC, SINGLE ROD

This set is composed as follows:

1 Projector, 2 spare lamps for projector, 6V/30W, 1 optical precision metal rail: 1 meter long, with 2 support, 6 little riders, 1 big rider, 1 set of diaphragm with circular hole diameter 1.5 mm, 10mm, 15mm, with square hole 10mm each side, 1 set of colored slide, 1 holder for the diagrams, 1 metal screen, 1 Joly photometer with holder. All the optical bench items are supplied in a sturdy portable plastic case. With two spare lamps.

PHY-266

OPTICAL BENCH METALLIC, DOUBLE ROD

Consists of two steel rods, one of which is graduated in mms. with heavy metal end supports with levelling screws with four metal slides which slide smoothly on the bench. Two of the sides have transverse motion arrangement. Complete with two lens holders and two object needles.

PHY-266.1 Graduated to 1 metre

PHY-266.2 Graduated to 1.5 metre

PHY-267

OBJECT NEEDLE, MOUNTED

A pointed needle mounted on a 6 mm brass rod, giving an overall length of 80 mm. approx.

PHY-268

OBJECT SCREEN

A metal screen 75 mm dia, with central aperture covered with mesh wire gauze. Mounted on a 6 mm brass rod.

PHY-269

PRISM TABLE

An 82 mm dia disc made of brass, mounted on a 6 mm rod.

PHY-270

CANDLE HOLDER

A cylindrical 20 mm internal dia x 22 mm deep mounted on a 6 mm rod.

PHY-271

RECEIVING SCREEN

Metal frame 100 x 75 mm, white enamelled, with a plain paper.

PHY-272

STAND FOR OPTICAL BENCH ACCESSORIES

Metallic pillar with clamping screw, supported on a base with an engraved index line at one end. To accept rods of 6 mm dia as used on standard optical bench fittings.

PHY-273

COMBINED OBJECT AND RECEIVING SCREEN

Comprising a black metal frame 150 x 100 mm with an aperture and a removable white card screen. The card has an aperture with an index point for use as an object, or the card may be inverted and used as a receiving screen. Mounted on a base of size 100 x 50 mm.

PHY-274

YOUNG'S SLIT

Consists of double slit 10 mm long x 1 mm separation in 50 x 50 mm frame. Mounted in channel with a hinged joint and micrometer screw to give fine adjustment. To observe the fringes produced by interference between two beams of light from a common source.



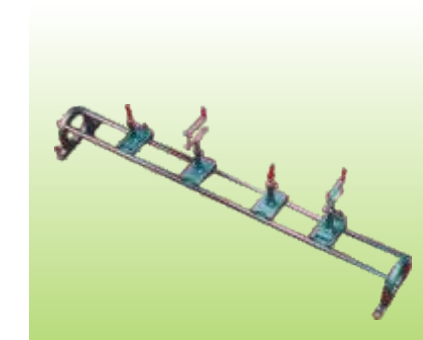
PHY-260



PHY-261



PHY-263



PHY-266





PHY-275

PHY-275
FRESNEL'S BI-PRISM
Optically worked surfaces, 40 x 30 mm, Mounted in a Frame.



PHY-279

PHY-276
NEWTON'S RING APPARATUS
Consisting of a flat glass plate and a slightly convex lens of 50 mm dia. are placed in a metal frame with three pressure adjusting screws to produce Newton's Rings.

PHY-277
NEWTON'S RING APPARATUS, REFLECTED SYSTEM
To measure the wavelength of the light by the reflected system, frame 60 x 58 x 50 mm high with a glass plate mounted at an angle of 45° to reflect light downwards on a plano-convex lens of one metre focal length, resting on a glass plate 38 x 38 x 3 mm. Complete with lens.

PHY-278
DIFFRACTION GRATINGS
600 lines per mm, transmission type, 30 x 25 mm, with protective glass cover.

PHY-279
NEWTON'S COLOUR DISC
Comprising a multi coloured disc mounted on a stand and driven by hand wheel.
PHY-279.1 150 mm Dia PHY-279.2 200 mm Dia

PHY-280
SPECTROSCOPE
Consists of a metal tube with draw-out focussing and an adjustable slit, fitted with achromatic objective and prism, in case.

PHY-281
SPECTROMETER STUDENT
Spectrometer with dia 170 mm, metallic scale graduated 360° x 1° independently rotatable, with locking screw, vernier attached to the telescope reads to 0 to 1° (6 minutes of arc). Collimator is mounted on a fixed pillar, with an achromatic objective of 150 mm focal length and 21 mm aperture, and has an adjustable slit 6 mm long. The telescope is on a movable pillar, with a fine adjustment screw, an achromatic object of 170 mm focal length, 21 mm aperture. Ramsden eye-piece and glass crosswire graticule. Both collimator and telescope have spiral focussing system and have axis adjusting arrangement. The table has three levelling screws, with lines marked to assist prism placement. With prism holder and grating holder, one small screw driver and one tommy bar for axis adjustment. Without prism.

PHY-282
SPECTROMETER INTERMEDIATE
A model for student use, with an optical system equivalent to that on more advanced models, thus permitting many quantitative experiments. Graduated disc 150 mm dia fixed to table, double ended vernier, to read to 1 minute of arc, attached to telescope. Both telescope and table have fine adjustment screws and release of clamping screw enables coarse adjustments to be made by hand, telescope and collimator are fitted with 175 mm focal length, 32 mm clear aperture achromatic objectives and have rack and pinion focussing telescope fitted with x 15 Ramsden eye piece and crossline graticule. Both telescope and collimator have rack and pinion focussing and their optical axes can also be adjusted. Prism table has lines to assist prism placement and has three levelling screws. Complete in hard wood case with the following accessories:
One prism clamp, one diffraction grating holder, one tommy bar for adjusting optical axis.

PHY-283
MERCURY VAPOUR LAMP
With holder and choke 80 W and 125 W

PHY-284
TRANSFORMER FOR SODIUM LAMP
In a sturdy metal case, Input 220-240 V ac, output to suit sodium lamp, with 3-core lead.
PHY-284.1 35 Watts PHY-284.2 55 Watts

PHY-285
POLARIMETER
The circular head is attached near the analyser and vernier movement on the scale enables the reading of optical rotation accurate upto the accuracy of 0.10. Soleil's Bi-Quartz or Laurent's half shade device which makes the instrument accurate and simple and simple for use with white light (day light) or sodium light. The polarimeter tubes made from Borosilicate glass with metal fittings at both ends. The tube end covers with glass round disc, optically true with rubber washers to make it leak proof. Complete with a set of two polarimeter tubes (100 mm and 200 mm), to measure the angle of rotation of optically active substance in solution. Packed in a case.



PHY-280



PHY-282



PHY-286
POLARISODS
Mounted on a graduated 360° circular scale with pointer, can be fitted to any size of collimator or telescope.

SOUND

PHY-287
BELL IN BELL JAR
An electrical bell working on 3-6 V ac/dc. Suspended in bell jar with connections to terminals mounted on Rubber bung sealing the jar.

PHY-288
WAVE MACHINE, POWELL'S
Consisting of 19 spheres mounted on 75 mm long rod, with intervals of 20° equally spaced along the shaft. The shaft rotates in two pillars mounted on a sturdy base.

PHY-289
WAVE MOTION APPARATUS
For demonstrating longitudinal and transverse motion, consisting of 18 eccentric Aluminium discs supporting a series of metal rods. Transverse waves are obtained by straight rods and longitudinal waves by bent rods.

PHY-290
HELICAL SPRING
To illustrate wave motion. Flat section steel wire in helical coil dia 50 mm and length 75 mm.

PHY-291
STEEL SPRING, NARROW
Experiments of transverse wave motion, dia 20 mm, length 3 metres approx. when closed, extending to 10 metres.

PHY-292
RIPPLE TANK
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 580 x 500 x 70 mm supplied complete with rippler assembly, two straight obstacles 130 mm long, one straight obstacle 40 mm long, curved reflector 200 mm radius, transparent refraction plate, wooden wave roller, one pack of rubber bands, water dropper, sponge, illuminator and power supply.

PHY-293
POWER SUPPLY UNIT FOR RIPPLE TANK
For use with the ripple tank, to operate both the rippler motor and the illuminant. Output 12 V a.c. max 24 W for illuminant and 0 to 6 V d.c. variable for rippler motor. Operates from 240 V a.c. mains.

PHY-294
HAND STROBOSCOPE FOR RIPPLE TANK
Simple form stroboscope use with ripple tank, a disc of 250 mm dia. with 12 equispaced slots and a finger hole, rotating on its axis, with handle.

PHY-295
STROBOSCOPE (Xenon)
In a metallic case with a carry handle. An inclined rear panel carries the flash rate control, range selector, sockets, and switch for external synchronization, and the power switch.
Flashing Rate
Range 1 : 1-10 flashes per second at 0.8 j
Range 2 : 10-100 flashes per second at 0.2 j
Range 3 : 100-250 flashes per second at 0.1 j
Main Flashing Power, 5 W Approx
Accuracy ± 2% f. s. d. On each range.
Flash Duration
12 U sec. Approximately
Triggering



PHY-285



PHY-288



PHY-289



PHY-292





PHY-295



PHY-296



PHY-300



PHY-301

Internal oscillator, External shorting contacts.

