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Precision Variable Power Supply Page 2

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Lascells Precision Power Supplies

Precision, full specification variable and stepped power supplies for the school laboratory with unrivalled advantages in terms of design and electrical specification. Up to 8A D.C, and most importantly, constant, regulated D.C. voltage regardless of load. Combine this with a simple to adjust maximum voltage limiter, automatic overload protection, digital voltage readout and a compact, lightweight case and you have the perfect power supply in a truly space saving package.

Features:

- Regulated D.C. output – set the voltage to the value required as displayed on the built-in panel meter and the supply will maintain this no matter what you connect to the terminals
- Maximum voltage limiter. Use an Allen key through the front panel to set the dial to the highest voltage you want your students to use. The main control will then work as normal up to this value but if a higher voltage is tried there will be no increase
- Digital panel meter showing the D.C. output being used at all times
- Automatic over-current protection. If more than 8A is used the output voltage reduces to zero. Normal output is restored once the current is reduced. No resetting required
- Additional AC 6V and 12V (unregulated) are provided at 1.5A max for AC work such as transformer investigations. This can be used in parallel with the D.C. output
- Compact design. Easy to store, easy to carry around, more space left on the bench. At only 2.2kg each and measuring only 125 x 175 x 230mm four supplies will fit in a single storage tray. A real space saving solution
- Robust, powder-coated steel case with integral plastic handle and removable mains lead
- Clear simple controls with illuminated front-panel mains switch

Lascells Precision Variable Power Supply

- Output voltage D.C: 0 to 15V continuously variable
- Output quality: Fully smoothed and regulated
- Max voltage variation with load current 2%
- Max ripple at full current 300mV
- Output voltage A.C: 6V and 12V A.C. unregulated
- Output current D.C: 8A max. 6A continuous
- Output vurrent A.C: 1.5A A.C. max
- Voltage limiter: Front panel Allen key adjust
- Overload protection: Electronic trip on D.C. and thermal trip on A.C.
- Display: Digital output D.C. only

Code	Pack	Price
PY3002	Each	£159.00

Lascells Precision Switched Power Supply

- Output voltage D.C: 1 to 10V in 1V increments plus 12V and 14V
- Output quality: Fully smoothed and regulated
- Max voltage variation with load current 2%
- Max ripple at full current 300mV
- Output voltage A.C: 6V and 12V A.C. unregulated
- Output current D.C: 8A max. 6A continuous
- Output current A.C: 1.5A A.C. max
- Voltage limiter: Front panel Allen key adjust
- Overload protection: Electronic trip on D.C. and thermal trip on A.C.
- Display: Digital output D.C. only

Code	Pack	Price
PY3004	Each	£159.50



Lascells MII Power Supply

A traditional switched power supply which uses established PSU technology to provide a smoothed power supply suitable for all laboratory applications which require a rugged source of emf at either AC or DC.

An internal mechanism disconnects the output when the voltage setting is changed ensuring that the switch contacts are protected from overload and the unit can be locked at any setting by means of an Allen screw located on the front panel. As with all Revolution Power Supplies the unit is housed in a robust powder coated case with integral carrying handle and is sized such that 4 can be carried in a single Gratnells storage tray.

- Output Voltage: 0 to 12V d.c. in 2V increments capacitor smoothed. 0 to 12V a.c. in 2V increments
- Output Current: 5A max 4A continuous
- Voltage Limiter: Front panel Allen key insert
- Current Protection: Thermal circuit breaker. Manual resetsupplies will fit in a single storage tray. A real space saving solution

Code	Pack	Price
PY3001	Each	£119.00

Lascells Digital Voltmeters & Ammeters

Spend less time changing batteries with Lascells bench meters. These digital bench meters are housed in robust ABS and PVC cases. Both feature ~50 minute 'auto off' circuitry to conserve battery life and an LED indicator prompting battery change when necessary. Both units are powered by a 9V PP3 battery.



Voltmeter (PY3008)

Specifications:

- Range: 0 to ± 20V D.C.
- Resolution: 0.01V
- Accuracy: ± 2%
- Input impedance: 10MΩ approx

Ammeter (PY3010)

Specifications:

- Range: 0 to ± 10A D.C.
- Resolution: 0.01A
- Accuracy: ± 2%
- Input impedance: 0.01Ω approx.

