TESCA™

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# Turnkey Manufacturing

## FOR EDUCATION & INDUSTRY

**Educational Equipment, Hand, Power & Drilling Tools, TMI Products, Swithgear & Automation, 3D Scanners & Civil Surveying, Seismograph, Earthquake Equipment, Software, UAV/Drones, Lab Furniture, Mining Valves, Laboratory Plasticware/Glassware, IT-Computers Networking, Electronic Components, Other Products**

# About Company

Tesca Technologies Pvt. Ltd. is World's Leading ISO & CE Certified Manufacturer & Exporter of Test, Measuring, Vocational, Didactic, Educational Training Equipment, LMS & Workshop Tools & Machines. Member for Electronics & Computer Software Export Promotion Council, New Delhi, India having sales in more than 85+ Countries Worldwide. Tesca's operations are spread out in 23000 Square Feet encompassing more than 3000 manufactured Innovative Products and Turnkey Project Capabilities for International Tenders. Tesca is an Export House established in December 2009 with our Registered & Corporate Office both set up at Jaipur. We are actively doing business in Middle East, CIS, South East Asia, Africa as well as South America Countries. We have our representatives in almost all Countries. Please be noted that we are doing projects meant for School Education, Vocational Training, Laboratory, Health Center, Hospital Equipment, Agricultural Modernization, Industrial Modernization, Rural Water Supply as well as Small Scale Enterprises funded by Ministry of Education, World Bank, Asian / African Development Bank as well as GOI LOC.

**Tesca At A Glance:**

- ISO & CE Certified Manufacturer & Exporter of TVET, Skill Development for Education & Industry
- Member of CII, ESC, Electronics & Computer S/W Export Promotion Council, Delhi, India
- Member of FORTI, REPC, IVETA, Worlddidac Association, Switzerland
- 23000 Sq. Feet of Operations, **10000 Innovative Products**, "You Name It & We Have It"
- Turnkey Projects for International, World Bank, AFDB, ADB, UNDP, FAO Tenders
- Amongst top most Qualified & Reputed Exporter in India
- Sales to more than 85+ countries, Your Sourcing Partner in India
- Worldwide Installation/ Exhibitor in Africa, Dubai, Switzerland, Hong Kong

**Quality:**
Our products are accepted across global market. The prime reason for such widespread acceptance is an undying pledge to quality. To actualize and maintain such quality levels, we adhere to international quality management system. Our products are tested by our technical experts in various stages of production to ensure 100% quality. A devoted team of quality experts are entrusted with this job and they ensure that our products are in line with the global standards.

**Mission:**
Be the World's Leading Manufacturer & Exporter of TVET, Skill Development, Bridge Gap between Industries & Institutes, Vocational Training by imparting Environment Friendly Technologies, Solutions and Innovations to make a Better World.

**Vision**
Contribute towards United Nation's Sustainable Development Goals of Quality Education, Industry, Innovation & Infrastructure.