PHY-296

TUNING FORKS SET OF 8

Chrome plated, with frequency marked, a set of 8, of different frequency from 256 to 512 Hz, packed in case

PHY-297

TUNING FORKS SET OF 13

Chrome plated, with frequency marked, a set of 13, of different frequency from 256 to 512 Hz, packed in case.

PHY-298

TUNING FORK

Chrome plated, with frequency marked.

	Frequency, Hz	Note
PHY-298.1	256	C1
PHY-298.2	288	D
PHY-298.3	320	E
PHY-298.4	341	F
PHY-298.5	384	G
PHY-298.6	426	A
PHY-298.7	480	B
PHY-298.8	512	C2

PHY-299

TUNING FORKS SET BLUE STEEL

Set of 8 blue steel, with frequency marked, of different frequency from 256 C to 512 Hz, packed in case.

PHY-300

TUNING FORK, SET OF FOUR

For demonstrating the formation of a basic major chord. Comprises four forks mounted on a common resonance box and having frequencies of C1(256), E(320), G(384), C2(512), Hz. complete with hammer.

PHY-301

HAMMER FOR TUNING FORK

Provided with rubber head.

PHY-302

STETHOSCOPE

Very sensitive professional pattern with rubber tubing model for human heart and chest sounds with combination chest-piece giving choice of bell or diaphragm.

PHY-303

ELECTRICAL VIBRATOR

Comprises a steel rod clamped near one end through two 4 mm terminals. Which passes through a small solenoid and between the poles of a magnet. Adjustable contact points fitted through a second pair of terminals make alternating connection with an adjustable contact on the rod. The rod has a small hole at one end for the attachment of thread which passes over a bench mounting pulley and supports a scale pan. For 2 V a.c. Supplied with pulley, clamp, and scale pan.

PHY-304

ELECTRICAL TUNING FORK

Fitted on sturdy streamlined base with provision for horizontal or vertical use. Prong is 10 x 25 x 300 mm. Accurate frequency adjustment, Electromagnet can work on 6 Volts. The amplitude of vibration can be varied by adjusting the position of the electromagnet.

PHY-305

SONOMETER, THREE WIRE

Comprising a hollow wooden box size 1200 X 115 X 60 mm with two fixed bridges with a one metre scale in between and pulley complete with a long movable bridge, wrest-pin key and two each brass and steel wires 0.4mm dia each and one of 0.08mm dia, of 1.5 m length, supplied without masses.

PHY-306

MELDE'S APPARATUS

To demonstrate the effect of vibrations in a stretched cord and to investigate relation between frequency, tension and density. Comprising an adjustable length of thin steel rod mounted in a pair of socket terminals near one end and passing through an a.c. energising coil and a permanent magnet. The other end of the wire has a small boss with clamping screw for attaching a cord. Two adjustable contacts are also fixed on either side of the armature connected to terminal sockets to provide a quick change-over switch in capacitor charge/discharge experiments etc.

PHY-307

WHIRLING TABLE

For use in vertical or horizontal position, with driving wheel. Overall height 475 mm approx.

PHY-308

ORGAN PIPE

Made of wood simple open form with air column 40 cm. Size 520 x 50 x 50 mm.

PHY-309

RESONANCE APPARATUS

A chrome plated brass resonance tube 100 cm long, a reservoir made of brass capacity 250 ml and a metre scale mounted on a metallic stand. Supplied with rubber tubing.

MAGNETISM

PHY-310

BAR MAGNETS, CHROME STEEL

Made of steel, in pairs spray painted, with keepers

PHY-310.1	37 x 12 x 5 mm
PHY-310.2	50 x 12 x 5 mm
PHY-310.3	60 x 13 x 5 mm
PHY-310.4	100 x 12 x 5 mm

PHY-311

BAR MAGNET, ALNICO

Alnico, strong lifting power, permanent, in pair, with keepers.

PHY-311.1	25 x 15 x 10 mm
PHY-311.2	50 x 15 x 10 mm
PHY-311.3	75 x 15 x 10 mm
PHY-311.4	100 x 15 x 10 mm
PHY-311.5	50 x 12 x 8 mm
PHY-311.6	75 x 12 x 8 mm
PHY-311.7	100 x 12 x 8 mm
PHY-311.8	150 x 12 x 8 mm

PHY-312

BAR MAGNET, CERAMIC

Ceramic magnets for strong lifting power. In pair, size 50 x 10 x 5 mm.

PHY-313

HORSE SHOE MAGNETS CHROME STEEL

Made of steel, spray painted, with keeper.

PHY-313.1	50 x 12 x 5 mm
PHY-313.2	75 x 12 x 5 mm
PHY-313.3	100 x 12 x 5 mm
PHY-313.4	150 x 12 x 5 mm

PHY-314

HORSE SHOE MAGNET, ALNICO

Strong lifting power with keepers

PHY-314.1	50 x 12 x 15 mm
PHY-314.2	75 x 12 x 15 mm
PHY-314.3	100 x 12 x 15 mm

PHY-315

MAGNET, U-SHAPED, ALNICO

Strong lifting power with keeper.

	Size
PHY-316.1	37 x 6 x 10 mm
PHY-316.2	50 x 15 x 10 mm
PHY-316.3	75 x 15 x 10 mm

PHY-317

CYLINDRICAL MAGNETS, CHROME STEEL

Made of steel, spray painted, in pair, with keeper.

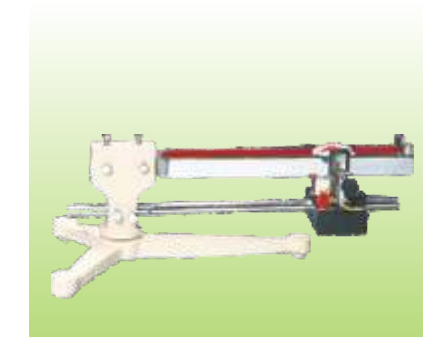
	Length x dia.
PHY-317.1	50 x 10 mm
PHY-317.2	75 x 10 mm
PHY-317.3	100 x 10 mm

PHY-318

CYLINDRICAL MAGNETS, ALNICO

Strong lifting power, spray painted, in pair, with keeper.

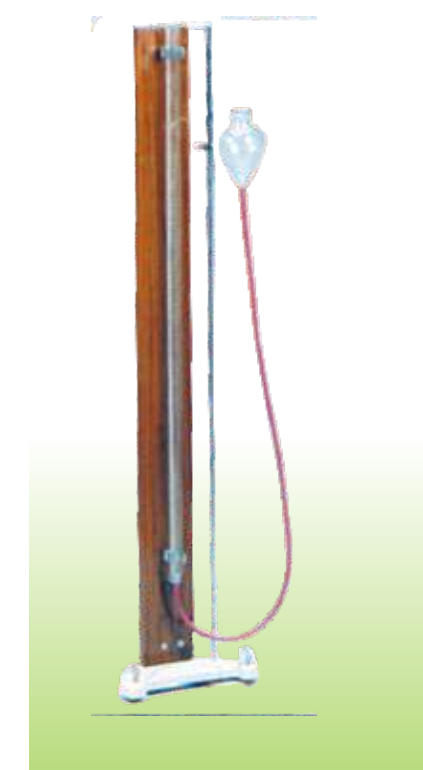
	Length x dia.
PHY-318.1	50 x 10 mm



PHY-304



PHY-305



PHY-309



PHY-311





PHY-314

PHY-318.2 75 x 10 mm
PHY-318.3 100 x 12 mm

PHY-319
RING MAGNET, CERAMIC
An annular magnet

	dia x hole x thickness
PHY-319.1	32 x 16 x 8 mm
PHY-319.2	36 x 18 x 8 mm
PHY-319.3	45 x 22 x 8 mm

PHY-320
STIRRUP FOR MAGNETS
Brass wire for suspension of magnets. Magnets up to 30 mm width.

PHY-321
IRON FILLING
For indicating lines of force packed in a bottle of 500 gms.

PHY-322
MAGNETISING AND DEMAGNETISING COIL
Suitable for ordinary magnets, iron bars, strips etc. Consists of a 250 mm long solenoid wound with insulated copper wire and mounted on a base, with switch and 4 mm terminals. Operating voltage is 12 V a.c. or d.c. at 6A max.

PHY-323
ELECTROMAGNET
Iron, U Core circular section with flat ends has one bobbin in each limb wound with enameled Copper wire with armature.

PHY-324
DEFLECTION MAGNETOMETER
One metre long base with a 50-0-50 cm metre rule. At the centre is a recess for magnetometer.

PHY-325
MAGNETOMETER
Housed in a plastic box with aluminium dial graduated in 0-90 degree four times, anti-parallax mirror and steel pivot. The short magnetic needle and a light aluminium pointer designed for precise readings and maximum damping. The compass box has a hollow circular cavity to fit tangent galvanometer stand or deflection magnetometer base.

PHY-326
TANGENT GALVANOMETER
6" dia plastic bobbin with 3 windings of 2, 50 and 500 turns. The magnetometer is supported on a brass tube fitted on an ebonite plate which is free to revolve in the base of the instrument. The magnetometer and ring can both be rotated independently of the base of the instrument. The magnetometer and ring can both be rotated independently of the base which is with levelling screws. Compass box consists of a bakelite case with metal 100 mm dia dial graduated in degrees and anti parallax mirror. Cobalt steel magnet and aluminium pointer are mounted on special synthetic sapphire. The needle moves on special pivot. The above combination makes the needle practically frictionless.