Code	Description	Pack	Price
PY3008	Voltmeter 0-20V	Each	£24.50
PY3009	Voltmeter 0-20V (class pack)	15	£335.00
PY3010	Ammeter 0-10A	Each	£24.50
PY3011	Ammeter 0-10A (class pack)	15	£335.00





Lascells Lost Volts Apparatus

This 'Lost Volts' apparatus provides a convenient solution for experimentally determining the internal resistance and the EMF of a cell. The unit requires connection to a 6V D.C. source of EMF, a voltmeter and an ammeter.The unit houses seven appropriately rated resistors and a push switch and is designed to remove any complications from wiring separate resistors. The switch reduces the possibility of unnecessary drain of the battery and excessive heat being generated in the resistors.

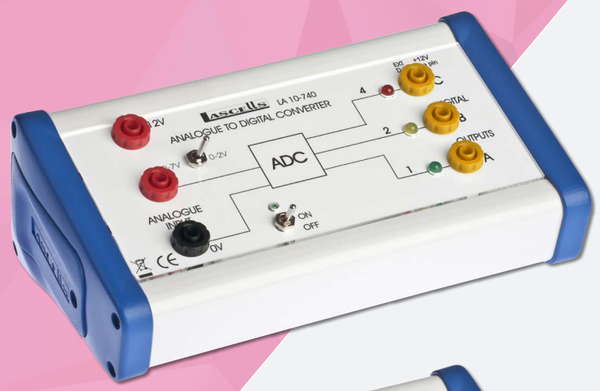
Code	Pack	Price
PY3024	Each	£36.72



Lascells Lost Volts Separated Apparatus

A pack of 5 convenient and appropriately rated mounted components to enable students to carry out an experiment to determine the EMF and internal resistance of a cell. The pack is supplied with full instructions and the resistors can be combined to create up to nine different resistances allowing a good range of readings to be taken. The resistors will need connection to a 6V D.C. source of EMF, an ammeter and a voltmeter.

Code	Pack	Price
PY3026	5	£32.32



Lascells ADC Analogue to Digital Converter

This unit is designed to assist in the understanding of digital and analogue communications systems. When a variable voltage is applied to the input terminals it is converted into a digital output. One volt input corresponds to binary 1, 2 volts for binary 10, 3 volts for binary 11 etc. up to 7 volts binary 111. There is a fine setting as well with 2V corresponding to binary 111. A low frequency AC input signal can be converted into a changing digital value. Use on its own or combined with the DAC to decode back into a stepped analogue voltage. The unit requires a plugtop 12V PSU - available separately or may be powered from the front panel sockets using a good 12V D.C. power supply.

Code	Pack	Price
PY3032	Each	£86.78



Lascells DAC Digital to Analogue Converter

This is a companion unit to the ADC which converts a digital input in the range 0 to binary 111 into an analogue voltage output. Binary 111 gives 7 volts. The system is of particular application when discussing digital data communication, loss of information, resolution etc. The same PSU as the ADC may be used.

Code	Pack	Price
PY3034	Each	£80.41

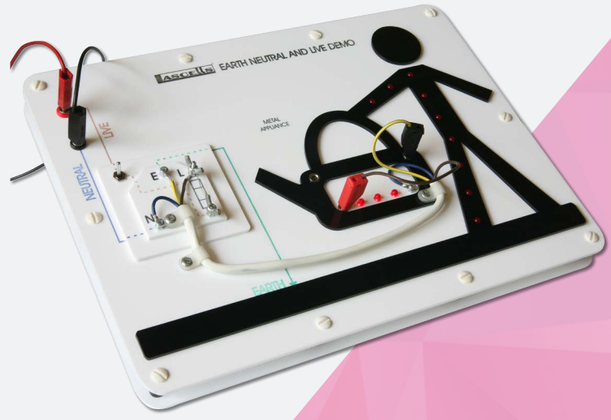
Lascells Electricity

Lascells Earth Neutral Live Demo

This apparatus is an effective demonstration of how the earth wire and fuse act together to protect both the user and the appliance. The apparatus can be set up to demonstrate and explain the safe wiring of an appliance, the danger of an unearthed appliance and the action of a fuse.

In use the appliance is connected correctly and the LEDs in the kettle will illuminate to show the appliance is working. A fault is then demonstrated by swapping the live wire from inside the kettle to the case to show either the fuse melting and protecting the user and appliance, or in the case of no earth wire, the LEDs illuminate to indicate the passage of current through the person to ground. The apparatus is clearly labelled and easily allows the tracing of current from the 'power station' through the 13A socket, plug and appliance through the live wire and back through the neutral wire. In addition, the layout of the 3 pin plug is positionally correct to reinforce the wiring layout and the position of the fuse. The fuse is easily visible and can be seen to 'blow' when a fault occurs.The unit is supplied with 10 metres of fuse wire and full instructions. A 12V D.C. power supply is required. Connections are made via 4mm shrouded sockets.