Corporate Office

Production Floor

Conference Hall

Products Showroom

Reception

Collection of World Art

# Certificates

CE Certificate

ESC Certificate


IVETA Member

Worlddidac Member

ISO Certificate

CII Certificate

REPC Member

FORTI Member

Kenya - 2016

Kenya - 2017

# Worldwide Products Installation

Mauritius - 2018

Uganda - 2018

India - 2021

Gambia - 2023

Ethiopia - 2021

## Sales in 85+ Countries Worldwide

India - 2022

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# Electronics Lab

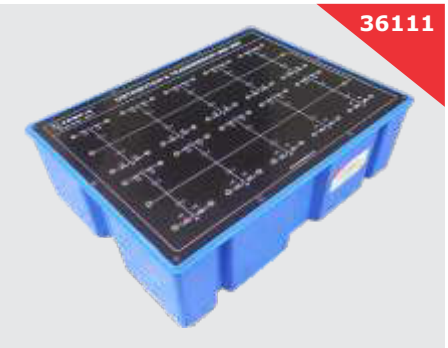

Educational Trainer Kit is one of the teaching methods to strengthen the acquisition of knowledge and technical skills. Tesca Technologies Pvt. Ltd. is a pioneer in manufacturing a wide range of Educational Trainer kits. Having a core range in Analog & Digital Lab Trainer | Electrical Machine Trainer | Bread Board Trainer | Power Electronics Trainer | Basic Electricity Trainer | Analog & Digital Communication Trainer | Embedded Trainer | Fibre Optics | Antenna Trainer | PLC Trainer | Process Control Trainer | Hydraulic Trainer | Pneumatic Trainer | etc. For Students of | Electrical | Electronics & Communication | Instrumentations | Applied Electronics | Mechanical in Higher Studies at Schools to Universities.


**LINEAR I.C. TRAINER**

To measure the quiescent supply current, To null the offset voltage, To measure open-loop voltage gain under closed loop condition., To measure output resistance, To measure differential input resistance, To measure unity gain bandwidth


**T AND PIE NETWORK TRAINER**

Study and verification of Image Impedance of Unsymmetrical T-Network, Study and verification of Image Impedance of Unsymmetrical p-Network, Study and verification of Characteristic Impedance of Symmetrical T-Network, Study and verification of Characteristic Impedance of Symmetrical p-Network.




### TWO STAGE R-C COUPLED TRANSISTOR AMPLIFIER

Voltage distribution along open circuit line, Voltage distribution along short circuit line, Study of Ferranti effect, Study of distortion-less line, Velocity of propagation.


### AUDIO AMPLIFIER (CE) WITH POWER SUPPLY

To study and plot the forward & reverse bias characteristics of a Germanium semiconductor Diode, To study and plot the forward & reverse bias (breakdown) characteristics of a Zener Diode.


### EMITTER FOLLOWER (CC) WITH POWER SUPPLY

Voltage Gain, Input Impedance, Output Impedance, 9V D.C. at 50mA, IC regulated Power Supply internally connected, NPN transistor, Adequate no. of other electronic components, Mains ON/OFF switch, Fuse and Jewel light, The unit is operative on 230V ±10% at 50Hz A.C. Mains.


### PUSH PULL AMPLIFIER

To measure output power, To plot the frequency response characteristics, Distortion Measurement, -9V DC at 50mA, IC regulated Power Supply internally connected, Driver Transformer and Output Transformer, Four different output loads selected by a band switch.


### WIEN BRIDGE AUDIO OSCILLATOR

To study the main features of the Wien Bridge Audio Oscillator, To obtain oscillation of different frequencies by varying R-C, To study the frequency response of phase shift network, Variable gang condenser, Potentio-meter, Two PNP transistors.


### PHASE SHIFT AUDIO OSCILLATOR

To study Phase Shift Audio Oscillator circuit using a single transistor, To study the improved Phase Shift Audio Oscillator circuit using two transistors.



### AMPLIFIER AND OSCILLATOR WORK BOARD

To study the Phase Shift Audio Oscillator circuit, Study of CE amplifier circuit and to measuring voltage gain. (AV), To plot the frequency response characteristics of the CD amplifier.

36126

**R.F. (L-C) OSCILLATORS (HARTLEY'S, COLPITT'S, CLAPP'S)**

Hartley's Oscillator, Colpitt's Oscillator, Clapp's Oscillator.
PNP transistor, Variable gang condenser, Adequate no. of other electronic components, Mains ON/OFF switch, Fuse and Jewel light.

36127

**FREE RUNNING MULTIVIBRATOR (ASTABLE)**

To study the operation of a Transistor Free (Astable) Running Multivibrator, To study the waveform at various places on the Free Running Multivibrator Circuit, To study the operation of improved free Running multivibrator and to observe the output wave shape.

36128

**BI-STABLE MULTIVIBRATOR**

To study the operation of a Transistor Bistable Multivibrator, To trigger the Bistable Multivibrator with Square wave signal and to compare output frequency with the trigger waveform frequency.