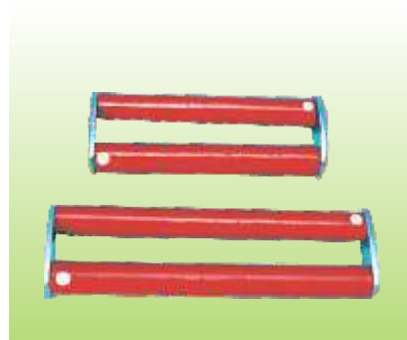
PHY-327
MAGNETIC NEEDLE, BRASS BEARING
A carbon steel needle with brass bearing.

PHY-327.1	50 mm
PHY-327.2	75 mm
PHY-327.3	100 mm

PHY-328
MAGNETIC NEEDLE, JEWEL BEARING
A carbon steel needle with jewel bearing.

	Length x dia.
PHY-328.1	50 mm
PHY-328.2	75 mm
PHY-328.3	100 mm

PHY-329
MAGNETIC NEEDLE ON STAND
Composed of strongly magnetised needle, length 100mm, stand height 110 mm with PVC base of 60mm dia approx, pillar terminating in steel point.



PHY-318



PHY-319



PHY-325



PHY-329A
PLOTTING COMPASS
In aluminium case, with card dial.

PHY-329A.1	12 dia mm
PHY-329A.2	16 dia mm
PHY-329A.3	25 dia mm
PHY-329A.4	50 dia mm

PHY-330
PLOTTING COMPASS
In plastic case, with card dial, dia 16 mm.

PHY-331
PLOTTING COMPASS BOTH SIDE GLASS
Both sides glass, with needle pivoted between top and bottom glass plates, without dial, 20 mm dia.

PHY-332
MAGNETIC FIELD SENSOR
Connects to interface with auto-indentification
2 ranges : -6.4 to +6.4 millitesla, and -0.32 to +0.32 millitesla
Sensitive enough to measure earth's magnetic field
Uses Hall effect transducer
Retain sensor tip for measuring both transverse and longitudinal magnetic fields.

PHY-333
POCKET COMPASS WITH LOCK
Dia, 50 mm with cover and locking arrangement. Dial marked with points of compass and degrees.

PHY-334
MARINER'S COMPASS
With metallic bowl gimbles and mounted on Metal Stand.

PHY-335
PRISMATIC COMPASS
Brass, metallic circle graduated to 0 to 5° , with synthetic sapphire bearing and auto lifter, sliding lensetic prism, with coloured glasses, reflecting mirror, packed in a case.

PHY-336
BARLOW WHEEL
Disc made of copper, star shaped, adjustable for height, rotates vertically between the limbs of a horse shoe magnet when electric current is passed to the wheel through a mercury trough in the base, supplied with terminals, but without mercury.

PHY-337
FARADAY'S DISC
A disc made of copper, with a turning handle rotates between two poles of a horse shoe magnet. One of the two terminals on the wooden base is connected to a pillar supporting the disc and the other to a brush bearing on edge of the disc. Instrument demonstrating conversion of mechanical energy into electrical energy

PHY-338
ORESTED'S APPARATUS
Showing the action of electric current on a magnet. Magnetic needle 75 mm long with brass bearing supported by pivot mounted on a base and surrounded by a copper rod strip rectangle with two terminals.

PHY-339
MAGNETIC FIELD APPARATUS
A plastic ring supported on a wooden table wound with three coils of 5, 10 and 20 turns of insulated copper wire, connected to terminals on the base.

PHY-340
DIP NEEDLE
On stand revolving in pivots, with a graduated quadrant, rotatable on a base marked every 45°.

PHY-341
DIP NEEDLE
Comprising a circular scale 75 mm dia, graduated 0-90° four times, supported on a rectangular base. The needle is carefully balanced on steel pivots in brass bearing. Complete with base.

PHY-342
DIP CIRCLE
An accurately balanced magnetic needle, with hardened steel pivots, in jewelled bearings. The needle can be removed for reversal. With a vertical circular scale marked 0-90° in four quadrants, in a non-magnetic metal case rotating about its vertical axis on a brass scale with vernier which reads to 0.1°.

PHY-343
ELECTROSTATICS



PHY-326



PHY-329



PHY-331

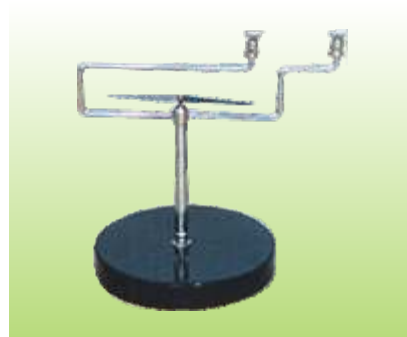


PHY-333



PHY-336





PHY-338

GLASS TUBE
For producing electrostatic charge by rubbing, both ends closed and rounded. Dimensions 300 x 12.5 mm length x diameter.

PHY-344
EBONITE ROD
Polished 300 x 12.5 mm length x dia.

PHY-345
POLYTHENE ROD
Dimensions: 300 x 12.5 mm length x dia.

PHY-346
PERSPEX ROD
Polished finish, 300 x 13 mm length x dia.

PHY-347
FRICITION ROD, COMPOUND
Rod Made of half glass half brass, 300 x 12.5 mm length x dia.

PHY-348
FLANNEL RUBBING CLOTH
For producing charges on the insulating rods and strips, 250 mm square.

PHY-349
WOOLEN RUBBING CLOTH
Very suitable for use with polythene, cellulose and Perspex, 250 mm square.

PHY-350
PITH BALLS
Polystyrene, 10 mm dia, in a pack of 10.

PHY-351
ELECTROPHOROUS
Metallic disc 50 mm dia, mounted on 90 mm long handle, and a small contact sphere, with a plastic base.

PHY-352
CONDUCTOR
Made of brass nickel plated mounted on insulated stand.
PHY-352.1 Pointed cone with rounded narrow end
PHY-352.2 Cylinder, with rounded ends
PHY-352.3 Sphere

PHY-353
BIOT'S APPARATUS
With insulated handles, spherical conductor on insulating stand with two hollow hemi-spheres, to show that electrostatic charge resides on outer surface of a conductor.

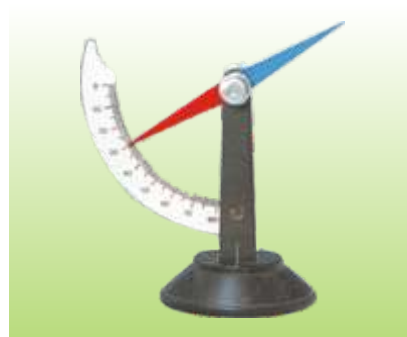
PHY-354
VAN DE GRAAFF GENERATOR
Hand Driven mounted on a wooden base with driving wheel and driving belt. The discharge sphere is supported on a pivoted arm, with a handle for easy adjustment and is attached to driving wheel support. With a 4 mm socket at top of the dome and a 4 mm earth socket in the hand wheel support. Supplied with discharging sphere, but without accessories.

PHY-355
VAN DE GRAAFF GENERATOR, MOTOR DRIVEN
Same as cat. no. PHY- 355, but driven by an electric motor working on 220-240 V mains, with a separate discharging sphere mounted on rod.

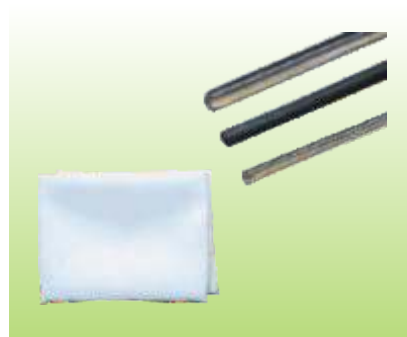
PHY-356
PROOF PLANE
A metallic disc with insulating handle, 20 mm dia.

PHY-357
ELECTRIC WHIRL
The apparatus comprises of six pointed star wheel with all the points curved in one direction. The star wheel rotates freely on a pivot point mounted on a short stand and the stand is provided with a connection socket on the base. To demonstrate the effect of electric discharge from points

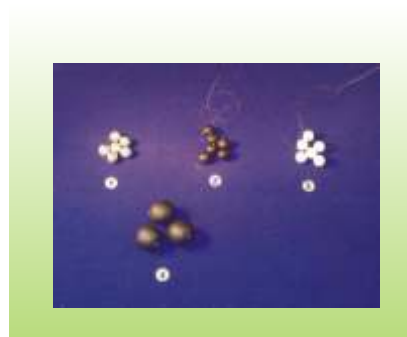
PHY-358
WIMSHURST MACHINE
Consist of two plates 250 mm dia and each carries aluminium segments driven in opposite direction



PHY-341



PHY-344, 345, 346, 348



PHY-350



by hand wheel and belt, with two leyden jars, mounted on wooden base.

PHY-359
ELECTRIC FIELD APPARATUS
Comprises a glass dish 100 mm dia and two 4 mm socket terminals mounted on two insulated pillars, supplied with two wire point electrodes and two electrodes of T-shaped.