Code	Pack	Price
PY3042	Each	£72.49



Lascells Lemon LED Demonstration

A low powered LED comes securely contained within a robust tube for protection. Suitable for use with lemon batteries. Zinc and copper pieces for connections are not included but are available separately. Crocodile clips, leads and lemons not included.

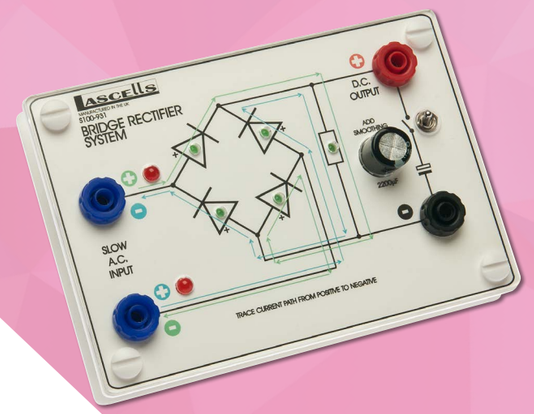
Code	Pack	Price
PY3068	Each	£4.57



Lascells Bridge Rectifier System

A must for the effective demonstration of this important circuit. This unit contains a bridge rectifier circuit with LEDs showing which diodes are conducting during each half cycle of the A.C. supply. The clear front panel label shows the current path at each stage through the on-board load resistor. In addition, there is a smoothing capacitor which may be switched in as required. The unit may be powered from a 6V D.C. supply (mains or battery) with the connections reversed for each half cycle. A better approach is to use a slow Signal Generator (about 1Hz) or our special A.C. waveform generator which allows the signal to be paused at any point in the cycle.

Code	Pack	Price
PY3112	Each	£38.12



Lascells Thermistor System

This apparatus contains an NTC bead thermistor with a nominal resistance of 4.7kΩ in a glass tube with electrical connection made by means of 4mm flying leads. Students from KS3 to post-16 can carry out practical investigations into thermistor characteristics. Full instructions and specimen results included.

Code	Pack	Price
PY3084	Each	£20.74





Lascells Resistance Selector

Mini substitution unit using a single rotary switch to select from twelve values all at 5% 0.5W. Values are 100Ω, 330Ω, 470Ω, 680Ω, 1kΩ, 3.3kΩ, 4.7kΩ, 6.8kΩ, 10kΩ, 33kΩ, 47kΩ and 100kΩ. Connections via 4mm sockets.

Code	Pack	Price
PY3110	Each	**£30.45**



Lascells Electrode Holder

A robust acrylic base, 130mm wide with two crocodile clip holders. The crocodile clips hold standard 5mm carbon rod or strip metal electrodes and can be connected to with 4mm leads. For use in electrolysis, electro-plating etc.

Code	Pack	Price
PY3120	Each	**£4.73**



Lascells Junction Block

Neatly connect multiple 4mm wires and simplify circuit layouts with this multi-way connector.

Code	Pack	Price
PY3122	Each	**£6.20**



Lascells Demonstration Electric Motor

The demonstration electric motor is a ready built fully functional unit showing all the essential features of a simple motor as taught in the KS4 syllabus. A single rectangular coil rotates in a linear magnetic field with a simple commutator and brush arrangement. Field directions can be reversed by reversing the ferrite slab magnets and current direction can be reversed by reversing the leads. Requires D.C. voltage in the range 1.5V – 6V.

Code	Pack	Price
PY3000	Each	**£38.59**



Lascells Faraday's Law Apparatus

This system provides a simple and effective method of studying Faraday's Law. An acrylic tube supports an easily moved coil so that a small cylindrical magnet (supplied) can be dropped down the tube to generate a pulse of electricity as it passes through. An oscilloscope (not supplied) is used to monitor the pulse and measure its amplitude. At different speeds the amplitude varies and can be used by senior students to investigate Faraday's Law while revising equations of motion to determine the speed. Twin coils, 150 and 300 turns, allows for extra versatility. Recommended for KS4/post-16.

Code	Pack	Price
PY3006	Each	**£40.69**

Lascells Magnetic Field Unit

Clear acrylic base assemblies which are suitable for bench or overhead projector use. Can be used to demonstrate magnetic field patterns around conductors using plotting compasses or iron filings. Three types are available requiring a D.C. power supply capable of providing 5-8A.The twin coil model has a single turn coil rated at 8A max and 5 turn coil rated at 5A max.