36129

**DE-SAUTY BRIDGE APPLICATIONS**

Measurement of capacitance of gang condenser using De-Sauty Bridge., Measurement of a dielectric constant of a non-conducting liquid using De-Sauty Bridge.

36229

**MONO-STABLE MULTIVIBRATOR**

To study the operation of a Transistor Monostable Multivibrator and to produce a pulse train of varying repetition rate from a square wave input, To study the voltage waveforms at various points in the Transistor Monostable Multivibrator circuit.

36130

**REGULATED POWER SUPPLIES**

To study half wave rectification, To study full wave rectification, To study measurement of ripple and ripple reduction methods using the following: Capacitor filter, Inductor filter, Choke input of L.C. filter, CLC or p filter, To study Zener - diode voltage regulator circuit.

36131

**SERIES & PARALLEL RESONANCE**

Series resonance for different values of resistances, capacitances, inductances and plotting of resonance curves, Parallel resonance for different values of resistances, capacitances, inductances and plotting of resonance curves, Measurement of Q for both series and parallel resonances.

36132

**ANDERSON BRIDGE**

Anderson Bridge circuit with arms values, Potentiometer for varying one arm, Three different value inductances. Potentiometer with calibrated dial, Five capacitors selected by a band switch, Audio Amplifier with its IC regulated Power Supply, One KHz Sine Wave Oscillator with its IC regulated Power Supply.

36133

**VOLTAGE MULTIPLIERS**

Full wave Voltage Doubler, Half wave Voltage Doubler, Voltage Tripler, Voltage Quadrupler.

36134

**PASSIVE FILTERS (CONSTANT-K, LOW, HIGH AND BAND M-DERIVED LOW & HIGH)**

Low-Pass constant-K filter, High-Pass constant-K filter, Band-Pass constant-K filter, Low-Pass M-Derived filter, High-Pass M-Derived filter, Different types of Passive Filters, Adequate no. of other electronic components.

36135

**BOOT STRAP SWEEP GENERATOR**

Amplitude variation of the output waveform, Frequency variation of the output waveform, Linearity of the output waveform.

36136

**PUCKLE`S SWEEP GENERATOR**

Amplitude variation of the output waveform, Frequency variation of the output waveform, Linearity of the output waveform.

36140

**DIFFERENTIAL AMPLIFIER**

To study the operation of a Differential Amplifier, To measure the Common Mode Gain and Differential Mode Gain of the Differential Amplifier and determine its Common Mode Rejection Ratio(CMRR).

36141

**DIODE LIMITERS**

To draw the transmission characteristics of the different Diode Limiter configurations, To observe the limiting action of the sine wave on the Oscilloscope, To observe the effect of diode capacitance at very high frequencies.

36142

**F.E.T. AMPLIFIER**

To design and calculate the finite gain of FETAmplifier, To draw the overload characteristics, To draw the frequency response, To measure the input impedance, To measure the output impedance.

36143

**SCHMITT`S TRIGGER**

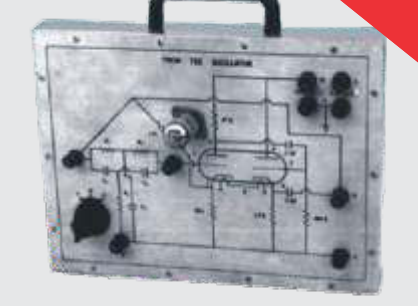
To find loop gain of the binary circuit and to see the parameters responsible for making the loop gain to 1, To adjust the loop gain to be less than 1 and to see linear amplification, To adjust the loop gain to be slightly greater than 1 and to observe the switching action.

36144

**ELECTRON COUPLED OSCILLATOR**

To see the effect of loading on an Oscillator, To reduce the effect of loading on the oscillator by electron coupling the oscillations to a different tuned circuit.