PHY-360
AEPINUS AIR CONDENSOR
Comprises two discs of 100 mm dia supported on a pair of insulated pillars. The gap is adjustable. A support for interposing sheet of dielectric material is provided, mounted on an insulated base, 4 mm terminal sockets for connection and additional vertical sockets to carry a pair of suspended cork balls.

PHY-361
BUTTERFLY NET, FARADAY
Net with cord, on insulated pillar on a metal tripod base, to showing electric charge resides on external surface of a conductor.

PHY-362
LEYDEN JAR
Plastic vessel with removable internal and external metal vessels. A metal sphere is fitted to the inner vessel by a brass rod.

PHY-363
DISCHARGER
Two small brass plated spheres mounted on curved arms jointed with insulated handle.

PHY-364
ELECTROSCOPE SIMPLE FLASK TYPE
A conical flask with rubber stopper which holds a metal rod with disc top and lower flat end to which a leaf may be pasted. Supplied with two leaves

PHY-365
GOLD LEAF ELECTROSCOPE
A metal case with 4 mm earthing socket with glass window. A metal disc passes through an insulating polythene bush and ends in a flat support for "gold leaf" with a transparent scale to show quantum of deflection.

PHY-366
INSULATED PITH BALL
A pair of light weight balls are suspended from a rod mounted on insulated base.

PHY-367
GOLD LEAVES
A pack of six leaves for Electroscope.

PHY-368
ELECTROSTATIC KIT
The kit comprises of one electroscope, one packet of metal leaves, 4 metalised spheres, 1 reel of nylon thread, and two polythene plates 75 x 75 mm, one electrophorus plate with insulating handle, 1 proof plane, two aluminium cans, one cellulose acetate strip, 1 polythene strip, and one stirrup for suspending strips, one flannel rubber, one wire hook and instructions.

ELECTRICITY

PHY-369
DANIEL CELL
Comprises an outer copper vessel 125 x 75 mm with terminal and perforated shelf, a zinc rod 125 x 12 mm with brass terminal and Porous pot 150 x 50 mm, complete.

PHY-370
ZINC ROD
For Daniel cell size 125 x 12 mm dia, fitted with a brass terminal.

PHY-371
SIMPLE VOLTAIC CELL
Comprising of copper and zinc plate of size 90 x 25 mm with a terminal, with battery jar of size 150 x 100 mm.

PHY-372
PLATES WITH TERMINAL FOR SIMPLE CELL
Fitted with a 4 mm socket terminal.
PHY-372.1 Lead 90 x 25 x 1.5 mm
PHY-372.2 Zinc 90 x 25 x 1.5 mm



PHY-353



PHY-355



PHY-358



PHY-365





PHY-368



PHY-369



PHY-374



PHY-375

PHY-372.3 Carbon 90 x 25 x 6 mm
PHY-372.4 Copper 90 x 25 x 1.5 mm

PHY-373
POROUS POT

PHY-373.1 ht x dia
150 x 50 mm
PHY-373.2 150 x 75 mm

PHY-374
LECLANCHE CELL

Comprising of porous pot containing a mixture of manganese dioxide and carbon, and a zinc rod with brass terminal.

PHY-374.1 In glass vessel
PHY-374.2 In plastic vessel

PHY-375
DEMONSTRATION ELECTRIC BELL

Mounted on a wooden base, all parts easily visible, operates on 4 - 6 volts.

PHY-376
TELEGRAPH SET, VERTICAL TYPE

A set of two units workable on 4 - 6 volts. Each unit is fitted with one morse key, one sounder and power switch for battery, with two battery and two line terminals. All connections are easily visible.

PHY-377
DEMONSTRATION MODEL OF TELEPHONE

To be used also as hydrostatic balance. Capacity 200g, Sensitivity: 10mg, Chrome plated brass. Complete with 3 pans, one of which has a shorter stirrup. Adjustable pan height. Mounted on rectangular plastic base Supplied with: set of masses double Archimedes cylinders one beaker

PHY-378
ELECTROMAGNETIC KIT (WESTMINSTER)

Kit comprises of 8 anisotropic alloy magnets, 8 ceramic ferrite magnets, 4 steel magnet-yokes, 6 plotting compasses, 4 hardwood formers for compasses, 1 bottle iron filings, 4 iron filings dispensers, 4 each double C-cores, Clip for C-cores, aluminium rings, split aluminium rings, 4 each support bases, armatures with axle-tubes, aluminium axle-rods, 8 split pins, 16 rivets, 1 length latex rubber tubing, 4 each formers for coils reels cellulose tape, reels copper wire, 4 sheets white pasteboard, 4 reels cotton wire, 4 each carbon resistors 100 ohms and 10 ohms, 10 flash lamp bulbs, 5 neon bulbs, 8 m.e.s bulb holder, wood clamp and wood block.

PHY-379
POWER SUPPLY (WESTMINSTER ELECTROMAGNETIC KIT)

Power Supply for Westminster Electromagnetic Kit giving 1 V full wave rectified d.c. and 1 and 2 V a.c. outputs at 8 A max. Clear circuit diagram is printed on the top panel carrying mains switch, light indicator and output sockets for d.c. and a.c.

PHY-380
WORCESTER CIRCUIT BOARD

To explore the nature and properties of electricity by using simple circuits which are easily constructed on a base board. The connector system uses p.c.n. strips with cut-out sections whose ends can easily and quickly insert in spring terminals, ensuring low contact resistance and good electric contact.

The following components are supplied :-

1 Silicon diode 1 Resistor 3.9 ohm 2.5 W 1 Pair Leads, red, with crocodile clip. 1 Pair Leads, black, with crocodile clip. 1 Pair Leads, yellow with crocodile clip. 2 Switches mounted on p.c.b. connectors. 1 Baseboard, plastic, with spring terminals and three battery holders. 3 Batteries. 12 Lamps 1.25 V m.e.s. 6 Lamp holders mounted on p.c.b. connectors. 12 Plain connector p.c.bs. 1 Wire wound potentiometer with crocodile clip connections. 2 Soft iron nails, 5 cm long 2 m Bare copper wire, swg 202 lengths Bare eureka wire, swg 342 lengths Plastic covered copper wire 1 Electrode support 10 Pencil lead electrodes 1 Sheet copper foil, 150 mm square 1 Pack Steel wool

PHY-381
MORSE KEY AND SOUNDER COMBINED

Mounted on wood base, unit which can be serviceable for the line as well as when two two such units are used.

PHY-382
MORSE SOUNDER

An open construction, on wooden base with two terminals, with twin coils forming an electromagnet, tension adjustment on the armature.

PHY-383

DEMONSTRATION MODEL OF MOTOR

Mounted on a plastic base, completely exposed, open construction, shows all parts, operated by 4-6 battery. Newton's colour disc can be fitted. With plug sockets for connections to power supply.

PHY-384

DEMONSTRATION ELECTRIC MOTOR

Simplest form of open construction d.c. motor model with 2 pole armature wound with insulated copper wire and a permanent magnetic field provided by a removable bar magnet, with a commutator and phosphor bronze brushes connected to 4 mm sockets.

PHY-385

ELECTRIC MOTOR ST. LOUIS

Motor consisting of two pole armature, mounted between the ends of two bar magnets. The armature has a two section commutator and a pair of slip rings on its shaft and is so constructed that the wire cannot slip off the iron core. The upper bearing and brushes for the commutator are mounted on a strong upright. Separate brushes are provided for the commutator and for slip rings and each is connected to a terminal. The magnets are held in position by thumb screws.

PHY-386

DEMONSTRATION MODEL OF TRANSFORMER

Coil 300 turns, coil 600 turns, U-core. U-core: made up of laminated ferro silicon core accepting two coils, mounted on plastic base. Coils: in a plastic case that ensure the perfect electrical insulation for the safe use.

PHY-387

GENERATOR MODEL

A simple demonstration of a dynamo model mounted on a wooden/plastic base with a miniature bulb on bulb holder. The dynamo is driven by a crank. Velocity ratio : 4:1 approx. Supplied with one spare lamp.

PHY-388

DEMONSTRATION DYNAMO MODEL

Demonstration model of dynamo. Hand operated demonstration form. Plastic base dimension approx. 200x150mm. Overall height 145mm. Supplied with 5 spare LEDs.

PHY-389

INDUCTION COIL, RUHMKORFF

Insulated copper wire impregnated with paraffin wax wound on the coils, input 6-8 V d.c. through two 4 mm socket terminals, with an adjustable trembler system. The spark suppression capacitor is housed in the base. Two pointer electrodes with insulated handles are provided.

	Spark Length
PHY-389.1	10 mm
PHY-389.2	25 mm
PHY-389.3	50 mm
PHY-389.4	75 mm
PHY-389.5	100 mm

PHY-390

THERMOPILE

Mounted on a Metallic Stand, Comprising 112 copper constantan couples in series and arranged in the form of a rectangle with sensitive area of 18 x 22 mm. With a metal cone to increase directional selectivity. The inner surface of the cone is polished. With a pair of 4 mm sockets, on stand. The e.m.f. of the pile is of the order of 4mV per °C difference between the hot and cold junctions.