Base dimensions: 150 x 150 x 45mm with connection via 4mm sockets. Available models (must be ordered individually):

- Vertical wire field (PY3012)
- 15 turn long solenoid (PY3014)
- Twin vertical coils (PY3016)

Code	Description	Pack	Price
PY3012	Vertical Wire	Each	**£23.63**
PY3014	15 Turn Solenoid	Each	**£23.63**
PY3016	Twin Coil	Each	**£23.63**



Lascells Set of Five Transformer Coils

Student investigations into the relationship between coil turns and voltage are well catered for by this inexpensive range of coils designed to be used with 'Westminster Kit' type laminated 'C' cores and clips. The system also permits students to investigate for themselves the basics of Faraday's Laws of Electromagnetic Induction. The coils are made from strong plastic with 4mm socket connections. Each coil is centre-tapped giving three turns values per coil. The full set of five covers 50 – 650 turns in 50 turn steps plus 900 and 1150.

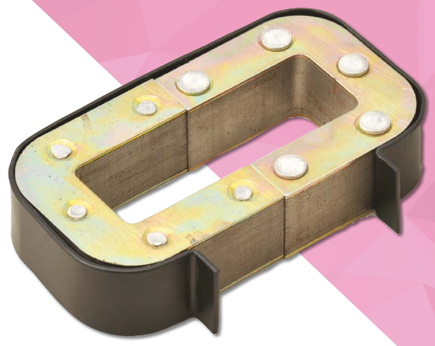
The coil set (of 5) comprises one of each coil.

- 50 + 100 coil
- 200 + 250 coil
- 300 + 350 coil
- 400 + 500 coil
- 550 + 600 coil

NB: Individual coils and coil set all require the C-core and clip set (CCORE2).

Code	Pack	Price
PY3028	5	**£135.42**





Lascells C-Core with Clip

Double 'C' core and clip. Each core is laminated to form a roughly rectangular core with a cross section and is cut across the middle to produce two equal C's. A spring steel clip is provided to hold them together.

Code	Pack	Price
CCORE2	Pair	**£14.48**



Lascells Hall Effect Probe

The unit is ideal for measuring magnetic fields ranging from strong, permanent magnets down to weak fields such as that of the Earth. The range is -70mT to +70mT and the readout is displayed in Tesla on the integral display. Three range settings allow field strengths from 1 x 10^{-5}T to 70mT to be displayed. The sensor output is also taken to 4mm sockets to allow a digital multi-meter (not supplied) to be connected. Output from the sensor is in the range -2.5 to +2.5V. The control circuitry and display are contained in a robust case with the sensor mounted in a 90° probe.

Code	Pack	Price
PY3030	Each	£101.55



Lascells Gauss Gun

The Gauss Gun provides a safe but dramatic demonstration of the acceleration of a body in a magnetic field and the conservation of momentum. It uses groups of high strength neodymium magnets to accelerate steel ball bearings with the whole assembly contained in a closed, transparent plastic tube for safety. A great discussion experiment on the nature and strength of magnetic fields, momentum, conservation of energy etc.

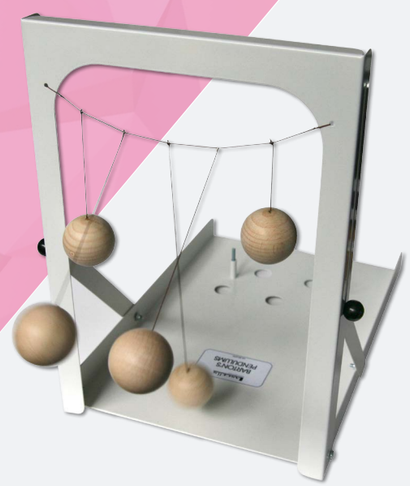
Code	Pack	Price
PY3108	Each	£24.94



Lascells Rotary System

This simple but effective system makes a complicated topic into one of the most enjoyable lessons possible for all ages at secondary level. It allows students to easily investigate the forces of circular motion so that they get hands-on experience of the effects. A spring system is enclosed in an acrylic tube so that the student can whirl a rubber ball around in a horizontal circle to measure the centripetal force. Radius and mass are easily varied and rotational speed is simply measured by timing the revolutions. The forces acting can be measured in 'force increments' or in Newtons if the spring is calibrated beforehand. Full instructions included.

Code	Pack	Price
PY3054	Each	£37.01



Lascells Bartons Pendulums

Barton's pendulums is a well known resonance effect but usually difficult to set up and store. This apparatus stores flat and can be quickly unfolded to show the resonance between similar length pendulums. Once the demonstration is over it can be closed up again to safely store the pendulum arrangement until required again.