36145



**TWIN-TEE OSCILLATOR (V.V)**

Study of the Twin-Tee Oscillator.
A valve with base fixed on panel and wired internally, A band switch for changing values of RC combinations, Adequate no. of other electronic components.


**TWO STAGE R-C COUPLED TRANSISTOR AMPLIFIER**

Study of the overload characteristics of the amplifier, Study of the frequency response of the individual as well as the cascade amplifier, Calculate the output and input impedance of the individual stages as well as that of cascade amplifier.


**SCHMITT'S F.E.T. BINARY**

To find out the loop gain of the binary circuit and study the output waveform for different amplitudes of audio signal, To study the supply voltage change on the output waveform, To study the effect of the frequency variation on the output waveform.


**AMPLIFIER (INTEGRATOR) (V.V)**

To find the Gain of a Wide Band Amplifier, To use the Amplifier as an Integrator.


**DIODE CHARACTERISTICS**

To draw the plate voltage V/s plate current curve for different values of filament voltages, To determine the plate resistance from the characteristics thus obtained.


**TRIODE CHARACTERISTICS**

To obtain static plate and mutual characteristics of a given triode, To determine the co-efficients, g , r and m of the triode valve from its characteristics. m p


**PENTODE CHARACTERISTICS**

To obtain plate and mutual characteristics of a given pentode, To calculate tube constants from the characteristics.


**DIODE & ZENER DIODE CHARACTERISTICS**

To study and plot the forward & reverse bias characteristics of a Germanium semiconductor Diode, To study and plot the forward & reverse bias (breakdown) characteristics of a Zener Diode.


**DIODE CHARACTERISTIC CURVE APPARATUS**

To Study and Plot the Forward and Reverse Bias characteristics of (Si) Semiconductor Diodes, To Determine the Static and Dynamic resistances of Forward Biased p-n junction of the given Diodes.


**TRANSISTOR CHARACTERISTICS**

Common Emitter Mode, Common Base Mode, Common Collector Mode, Transfer Characteristics of Transistor.

36154

### F.E.T. CHARACTERISTICS

Measurement of IDSS, Plot the static drain characteristics of FET, Drain Current V/s Drain Voltage Characteristics for different fixed values of VGS, Drain Current V/s Gate Bias Characteristics for different fixed values of VDS, Show that FET work as VVR (voltage variable resistance).

36155

### INTEGRATING DIFFERENTIATING AND CLAMPING CIRCUITS

Study of Integrating Circuit response at 1KHz and 10 KHz for different combinations of R and C, Study of Differentiating Circuit response at 1 KHz and 10 KHz for different combinations of R and C, Study of series and shunt Clamping Circuits.

36156

### SILICON CONTROLLED RECTIFIER CHARACTERISTICS

To study the D.C. gate control characteristics (firing characteristics) of a SCR, To study and plot the anode current characteristics of a SCR, To measure the holding current of a SCR, To study the plot the phase firing characteristics of a SCR.

36157

### TRANSISTOR FEED BACK AMPLIFIER

To observe the gain of the amplifier at 1 KHz with and without negative feed back in the emitter circuit and external feed back network disconnected, To observe the variation of the gain of the amplifier with different amount of feed back in the external circuit at 1 KHz, To measure the input and output impedances of the feed back amplifier.

36158

### VERIFICATION OF CHILD'S LAW

To study the static characteristics of a diode and to verify the Child's Law.
A valve with base fixed on panel and wired internally, 0-300V D.C. at 100mA, continuously variable regulated Power Supply for plate voltage, D.C. Meter, 65mm rectangular dial with rotary switch selectable voltage ranges of 30V & 300V and current range of 0-100mA.

36159

### DETERMINATION OF BAND GAP IN SEMICONDUCTOR DIODE

To draw the characteristics of a P-N junction Diode for reverse saturation current and temperature, To determine the Energy Band Gap in a P-N Junction Diode.