PHY-391

THERMOPILE

Comprising 24 bismuth and antimony bars connected in series and arranged in the form of a rectangular pile with the junctions equally divided between the two ends. The pile is mounted in a cylindrical housing provided with 4 mm socket terminal mounted with a rod on a heavy metal base. A removable brass nickelled funnel is provided to fit over the ends of the pile.

PHY-392

WHEATSTONE BRIDGE, FOUR GAPS

Mounted on a polished wooden base four gap system, enabling two additional resistance to be interpolated in the additional gaps, enables greater accuracy of measurement by reducing unwanted resistance to a minimum. Two brass strips are provided to close the gaps when so required. Complete with knife edge jockey.

PHY-393

POTENTIOMETER, 4 WIRE



PHY-380



PHY-384



PHY-386



PHY-387





PHY-388



PHY-390



PHY-392



PHY-394



PHY-397

Mounted on a polished wooden base with four wires of constantan connected in series to give effective length of 4 metre, with plated brass strips and box wood rule graduated 0-100 cm x 1 mm provided with two terminals. With jockey having knife edge, press keys type giving accurate contacts and a terminal for connection.

**PHY-394
POTENTIOMETER**

Mounted on a polished wooden base, one metre long single resistance wire passes over a metre scale and is firmly clamped to stout brass end plates on wooden base. with knife-edge jockey.

**PHY-395
JOCKEY KNIFE EDGE**

Metal knife edge mounted in insulated handle with plated brass contact and terminal and 4 mm socket.

**PHY-396
POTENTIOMETER, DECADE PATTERN**

Eight steps of 2 ohms and a slide wire of equal resistance enclosed circular type. Divided into 200 parts and calibrated to read in milli volts, all in series and with coarse and fine rheostat provide the standardizing unit. terminals are provided for standard cell, Galvanometer and two 1.5 Volts batteries and two sets of external test circuits worked by a rotary switch.

**PHY-397
RESISTANCE SUBSTITUTION BOX**

Range given by 12 preferred value carbon resistors with rotary selector switch, in case. Values are 33 ohms, 7 W: 100 ohms, 7 W 330 ohms, 4 W, 1 Kohm 1 W 3.3 Kohm 0.5 W, 10 Kohm 33 Kohm, 100 Kohm, 330 Kohm, 1 Mohm, 3.3 Mohm and 10 Mohm, all rated 0.25 W.

**PHY-398
RHEOSTAT, SINGLE TUBE**

Comprising a layer of resistance wire is wound on a porcelain tube which is supported by end supports. A sliding contact and three 4 mm socket terminals are provided, one terminal being connected to the sliding contact and the other two to the ends of the winding, enabling the unit to be used as rheostat or potentiometer.

	Ohms	Amp	Tube length
PHY-398.1	1400	0.3	200 mm
PHY-398.2	150	1	200 mm
PHY-398.3	30	2.3	200 mm
PHY-398.4	10	4	200 mm
PHY-398.5	50	2.3	300 mm

	Ohms	Amp	Tube length
PHY-398.6	23	2.3	150 mm
PHY-398.7	10	3.3	150 mm
PHY-398.8	22	2.8	200 mm
PHY-398.9	24	3.3	250 mm
PHY-398.10	28	4.2	400 mm

**PHY-399
RHEOSTAT, SINGLE TUBE PROTECTED**
Enclosed type, Single tube, for use with high voltage up to 220 V, fitted with 4 mm socket terminals, with protected cover.

	Resistance (ohms)	Current (amps)
PHY-399.1	3	12
PHY-399.2	10	8
PHY-399.3	33	4.4
PHY-399.4	100	2.5

**PHY-400
RESISTANCE COIL**
Non-inductive, wound on plastic bobbin in a transparent cover, insulated support, with brass terminals

PHY-400.1	0.1 ohm
PHY-400.2	0.2 ohm
PHY-400.3	0.5 ohm
PHY-400.4	1 ohm
PHY-400.5	2 ohm
PHY-400.6	5 ohm
PHY-400.7	10 ohm
PHY-400.8	20 ohm
PHY-400.9	50 ohm
PHY-400.10	100 ohm

PHY-401

RESISTANCE UNIT

Bakelite round case, with two 4 mm socket terminals, values are figured in white, accuracy $\pm 1\%$.

PHY-401.1	0.1 ohm
PHY-401.2	0.2ohm
PHY-401.3	0.5ohm
PHY-401.4	1 ohm
PHY-401.5	2 ohm
PHY-401.6	5 ohm
PHY-401.7	10 ohm
PHY-401.8	20 ohm
PHY-401.9	50 ohm
PHY-401.10	100 ohm

**PHY-402
RESISTANCE UNIT**

In rectangular case, with two 4 mm socket terminals, accuracy $\pm 0.5\%$.

PHY-402.1	0.1 ohm
PHY-402.2	0.2ohm
PHY-402.3	0.5ohm
PHY-402.4	1 ohm
PHY-402.5	2 ohm
PHY-402.6	5 ohm
PHY-402.7	10 ohm
PHY-402.8	20 ohm
PHY-402.9	50 ohm
PHY-402.10	100 ohm

**PHY-403
RESISTANCE BOX, PLUG PATTERN**

Fitted on a polished wooden base, plugs are interchangeable with heads are machine moulded of bakelite. The brass blocks are undercut and are fitted to a thick insulating plate. 4 mm brass terminals. Coils are non-inductively wound and are treated to be strain-free. Coil values are engraved on the plate and an infinity plug is also included. Accuracy $\pm 0.5\%$ for 0.01 to 0.05 ohm coils, $\pm 1\%$ for the rest.

PHY-403.1	0.1 to 1 ohm,	total 2 ohm
PHY-403.2	0.1 to 5 ohm,	total 11 ohm
PHY-403.3	0.1 to 10 ohm,	total 21 ohm
PHY-403.4	0.1 to 50 ohm,	total 111 ohm
PHY-403.5	0.1 to 100 ohm,	total 211 ohm
PHY-403.6	0.1 to 500 ohm,	total 1,111 ohm
PHY-403.7	1 to 10 ohm,	total 20 ohm
PHY-403.8	1 to 50 ohm,	total 110 ohm
PHY-403.9	1 to 100 ohm,	total 210 ohm
PHY-403.10	1 to 500 ohm,	total 1,110 ohm
PHY-403.11	1 to 1000 ohm,	total 2,110 ohm
PHY-403.12	1 to 5000 ohm,	total 11,110 ohm

**PHY-404
RESISTANCE BOX, DIAL TYPE**

For use as accurate potential dividers, ratio arms etc. These units employ high stability resistance elements. They are equally stable for a.c. or d.c. use. The individual decades are series connected, each having switch position of 0 to 10 and are mounted in line with 4 mm socket terminals linked to the ends of the chain and to each inter decade junction. The top panel is clearly marked with the internal connection arrangement and maximum safe current capacity of each decade and the overall tolerance. Housed in robust case

	Range in W
PHY-404.1	Single dial 0-1
PHY-404.2	Two dial 0-1, 0-10
PHY-404.3	Three dial 0-1, 0-10, 0-100
PHY-404.4	Four dial 0-1, 0-10, 0-100, 0-1000
PHY-404.5	Six dial 0-1, 0-10, 0-100, 0-1000, 0-10000, 0-1MW

**PHY-405
POST OFFICE BOX, PLUG TYPE**

Fitted in elegantly polished wooden case Plug type, with three pairs of ratio coils of 10,100 and 1000 ohms and 16 series coils from 1 to 5000 ohms, total 11,110 ohms, giving a range from 0.01 ohm to 1,111,000 ohms. Two tapping keys are provided for battery and galvanometer.

**PHY-406
POST OFFICE BOX, WHEATSTONE BRIDGE**
Fitted in elegantly polished wooden case with two ratio dial of 10,100 and 1000 ohms each and a resistance arm of four dials, each of ten coils of 1, 10, 100 and 1000 ohms, giving total resistance of



PHY-398



PHY-399



PHY-400



PHY-401





PHY-403

11,110 ohms, with 4 mm socket terminals for battery, galvanometer and unknown resistance, highly stable resistance area used. Accuracy $\pm 0.1\%$.

PHY-407

KELVIN BRIDGE

Fitted in elegantly polished wooden case for precision measurement of low resistance, range 10 Ω to 1 ohm. With a rotary dial having ten coils of 0.1 ohm each and a circular slide wire resistance reading in steps of 0.001 ohm. A multiplier of 0.1 enables readings upto 0.0001 ohm. Separate current and potential terminals are provided. Properly aged manganin coils are used. Accuracy $\pm 0.1\%$ or $\pm 0.2\%$ of the slide wire length whichever is greater.

PHY-408

CAPACITANCE BOX

Fitted in compact metal case, single dial, and knob. Connections through 4 mm socket terminals Accuracy $\pm 2\%$. Maximum voltage 250 volts d.c.

PHY-408.1 10nF to 100nF in steps of 10nF

PHY-408.2 100nF to 1000nF in steps of 100nF

PHY-408.3 1 μ F to 10 μ F in steps of 1 μ FPHY-408.4 10 μ F to 100 μ F in steps of 10 μ FPHY-408.5 100 μ F to 1000 μ F in steps of 100 μ F

PHY-409

OPEN WOUND SOLENOID

Mounted on sturdy base with 4 mm socket terminal wide spaced heavy gauge copper wire coil to carry current upto 10 A. A platform is supported across the centre of the coil to show the field by use for iron filings or a small compass. Dimension of coil 150 x 50 mm dia.