Code	Pack	Price
PY3056	Each	£59.35

Lascells Hardwood Dynamics Trolley

Traditional hardwood trolleys on three double row ball bearing wheels for exceptional free running. Wheels are set back from main body of chassis to reduce the chance of collision damage and a flat top is provided to allow the trolleys to be stacked in order to double mass. Dimensions: 260 x 100 x 60mm.

Code	Pack	Price
PY3062	Each	£43.32



Lascells Monkey & Hunter

An essential part of projectile studies is the 'Monkey and Hunter' problem. A monkey sees a hunter take aim. If he lets go when the hunter fires will he drop so that the bullet passes harmlessly overhead or should he sit still and watch the bullet pass harmlessly underneath since it is pulled down by the gravitational field?

This apparatus allows for an interactive study of the problem by students. An elastic powered 'gun' fires ping pong ball 'bullets' at a model monkey supported from a small electromagnet. The electromagnet is switched off at the instant the projectile leaves the gun. Both monkey and bullet fall at the same rate and the bullet hits the monkey. The system has everything required except a low voltage power supply and laboratory stand for the electromagnet.

Code	Description	Pack	Price
PY3064	Monkey & Hunter Apparatus	Each	£102.38
PY3066	Replacement Monkey	Each	£21.53





Lascells Vacuum Bazooka

This amazing device attaches to a vacuum cleaner and launches lightweight, hollow projectiles at high velocity. When aimed vertically typical heights reached are 5 to 6 metres. Additional weights can be added to the projectiles for all manner of investigations into energy, acceleration, momentum etc. An essential item to brighten up the subject of dynamics or to amaze everyone on open days and science fairs. As featured in the book "Vacuum Bazookas and Electric Rainbow Jelly" by Neil Downie.

Code	Pack	Price
PY3070	Each	£47.25



Lascells Bazooka Extension

This add-on tube extends the barrel of the basic vacuum bazooka which means the accelerating force is applied for a longer time. The corresponding increase in momentum can be explored as part of an investigation into the impulse equation in mechanics.

Code	Pack	Price
PY3072	Each	£28.51



Lascells G by Free Fall

The simplest approach yet to this basic experiment in mechanics. By squeezing the "ears" of the release unit the ball bearing is released and the circuit connections to a timer are broken at the same instant. The base unit is a sensitive microswitch "trapdoor" giving either make or break contacts at the moment of impact.

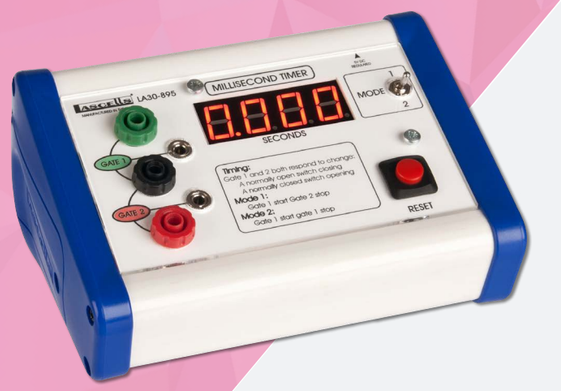
No power supplies are required, just a sensitive timer with any START and STOP triggering. Connections by 4mm leads.

Code	Description	Pack	Price
PY3074	G by Freefall Apparatus	Each	**£51.98**
PY3076	Spare Release Mechanism	Each	**£19.43**



Need a demo?

Please get in touch and we'll do all we can to accommodate your request. T: 0115 982 2022



Lascells Simple Timer

The Lascells simple timer is a fully functional, easy to use millisecond timer and has a clear, 4 digit LED display. Three sockets provide START and STOP inputs which respond to any change of switch settings i.e. normally closed to open or vice versa making triggering very simple and reliable. A single switch changes the timer from GATE 1 start and stop to GATE 1 start GATE 2 stop. In addition, 3.5mm sockets are provided to allow Lascells timer light gates to be connected. The timer has millisecond resolution for times up to 10 seconds and then the display auto-ranges for longer periods up to 9999s with corresponding reduced resolution. Supplied with mains plug-top adaptor and full instructions.

Code	Pack	Price
PY3080	Each	**£103.95**



Lascells Timer Light Gate

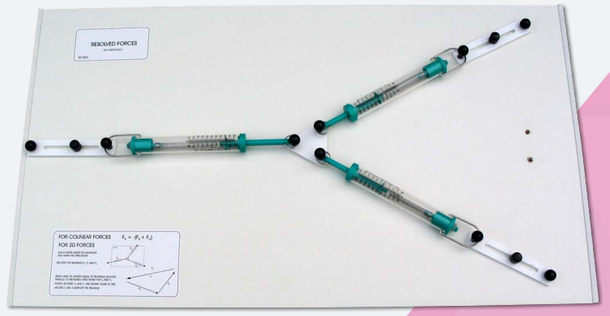
An infra-red beam, high speed light gate for use with Lascells timers. The attached cable is terminated by a 3.5mm jack plug which fits directly into the timer so that no other connections are required.