36160

### THERMISTOR CHARACTERISTICS

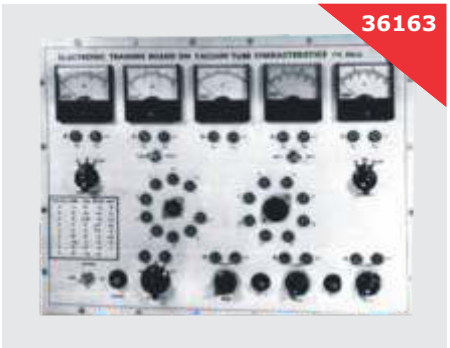
To draw Resistance V/s Temperature characteristics of a Thermistor, To find temperature co-efficient of thermistor from graph and to verify it by comparing with theoritical value.


**TRANSISTOR BIAS STABILITY**

To study the leakage current variation with temperature, To see the shift in Q point at different operating temperatures, To see the effect of temperature on stability of an amplifier, To see the distortion in a single stage amplifier as a result of change in Q point.


**TETRODE CHARACTERISTICS**

To draw the characteristics of the given Tetrode, To calculate the negative resistance from the graphs plotted.




**VACUUM TUBE CHARACTERISTICS (FOR DIODE, TRIODE, TETRODE & PENTODE)**

To study the characteristics of following Vacuum Tubes: Diode, Triode, Tetrode, Pentode.


**SEQUENTIAL TIMER**

To study various aspects of Sequential Timer, 12V at 200mA, IC regulated Power Supply, Circuit based on three Timer ICs, LEDs, for indication of each timer operation, Three sequences with variable time (time period can be varied from approx. 2 sec. to 15 sec.).


**VERIFICATION OF LAWS & NETWORK THEOREMS**

Verification of Ohm's Law, To verify Kirchoff's current law and voltage law, Verification of the series & parallel laws for resistances, Verification of Superposition Theorem, Study of potential divider, Verification of Maximum Power Transfer Theorem.


**TRIAC CHARACTERISTICS**

To study T2 positive with respect to T1 and gate positive/negative with respect to T 1, To study T2 negative with respect to T1 and gate positive /negative with respect to T 1, To study T2 positive/negative with respect to T1 and gate positive with respect to T 1, Triac as a static switch (D.C. control), Control of A.C. with A.C. signal.


**DIAC CHARACTERISTICS**

To plot V-I Characteristics of a DIAC and study the Breakover voltage, VBO, Negative resistance region, VBO symmetry and delta V, To study the applications of a DIAC as Saw tooth waveform generator, Pulse train generator.


**DE-SAUTY BRIDGE**

To study the working of a De-Sauty Bridge and to compare the capacitance of two capacitors.


**SEMI-CONDUCTOR DIODE CHARACTERISTICS**

To Study and Plot the Forward and Reverse Bias characteristics of (Ge & Si) Semiconductor Diodes, To Determine the Static and Dynamic resistances of Forward Biased p-n junction of the given Diodes.


**PN JUNCTION / SEMICONDUCTOR DIODE CHARACTERISTIC APPARATUS**

To study and plot the forward & reverse bias characteristics of a Silicon semiconductor Diode, To study and plot the forward & reverse bias (breakdown) characteristics of a Zener Diode.


**FUNCTION GENERATOR**

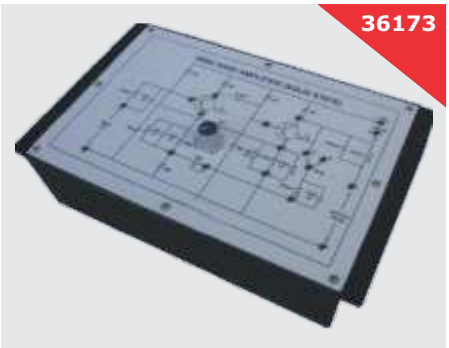
To study the operation of a function generator.
12V D.C. at 100mA, IC Regulated Power Supply, ± 6V D.C. at 100mA, IC Regulated Power Supply, Function Generator chip (566) mounted on a I.C. base, Control voltage is set with the help of band switches and potentio-meter.