PHY-410

SEARCH COIL, 100 TURNS

Mounted on tubular metal handle through which flexible leads pass. 1.8 ohms approximately.



PHY-404

ELECTRONICS

PHY-411

DIODE VALVE MOUNTED

Comprises a double diode valve type E.B 91 or equivalent is mounted on a standard box 90 x 90 x 30 mm with sockets for two anodes, heater and cathode. For experiments in diode characteristics

PHY-412

TRIODE VALVE MOUNTED

A triode valve is mounted on two part plastic box 90 x 90 x 30 mm with sockets for anode, heater, cathode, grid etc. For experiments in triode characteristics.

PHY-413

DIODE CHARACTERISTICS APPARATUS

Fitted with diode valve in the front panel. Workable on 220 V with stabilised power supply. Two meters are provided to read voltage and current. Output: H.T: 0-250 volts at 25 mA continuously variable L.T: 6.3 volts a.c. .



PHY-405

PHY-414

TRIODE CHARACTERISTICS APPARATUS

Fitted with triode valve Workable on 230 V with stabilised power supply. Provided with three meters for HT voltage, output current and bias voltage. Output: H.T: 0-300 volts d.c. at 30 mA, continuously variable Bias: 0-25 volts d.c. at 5 mA, continuously variable L.T.: 6.3 volts a.c.

PHY-415

TETRODE/PENTODE CHARACTERISTICS APPARATUS

Provided with stabilised dual power supply, five meters. For tetrode/pentode valve experiments. H.T-1: 0-300 volts d.c. at 30 mA continuously variable. H.T-2: 0-300 volts d.c. at 30 mA continuously variable. Bias: 10 volts d.c. floating. L.T.: 6.3 volts a.c. at 2 amps.

PHY-416

DIODE

Mounted on base.

PHY-417

ZENER DIODE

Zener diode mounted on base.

PHY-418

n-p-n TRANSISTOR

With a transistor mounted on base.

PHY-419



PHY-409

**p-n-p TRANSISTOR**

With a transistor mounted on base.

PHY-420

THERMISTOR

To show change of resistance with temperature. A thermistor mounted at end of a 2-core flying lead with 4 mm plug ends.

PHY-421

UNIJUNCTION

Unijunction transistor mounted on base.

PHY-422

FIELD EFFECT TRANSISTOR (FET)

FET mounted on 90 x 90 x 30 mm base.

PHY-423

POWER TRANSISTOR

A power transistor mounted on 90 x 90 x 30 mm base.

PHY-424

PHOTO CELL

Mounted on 90 x 90 x 30 mm base, a sensitive photo-voltaic solar cell.

PHY-425

TRANSISTOR CHARACTERISTICS APPARATUS

Fitted in a painted case, with four meters and built in regulated power supply suitable for both common base.

PHY-426

FET CHARACTERISTICS APPARATUS

Fitted in a painted case, with three meters, to study and plot output and mutual characteristics of a FET.

PHY-427

SEMICONDUCTOR DIODE/PN JUNCTION DIODE CHARACTERISTICS APPARATUS

Fitted in a painted case, with power supply and two meters, suitable for both forward and reverse bias characteristics.

PHY-428

ZENER DIODE CHARACTERISTICS APPARATUS

Fitted in a painted case, with two meters for measuring input voltage and output voltage, complete with built in power supply.

PHY-429

THERMISTOR CHARACTERISTICS APPARATUS

Study of thermistor as temperature measuring transducer electrically heated oven up-to 90°C Thermistor (NTC) mounted in metallic tubing and protected from corrosion. Study of non-linear (exponential) characteristics Unbalance Bridge circuit with 1st degree linearization Differential gain amplifier 3.5 digit DPM as temperature scale Glass thermometer for reference Detailed instruction manual.

PHY-430

LCR IMPEDANCE APPARATUS

Fitted in a painted case, with three resistance, three capacitors, inductance and two meters to read voltage and current for series and parallel resonance circuits.

PHY-431

LOGIC GATES TRAINER

Fitted in a elegantly painted case, logic gates trainer is a self training course in basic digital electronic and is first step to understand fundamentals of any computer. It enables the student to understand AND, OR, NOT, NAND and NOR Gates and in the process to make connections.

PHY-432

ELECTRONIC KIT SENIOR

The electronic kit senior is a kit designed keeping in view the requirement of today student who is very enthusiast regarding electronic projects. With this kit, one can make number of electronic circuits such as decade counter, shift register, display, uses of various gates in different applications, flip-flops, application of various operational amplifiers etc. Housed in a very rugged easy carry housing. It is self contained bit as it provides all the components required for performing experiments as per illustrations of the comprehensive manual.

PHY-433

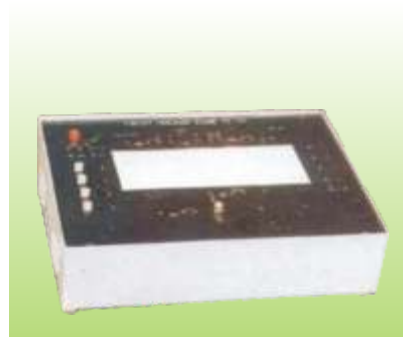
AUDIO FREQUENCY FUNCTION GENERATOR 1Hz TO 220 Hz

Wave Shapes : Sine, Square, and Triangular waves selectable by band switch.

Frequency Range : 1 Hz to 220 KHz using fine and coarse controls.

Accuracy : $\pm 3\%$ on all ranges.





PHY-432

Outputs Impedance : App. 60 Ohms
Amplitude for sine : 20 V Peak to Peak wave output.

PHY-434

OSCILLATOR SINE/SQUARE 1 Hz - 1 MHz

Wave Shapes : Sine, Square wave output 4 mm sockets.
Frequency Range : 1 Hz to 1 MHz using fine and coarse controls.
Accuracy : $\pm 5\%$ on all ranges.
Amplitude for sine wave output : 30 V peak to peak
Amplitude for square wave output : 15 V peak to peak
Output Impedance for sine wave : App. 600 Ohms
Output Impedance for square wave : App. 400 ohms

PHY-435

OSCILLOSCOPE, SINGLE TRACE

Fully solid state workable on 220 volts 50 Hz. All supplies are stabilised for accurate and stable operation. Single beam with a band width DC to 10 MHz. The accurate triggering of time base enable clear and stable display on screen 8 x 8 cm. Vertical deflection can be selected for either A.C. or D.C. provision for attenuation in the input circuit, calibrated from 5 mV to 50 V/cm.

Specification

Band width : Vertical D.C. to 10 MHz (3db)
Sensitivity : 10mV/Cm Maximum
Input Impedance : 1M Ohm
Square wave calibration : 2VP-P
Triggering : Internal from vertical amplifier or external.
Sweep Time Factor : 0.1 us/Div. 0.1s/div $\pm 5\%$
Horizontal Amplifier :
Band Width : DC to 1 MHz
Display : 8x8 cm square
Power Requirement : 25 Watt 230 V 50 Hz



PHY-433

PHY-436

OSCILLOSCOPE, DUAL TRACE, 20 MHz

It is a 20 MHz Dual Channel Oscilloscope ideal for professionals as well as students undergoing technical studies. It is rugged, light weight instrument that features a bright, sharply defined trace on a 80 by 100 mm cathode ray tube. The internal trigger signal is ac coupled. An external triggering signal or an external Z-axis modulation signal can be applied via a front panel or rear panel connector and the source selector switch. The horizontal system provides calibration sweep speeds from 0.2s to 0.1 Micro S division. for greater measurement accuracy a x5 magnifier circuit extends the maximum sweep speed to 20 ns per division. SPECIAL FEATURES Synchronisation of the signals from the two channels can be identified by a red LED marked as READY present on the right hand side top on the front panel

SPECIFICATION

Frequency Bandwidth : DC-20 MH
Deflection Factor : 5 mV/div-10V x div x5
Sweep Factor : 0.2s-0.1s/div. + 5%
Trigger synchronization : Int, Alt, line, Ext, TV
Vertical Type : CH1, CH2, Alt, Chop
Sweep Mode : Auto, Trigger, Single Time



PHY-434

PHY-437

ACCUMULATOR

In transparent polystyrene container with terminals.

PHY-453.1 2 Volt 20 Amphr
PHY-453.2 2 Volt 30 Amphr

PHY-438

ACCUMULATOR

In plastic container, mass type rating at slow discharge. With terminals.

PHY-454.1 2 volt 20 Amphr
PHY-454.2 2 volt 40 Amphr



PHY-439

PHY-439

ACCUMULATOR

In plastic container with terminals, multi-plate type.

PHY-455.1 2 volt 20 Amphr
PHY-455.2 2 volt 45 Amphr
PHY-455.3 2 volt 60 Amphr
PHY-455.4 2 volt 75 Amphr
PHY-455.5 6 volt 12 Amphr
PHY-455.6 6 volt 20 Amphr

PHY-440

BATTERY HYDROMETER

To measure the density of electrolyte in lead acid cells, a hydrometer float is contained in a glass body which is provided with a compressible rubber bulb and a nozzle

PHY-441

BATTERY CHARGER

Battery charger is compiled in steel cabinet workable on 220 volt 50 Hz protected with fuse, meter for output current, and switch for charging. Complete with battery terminals and main cable.