Code	Pack	Price
S300855	Each	**£54.57**

Lascells Resolved Forces Board

By using spring balances on an easy to understand layout the concept of balanced and resolved forces is easy to demonstrate. The attachment points can be put in line for collinear forces where the single force is the sum of the other two. For 2D work, angles and vectors can be easily examined. The durable white plastic-coated board measures 800 x 450mm and comes complete with balances and full instructions.

Code	Pack	Price
PY3078	Each	**£59.85**



Lascells Digital Boyle's Law Apparatus

The digital Boyle's Law apparatus provides a self-contained, reliable and simple way of demonstrating Boyle's Law. The volume may be reduced or increased by means of a 2.5ml syringe connected to a digital pressure sensor. The sensor output is calibrated to display the pressure in kPa on the easy to read LCD display. There is a measurable change in pressure for every 0.1ml change in volume allowing many data points to be taken and a graph plotted to confirm Boyle's Law.

For demonstration purposes two 4mm sockets are provided to allow the pressure reading to be displayed on a large demonstration voltmeter meter (not supplied) and a length of tubing is provided to allow a larger syringe to be used if necessary. Dimensions: 130 × 100 × 60mm. Weight: 0.7kg.

Code	Pack	Price
PY3060	Each	**£97.44**



Lascells Digital Joly Bulb

Visually and effectively demonstrate the relationship between temperature and pressure. The digital joly bulb is the perfect alternative to the traditional bulb and analogue gauge, pressures can be read directly from the built in digital display and the apparatus is sensitive enough to register an increase in pressure when the bulb is held gently in the hand. By submerging the bulb in water at different temperatures the relationship between temperature and pressure may be demonstrated and the calibrated digital readout allows a quantitative investigation to be carried out if required.

For demonstration purposes two 4mm sockets are provided to allow the pressure reading to be displayed on a large demonstration voltmeter (not supplied). Supplied with 9V PP3 battery and full instructions. Dimensions: 200 x 100 x 60mm. Weight: 0.7kg.

Code	Pack	Price
PY3058	Each	**£93.98**





Lascells Dual Colour Laser

The Lascells semiconductor laser contains two independent laser diodes, one red (650nm) and one green (532nm). Both lasers may be simultaneously passed through a double slit slide and both diffraction patterns may be displayed one above the other for an immediate comparison. The unit is equipped with internal 1 MHz modulation which when used in conjunction with the laser receiver and an oscilloscope allows the speed of light to be determined. An external source is also provided allowing audio to be sent to the receiver from a smartphone or mp3 player. The apparatus is switched using a removable key which prevents unauthorised use and is supplied with a 9V power supply and full instructions.

- Laser Wavelength: Red 655 +/- 5nm, Green 532 +/- 5nm
- Output Power: <1mW max
- Modulation: 1MHz internal, audio frequencies external
- Conforms to all the relevant safety standards

Code	Pack	Price
PY3050	Each	£206.85



Lascells Laser Receiver

A dual purpose receiver designed for use with the dual colour laser (PY3050). The unit contains a planar chip photodiode tied to a 1 MHz amplifier for speed of light calculations along with an audio amplifier for demonstrating data transmission using light. The unit has a built in speaker for audio reception. The amplified audio is also brought out to 4mm sockets on the front panel for observation or connection to a secondary driver such as the Rubens tube. When using the receiver for speed of light calculations the audio amplifier is disabled with the signal brought to the front panel only for monitoring using an oscilloscope. Supplied with power supply and full instructions.

- Dimensions (L x W x H): 190 x 65 x 110mm
- Weight: 400g
- Input voltage: External 9V D.C. +ve pin (included)
- Frequency range: 1MHz/Audio frequencies switchable

Code	Pack	Price
PY3052	Each	£101.33



Lascells LED Ray Box

A high quality ray box for ray tracing in optics experiments. The light source is a high intensity white LED which runs at low temperature. Supplied with removable slit plate and lens to provide one or three parallel rays. The unit will operate at constant intensity from either a D.C. lab supply or plug top power adaptor in the range of 9 to 30V so there is no issue of overloading the unit with a standard power pack. **N.B. power supply not included.**

Code	Pack	Price
PY3048	Each	£46.20



Lascells Colour Filter Set

Flexible acetate transmission filter material suitable for making slides for colour mixing experiments or any work involving coloured light. Each pack contains 7 x A5 pieces; primary red, primary blue, primary green, magenta, cyan, yellow and neutral density.The neutral density material gives 50% light transmission with no colour change. Dimensions: 210 × 150mm. Weight: 0.1kg.