PHY-457.1 2 Amps
PHY-457.2 3 Amps
PHY-457.3 4 Amps
PHY-457.4 5 Amps
PHY-457.5 6 Amps

PHY-442

BATTERY ELIMINATOR

Workable on 220 V 50 Hz, Housed in steel cabinet. Socket or Band-Switch provided for Selection of Volts output, with ON/OFF switch and main indication.

Output: 2, 4, 6, 8, 10, and 12 V D.C.

PHY-442.x	Output current
PHY-442.1	1 Amp.
PHY-442.2	2 Amp.
PHY-442.3	3 Amp.
PHY-442.4	4 Amp.
PHY-442.5	5 Amp.

PHY-443

CELL HOLDER

Plastic moulded very sturdy rectangular shaped cell holder with cover to hold 1.5 volt dry cell with sockets for output.

PHY-443.x	for one cell	PHY-443.2	for two cells
PHY-443.1			
PHY-443.3			

PHY-444

TRANSFORMER

Fitted in elegantly painted metal case, output 2, 4, 6, 8, and 12 V at 8 A through 4 mm sockets workable on 230-240 volt a.c. input.

PHY-445

POWER SUPPLY 12 V AC AND DC

The power supply is built in suitably sized steel cabinet employing modern technique and circuit; for measuring voltage and current are built in protection with fuse.

Specifications:

Mains input : 220 - 240 V 50 Hz
Output voltage : 0 to 12 V a.c. in 2 V steps. Full wave rectification.
0 to 12 V d.c. in 2 V steps

Protection : provided with overload protection

PHY-445.x	Output current
PHY-445.1	1 Amp
PHY-445.2	2 Amp
PHY-445.3	5 Amp

PHY-446

AC/DC POWER SUPPLY WITH HAND

ON/OFF switch

Input voltage : 220V 50Hz

DC output : 0-12V, 0-1.5A, stabilized and continuously adjustable voltage, electronic protection. AC output : 6V, 12V, max 2.5A, fuse protection.

PHY-447

POWER SUPPLY, CONTINUOUSLY VARIABLE, 25 V

The power supply is built in suitably sized steel cabinet employing modern technique and circuit, meters for measuring voltage, gives continuously variable a.c. and d.c. outputs up to 10 A for a.c. and 8 A for d.c. A meter is provided to indicated both a.c. and d.c. voltages. An internal fuse is provided for input and a resettable cut-out for output. With mains lead.

Specifications:

Mains input : 220-240 V a.c. 50/60 Hz
Output voltages : 0 to 25 V a.c. and unsmoothed full wave rectified d.c.
Output current : 10 A maximum a.c.
8 A maximum d.c.

Voltage selection : Rotary continuously variable transformer operated by a large knob in front panel.

Metering : a.c and d.c output voltages by a moving coil meter with selector switch to select a.c or d.c

Circuit protection : Mains input 3 A internal glass fuse link. Output is protected by a resettable cut-out.

Output terminals : Colour coded 4 mm sockets.

PHY-448

POWER SUPPLIES, REGULATED, DIGITAL



PHY-114



PHY-439



PHY-440



PHY-458





PHY-445

The power supply is built in suitably sized steel cabinet employing modern technique and circuit, meters for measuring voltage, these power supplies are d.c. regulated, stabilised short circuit and overload protected, easy and safe to use as a power source for electronic equipment. The power supply can be operated in either constant voltage or constant current mode. Both voltage and current are precisely regulated with low output ripple. Voltage and current readings are displayed on two separate 3½ digit meters.

Output voltage, single or double, is continuously adjustable from 0 to 30 volts by coarse and fine controls.

Specification:

Meters	: 3½ digital panel meters separately for voltage and current.
Accuracy of DPM	: ±0.2% of readings, ±2 least count.
Regulation	: ±0.05% for current.
	: ±0.05% for voltage
Ripple	: less than 3 mv r.m.s
Input voltage	: 230 volts ± 10%, 50 Hz.
PHY-448.1	Capacity 1 Amp
PHY-448.2	Capacity 2 Amp
PHY-448.3	Capacity 5 Amp

PHY-449

POWER SUPPLIES, REGULATED, ANALOGUE

Same as PHY-448 but output indication is through separate analogue meters.

PHY-449.1	Capacity 1 Amp
PHY-449.2	Capacity 2 Amp
PHY-449.3	Capacity 5 Amp

PHY-450

POWER SUPPLY H.T.

The power supply is built in suitably sized steel cabinet employing modern technique and circuit, meters for measuring voltage, general purpose H.T. unit for use with thermionic tubes etc. provides two continuously variable d.c. outputs of 0-25 V and 0-300 V and fixed a.c. output of 6.3 V for valve heaters. The two d.c. voltages are continuously and independently variable. Three meters are provided for reading HT, Bias, and LT voltages.

Specification:

Mains Input	: 220-240 V, 50/60 Hz
Output HT	: 0 to 300 V d.c. at 30 mA
Bias	: 0 to 25 V d.c. at 5 mA
LT	: 6.3 V a.c. at 2 Amps.
Load Regulation HT	: ± 1%
Line Regulation HT	: ± 0.5%
Output terminals	: Colour coded 4 mm sockets with one green socket for earthing.
Metering	: Three meters to measure HT volts, HT current, Bias voltage.

PHY-451

MOVING COIL METERS

Mounted on a plastic/acrylic stand, with permanent magnets, spring controlled movement, jewelled bearings, hard polished pivots, and knife edge pointer. For D.C. use, each meter is with colour coded terminals.

Scale length approx 50 mm, dial dia 65 mm mounted in desk stand with two colour coded terminals. Overall size 90 x 110 x 90 mm approx. Accuracy: ±2.5%

PHY-452

MOVING COIL METERS

Same as PHY-468, but dual range.

PHY-453

MOVING COIL METERS

Same as PHY-452, but Triple range

PHY-454

MOVING COIL METERS, SQUARE

Mounted on a plastic/acrylic stand. Scale length approx. 60 mm with anti-parallax mirror scale, dial size 72 x 72 mm with colour coded terminals.

Accuracy: ±2% fsd

PHY-455

MOVING COIL METERS, SQUARE

Same as PHY-454, but dual range.

PHY-456

MOVING COIL METERS, SQUARE

Same as PHY-454, but triple range.

PHY-457

VOLTMETER, MOVING COIL

For D.C. measurements, any single range
0-1, 1.5, 2, 5, 10, 25, 50, 100, 250, 300 volts.

PHY-458



PHY-447



PHY-448



PHY-449



For D.C. measurements any single range
0-25, 50, 100, 150, 250, 500 mV.

PHY-459

AMMETER, MOVING COIL

For D.C. measurements, any single range,
0-1, 1.5, 3, 5, 10 Amp.

PHY-460

MILLI-AMMETER, MOVING COIL

For D.C. measurement any single range,
0-1, 5, 10, 25, 50, 100, 250, 500 mA.

PHY-461

MICRO-AMMETER, MOVING COIL

For D.C. measurements, any single range,
0-50, 100, 200, 250, 500 µA.

PHY-462

GALVANOMETER, MOVING COIL

For D.C. measurements, Scale
35-0-35 or 50-0-50.

PHY-463

VOLTMETER, DUAL SCALE, MOVING COIL

For D.C. measurements,
1/5, 3/5, 5/15 Volts.

PHY-464

AMMETER, DUAL SCALE, MOVING COIL

For D.C. measurements,
2.5/5, 1/5, 1.5/3, 5/10 Amps.

PHY-465

VOLTMETER, TRIPLE SCALE, MOVING COIL

For D.C. measurements,
3/15/30, 3/15/300 Volts.

PHY-466

AMMETER, TRIPLE SCALE, MOVING COIL

For D.C. measurements,
50mA/500mA/5A.

PHY-467

A.C. VOLTMETER, MOVING COIL

Permanent magnet type with in-built rectifier, any single range,
0-30, 60 Volts.

PHY-468

A.C. AMMETER, MOVING COIL

Permanent magnet type, with current transformer, any single range, 0-1, 3, 5, 10 Amps.

PHY-469

DIGITAL BENCH METER

Digital meter for general purpose laboratory use housed in tough case use of a 3½ digit cover most of the ranges.

Specification:

Display 13 mm characters.

Main operated

Accuracy	±0.3% typical
Linearity	0.2% typical
PHY-469.1	1.999 mAAC
PHY-469.2	19.99 mAAC
PHY-469.3	199.9 mAAC
PHY-469.4	1.999 AAC
PHY-469.5	199.9 µADC
PHY-469.6	1.999 ADC
PHY-469.7	19.99 mADC
PHY-469.8	199.9 mADC
PHY-469.9	1.999 ADC
PHY-469.10	19.99 ADC



PHY-451



PHY-454



PHY-457



PHY-459





PHY-462



PHY-467



PHY-469



PHY-470

PHY-470

DEMONSTRATION METER

A demonstration meter and may be converted to an a.c. or d.c. Voltmeter and ammeter with selection of various ranges for each mode. With a high quality moving coil, spring controlled movement with full scale deflection of 5 mA or 100 mV d.c. The long pointer has a spade end and is clearly visible from a distance. Fitted in case with glass front and back. The instrument can be used with different dials to give different voltage and current ranges. All dials are interchangeable and each has a plug coupler to fit the instrument. The coupler connects appropriate resistors, shunts, or rectifiers to convert the instrument to the scales have clear bold figures and are marked on both sides to enable the lecturer also to observe the reading from the back of the instrument. A zero adjuster allows the instrument to be used for centre zero dials. One dial of range 50-0-50 mV d.c. is supplied with the instrument.