Code	Pack	Price
PY3044	Set	£8.97

Lascells Neodymium Wand

A set of 5 acrylic wands each fitted with a powerful 12mm diameter neodymium button magnet. The wands make the magnets safe for pupil use.

Code	Pack	Price
PY3038	5	£15.42



Lascells Adjustable Magnet

Consisting of a steel frame with lockable, adjustable jaws which will accept 50 x 20mm ferrite slab magnets or neodymium button magnets. The field strength can be changed by adjusting the distance. Use with the Lascells BIL coil to determine the flux density in the gap. The unit is supplied complete with 2 ferrite magnets, an eddy current pendulum demonstration and universal accessory bracket. Dimensions: 120 x 50 x 50mm. Mass 0.25kg.

Code	Pack	Price
PY3040	Each	£50.10



Lascells Multi-Wire Spark Detector

This apparatus gives a memorable and dramatic demonstration of the ionising properties of alpha particles. Alpha particles have short range but are very effective at ionising air. In this apparatus a number of fine wires are supported above a metal plate to form two electrodes separated by a small air gap. 4mm terminals allow an EHT supply to be connected and when the potential across the gap reaches about 4500V occasional ionised particles cause a visible and audible spark to occur. If an alpha source is brought near, the sparking dramatically increases showing the presence of ionised particles. The short range and poor penetrating properties of alpha radiation can be easily demonstrated. An EHT power supply capable of providing a negative potential is required.

Code	Pack	Price
PY3036	Each	£100.80



Lascells Planck's Constant Apparatus

Modern LEDs (light emitting diodes) cover the range from deep blue to infra-red. By monitoring the voltage at which each LED just begins to emit light a graph of energy input as a function of light emitted frequency can be plotted and an approximate value of Planck's constant deduced.

The system is an excellent illustration of modern electronics and gives a good investigation into a difficult topic in post-16 physics. The LEDs are mounted in a self-contained box with voltage control and monitoring points for current and voltage. A protection resistor is included to prevent damage to the LEDs. Complete with viewing tube but without power supply which should be approximately 5V D.C. from any laboratory source.

Code	Pack	Price
PY3118	Each	£76.13





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SCIENTIFIC LABORATORY SUPPLIES

Lascells Digital Signal Generator

Decade free frequency changing by press button UP and DOWN controls with time sensitive rate of change. Sweep from 0.1 Hz to 100kHz in seconds without the need to change ranges.

Key features:

- Ultra simplicity with only five controls
- Continuous frequency control from 0.1Hz to 100kHz. This means a full sweep through the audio band with no decade switch to contend with
- Precision waveforms, sine, square and triangle
- High power amplified output for speakers and transducers
- Precision frequency and amplitude display
- High resolution control with fast change selectors. Step resolution 0.1 to 1% of indicated frequency
- 4mm output connections

Specification:

- Input: 100 – 240V 50/60Hz mains plug-top adaptor providing 24V D.C.
- Frequency range: 0.1Hz to 100kHz continuous sweep
- Freq. control resolution: Between 0.1 and 0.5% of the indicated value
- Output 1: 24V Pk to Pk into 600 ohms for electronics
- Output 2: 10V Pk to Pk into 8 ohms for transducers amplitude control resolution 0.1V
- Waveforms: Sine, square and triangle

Code	Pack	Price
PY3088	Each	£235.00



Lascells Resonance Tube

This apparatus is ideal for all resonance investigations in air columns. The main tube is 1 metre long and 50mm diameter which takes a high power sound wave generator unit plugged in to one end. The generator is driven by a standard laboratory signal generator and as the frequency is adjusted the various resonance modes are detected by increased loudness of the note.The open pipe can be studied or a variable length closed pipe can be used by inserting the piston assembly provided. By using a higher amplitude on the generator, Kundt's tube investigations can be undertaken. Fine cork or polystyrene dust is distributed throughout the tube and at resonance the powder gathers at the nodes. Wavelengths can be easily measured.

To get a good response a closed tube is preferable, to reduce the sound levels in the laboratory while producing a measurable effect. The apparatus comes complete with two supports for the tube, sound wave generator, resonance tube, closing bung and full instructions. Requires a signal generator.

Code	Pack	Price
PY3090	Each	£100.80



Lascells Doppler Ball

Doppler ball is a 90mm plastic ball with a PP3 battery powered tone generator and speaker inside. The ball can be safely whirled round in a large horizontal circle to demonstrate the Doppler effect. Good output volume and variable pitch provide all that is required for a dramatic demonstration of the Doppler shift associated with a moving source. PP3 battery and rotation cord supplied. Dimensions: 90mm diameter, 100g.