PHY-470.1 In wooden case.
PHY-470.2 In plastic case.

PHY-471

SPOT GALVANOMETER

Very popular for use as a Null Detector for potentiometric set-ups and bridges. Housed in sturdy plastic case with in built lamp and scale arrangement, taut band type movement with Alcomax magnet, clamp and free arrangement for safe, transportation, easy replacement of the 6 V lamp, working on 220 V a.c. with internal transformer. With a 1, 1/10/1/100, 1/1000, and short circuit

Galvanometer resistance: 125 ohms
Current per mm deflections: 5 x 10⁻⁸
Volts per mm deflection: 6.25 x 10⁻⁶
Critical damping resistance: 1000 ohms

PHY-472

BALLISTIC GALVANOMETER

Useful for measurement of small quantities of electrical charge, the moving coil is suspended by a phosphor bronze strip, which carries an optically true concave mirror. The coil can be raised, lowered or set to zero by an adjusting knurled knob at top. A knob at back is provided for clamping and releasing the coil. With levelling screws.

	Resistance of coil	Period	Sensitivity
PHY-472.1	100 ohms	10-12 sec	180 mm
PHY-472.2	500 ohms	10-12 sec	400 mm

PHY-473

DIGITAL MULTIMETER

3½ digit, LCD multimeter

Range:
DC voltage : upto 1000 V in five ranges
AC voltage : upto 750 V in five ranges
DC current : upto 10 A in six ranges
AC current : upto 10 A in six ranges
Resistance : upto 20 Megohm in six ranges
Accuracy : ±0.5% for d.c. and resistance ranges.
±1% for a.c. ranges
Power supply : One 9 volt battery

PHY-474

DIGITAL MULTIMETER

4½ digit LCD multimeter

Range:
DC voltage : upto 1000 V in five ranges
AC voltage : upto 750 V in five ranges
DC current : upto 10 A in six ranges
AC current : upto 10 A in six ranges
Resistance : upto 20 Megohm in six ranges
Accuracy : ±1%
DC voltage : ±1%
AC voltage : ±1%
DC current : ±0.3%
AC current : ±0.75%
Resistance : ±0.25%
Power supply : One 9 volt battery

PHY-475

MULTIMETER, ANALOGUE

Low cost, high sensitivity pocket size circuit tester equipped with a meter movement of 175 micro amperes sensitivity. Pin-jack range selection system entirely eliminates mechanical switching troubles. The internal batteries measure resistance from 2 ohms upto 1 M ohms.

Range:
DC voltage : 0.25/10/50/250/1000 V (4K ohm/V) ±3%

AC voltage : 10/50/250/500/1000 V (2K ohm/V) ±4%
AC current : 0.25/10/250 mA ± 3%
Resistance : 0-10 K/1 M ohm (min. 2 Ohms x max 1 M ohm).
db : -20 to + 22, +20 to +36
Battery : 1.5 V (UM -3) x 2
Capacitance : 0.0001 (100 pF) to 0.03 μF 0.01-0.6 μF
Inductance : 10 to 1000 H

PHY-476

INSULATED 4 MM, SOCKET TERMINALS

With moulded captive head, 4 mm, socket, plastic body, nut and washers, Will also clamp wire and spade terminals.

PHY-477

BANANA PLUG

4 mm pin, screwed on plastic body

PHY-478

PLUGS, TRANSVERSE HOLE

Plastic moulded 4 mm plugs, with screw connection for wire and 4 mm transverse hole for extra connection.

PHY-478.1 Black
PHY-478.2 Red

PHY-479

FLEXIBLE LEADS, PVC

Plastic insulated copper wire, with crocodile clip at each end.

	Length	Colour
PHY-479.1	250 mm	Black
PHY-479.2	250 mm	Red
PHY-479.3	500 mm	Black
PHY-479.4	500 mm	Red

PHY-480

FLEXIBLE LEADS, PVC

Insulated, plastic copper wire with 4 mm plug at one end and crocodile clip at the other.

	Length	Colour
PHY-480.1	250 mm	Black
PHY-480.2	250 mm	Red
PHY-480.3	500 mm	Black
PHY-480.4	500 mm	Red

PHY-481

FLEXIBLE LEADS, PVC

Same as PHY-480, but with 4 mm plug at both ends.

PHY-482

CROCODILE CLIP

With strong grip, clamping screw for wire.

PHY-483

BATTERY CLIPS

strong grip, wide jaws

PHY-483.1 5A PHY-484.2 50A

PHY-484

COPPER WIRE, BARE

Wound on reel.

	SWG	Net weight
PHY-484.1	12	500 g
PHY-484.2	14	500 g
PHY-484.3	16	500 g
PHY-484.4	20	250 g
PHY-484.5	24	250 g
PHY-484.6	28	250 g
PHY-484.7	32	250 g

PHY-485

EUREKA/CONSTANTAN WIRE, BARE

A copper nickel alloy resistance wire, low temperature coefficient, reel of 125 g.

	SWG	
PHY-485.1	16	PHY-485.2 20
PHY-485.3	24	PHY-485.4 28
PHY-485.5	32	PHY-485.6 36

PHY-486

NICHROME WIRE, BARE



PHY-471



PHY-474

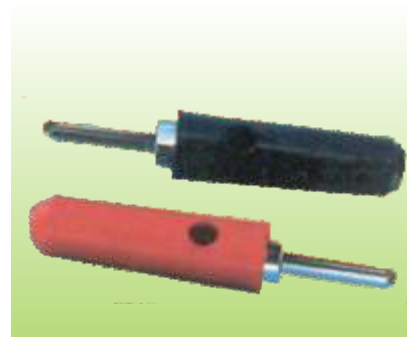


PHY-475



PHY-477





PHY-478



PHY-482



PHY-485



PHY-488

Reel of 125g net.

	SWG		SWG
PHY-486.1	18	PHY-486.2	20
PHY-486.3	24	PHY-486.4	28
PHY-486.5	32		

PHY-487

CONTACT KEY, SINGLE

Mounted on plastic base, a spring arm, press knob, contact stud and a connecting strip with two 4 mm terminals.

PHY-488

LEVER SWITCH, TWO WAY

Contact arm and three metal studs mounted on a plastic base, with three 4 mm terminals. The central terminal is the common connection.

PHY-489

PLUG SWITCH, ONE WAY

Two brass blocks with 4 mm terminals are mounted on a moulded base, an accurately tapered plug with a fluted top fits into the tapered hole between the two blocks, ensuring very low contact resistance.

PHY-490

PLUG SWITCH, TWO WAY

With three brass blocks, each with a 4 mm terminal and two standard tapered plugs to fit the two holes between the blocks.

PHY-491

KNIFE SWITCH

Mounted on a bakelite base with plated contacts and screw connections.

PHY-491.1	Single Pole Double Throw
PHY-491.2	Double Pole Double Throw

PHY-492

REVERSING SWITCH (KEY)

On plastic base, double-pole, dimensions 90x60x20mm, with 4mm plug sockets for banana plugs. For use at voltages up to 50V and 75V DC.

PHY-493

FLASH LAMP BULB, ROUND

M.E.S. cap.

PHY-493.1	1.25V	PHY-493.2	2.5V
PHY-493.3	4.5V	PHY-493.4	6V
PHY-493.5	12V		

PHY-494

LAMP HOLDER M.E.S.

Round Shape moulded plastic base.

PHY-495

LAMP HOLDER M.E.S. MOUNTED

Mounted on rectangular base with two 4 mm socket connections

PHY-496

GAS PRESSURE SENSOR

Connects to interface with auto identification. Range 0 to 210 kPa. Resolution 0.025 kPa. Includes 20ml syringe, plastic tubing with connectors, rubber stopper with connector, two way valve, air tight clamp.

PHY-497

USB TEMPERATURE PROBES

Direct USB connection, Range -10 deg C to 120 deg C, Resolution 0.25C, stainless steel jacket

PHY-498

USB MOTION DETECTOR

Ultrasonic Motion Detector for conducting experiments with time / motion, Direct USB connection, Capable of connection to data logger and graphing calculator, Range 10cm to 6m, Does not require any outside power source in USE mode.

PHY-499

PASCAL'S APPARATUS

To demonstrate that the pressure of liquid in a vessel is the same in every direction.

PHY-500

HARTLE DISK COMPLETE WITH ASSET OF OPTICAL ELEMENTS

Hartle disk complete with a set of magnetic optical bodies. The disk has a holder for the use with the optical bench. The magnetic optical bodies are supplied in a plastic case.

PHY-501

SUPPORT OF SENSORS

2" a-shape base support, stainless steel rod 10mm dia, 500mm length, 1 stainless steel rod, 10mm dia, 350mm length, 2 boss head squared, 1 extension clamp with rod.



PHY-489



PHY-493



PHY-494