Code	Pack	Price
PY3092	Each	£61.95

Lascells Sound & Waves

Lascells Space Tube for Sound in a Vacuum

A modern replacement for the Bell in a Bell Jar apparatus. A 90mm diameter acrylic tube houses a battery-operated, high output piezo sounder. When the end plates are attached and the unit connected to a vacuum pump no sound can be heard but the sound returns when the air is allowed back in. An effective demonstration with none of the complications of the traditional apparatus. Overall length 150mm. **N.B. Vacuum pump not included.**

Code	Pack	Price
PY3094	Each	£49.35

Lascells Speed of Sound Apparatus

This is an easy to use piece of apparatus for determining the speed of sound in air. The unit contains two sensitive microphones connected to control circuity that will start and stop a Lascells millisecond or microsecond timer. Alternatively the outputs may be monitored on a storage or pc oscilloscope. In use, a sharp sound is produced in line with the two microphones, the time recorded is then the time taken for the sound to travel between the two microphones. The apparatus is supplied with a 9V PP3 battery, a 6 metre connecting cable and full instructions.

- Dimensions (L x W x H): 100 x 110 x 65mm
- Weight: 375g.
- Input voltage: 9V PP3 battery

Code	Pack	Price
PY3096	Each	£78.07



Lascells Ripple Tank MkIII

The unit is completely self-contained with the translucent viewing screen hinging away to reveal a 12cm water tank. The tank is removable for ease of use and has an integral multi-faceted beach which virtually eliminates unwanted reflections. Illumination is from a high intensity built-in LED which can be automatically strobed in sync with the waves to give perfectly stationary images, or switched to allow the user independent control of the wave and strobe frequencies giving the impression of wave motion across the viewing screen.

The unit is supplied with three robust dippers and a selection of barriers shapes and lenses are also provided to enable demonstration of reflection, refraction, diffraction and interference.

- Dimensions (L x W x H): 225 × 170 × 143mm
- Weight: 1.07kg
- Input voltage: Regulated 12V D.C. +pin
- Current requirement: 400mA
- Strobe frequency range: 30 – 500Hz nominal

Code	Pack	Price
PY3098	Each	£125.00



Lasells Ripple Tank Frequency Counter

The Lascells Strobe Frequency Counter provides a compact, economic, reliable and simple way of detecting the frequency of a strobe light source. The sensor is calibrated to work with the Lascells ripple tank, allowing a quick measurement of strobe frequency. Simply turn the device on, and place it onto a closed ripple tank, and the frequency of the strobe will be displayed. The device is accurate from 1 Hz to 1 kHz, which exceeds the strobe range of the Lascells ripple tank. Battery not included.

Code	Pack	Price
PY3099	Each	£16.49





Lascells Loudspeaker Kit

Modern neodymium magnets make the construction of simple loudspeakers an easy and very impressive project. This kit provides all you need to construct 10 loudspeakers so that students can get real, hands-on experience of how the device works. The set comprises: ten plastic base mouldings, ten high power magnets, a reel of enamelled copper wire, a crocodile clip to 3.5mm headphone jack connection cable and full instructions. Everything can be re-used except the paper circles used by the students to make the "cone." Excellent output volume from a transistor radio or signal generator and a real hands-on experience.

Code	Description	Pack	Price
PY3114	Loudspeaker Kit	Each	**£50.03**
PY3116	Spare Cable	Each	**£8.40**



Lascells Cloud Chamber

The Lascells cloud chamber is the perfect alternative to existing unreliable and time consuming dry ice variants. The chamber is self-contained and thermoelectrically cooled. The chamber requires no dry ice or water; the only setup necessary is the addition of propan-2-ol (isopropyl alcohol, CHE3118SE) and connection to a mains socket. The chamber contains an integrated power supply and illumination of the chamber is provided by a high intensity LED. Using the provided source, tracks should be visible within 10 minutes. Once running the cloud chamber can be made to run for extended periods by adding more alcohol through the access provided in the lid.

A replacement cloud chamber source (PY3106) is available separately as a spare part. Dimensions: 400 × 250 × 180mm. Weight: 2.5kg.

Code	Description	Pack	Price
PY3104	Cloud Chamber	Each	**£389.00**
PY3106	Spare Cloud Chamber Source	Each	**£8.40**

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SLS Select Education
Tel: 0115 982 2022
Fax: 0115 945 5379
www.science2education.co.uk
sales@science2education.co.uk