**TWO STAGE TRANSFORMER COUPLED AMPLIFIER**

The Different circuit boards of PC/AT Computer are exposed on a PCB, Troubleshooting and fault finding procedure explained in details, Artificial fault creation facilities are provided by the switches, About more than 60 faults


**STUDY OF OPERATIONAL AMPLIFIER (UA 741)**

Study of OP-AMP 741 as Integrator and Summing Amplifier, Study of OP-AMP 741 as Differentiator, Study of OP-AMP 741 as Scalar and Summer, Study of OP-AMP 741 as Oscillator, Study of OP-AMP 741 as Differential Input Amplifier, Study of OP-AMP 741 as Voltage Follower.




**WIDE BAND AMPLIFIER**

To study the Wide Band Amplifier with and without Feedback, To draw the frequency response of the Amplifier, To obtain the input and output Impedance of the Amplifier Stage.


**STUDY OF UNIJUNCTION TRANSISTOR (U.J.T.)**

To plot V-I characteristics of a given U.J.T. (Unijunction Transistor), To use the given U.J.T. as a Relaxation Oscillator.


**STUDY OF CRYSTAL OSCILLATOR 1MHZ (V.V.)**

To study the Miller Crystal Oscillator and to observe its waveform and frequency, To study the Pierce Crystal Oscillator and to observe its waveform and frequency.


**TIMER APPLICATIONS IC-555**

Astable Multivibrator, Mono-Stable Multivibrator, Frequency Divider, Linear Ramp Generator, Square Wave Generator, Missing Pulse Detector, Pulse Width Modulation, Pulse Position Modulation, Schmitt Trigger, Sequence Generator, Bistable Multivibrator, Simple Clock Generator.


**ACTIVE FILTERS**

To study characteristics of various Active Filters, ±12V DC at 50mA, IC regulated Power Supply internally connected, Four Operational Amplifier ICs, Adequate no. of other electronic components, Mains ON/OFF switch and Jewel light, The unit is operative on 230V ±10% at 50Hz A.C.


**MOS-FET CHARACTERISTICS**

To determine experimentally the Drain characteristics of a given MOSFET, To study the use of MOSFET as an amplifier and to measure its voltage gain in common source configuration.


**VOLTAGE REGULATOR TUBE CHARACTERISTICS**

To study and plot the variation in output voltage with variation of load keeping input voltage constant, To study and plot the variation in output voltage with the variation of input voltage keeping load constant.


**THYRATRON CHARACTERISTICS**

To study and plot DC grid control characteristics (firing characteristics) of a Thyratron Tube, To study and plot the phase control characteristics of a Thyratron.


**JUNCTION DIODE RECTIFIER & FILTER CHARACTERISTICS**

Study of Junction Diode Rectifier output and ripple content for different resistive loads for Half wave, Full wave (Centre Tap), Full wave (Bridge), Voltage Doubler Circuit, Study of filter and load regulation characteristics for half wave and full wave rectifier having different resistive loads and filters of the type Capacitor filter.


**CHARGING AND DISCHARGING OF A CONDENSER**

To study the charging of a condenser, to plot a graph of voltage (V) across it against time (t) and to determine the time constant from thisgraph, To plot a graph of charging current (i) against time (t) and to determine the time constant from this graph.


**SEMI-CONDUCTOR DEVICES CHARACTERISTICS**

Germanium and Silicon Diodes, Zener Diodes, (Bipolar) PNP and NPN, FET, UJT, LED, Photo Diode, Photo Transistor, Thermistors N.T.C. and P.T.C., V.D.R., L.D.R., Opto-Coupler, DIAC, SCR, TRIAC, Varactor Diode ( Varicap Diode).


**SEMICONDUCTOR CHARACTERISTICS**

Light Emitting Diode (LED), Thermistors N.T.C, Light Dependant Resistor (L.D.R.), Voltage Dependent resistor (V.D.R.).


**DISCRETE COMPONENT TRAINER**

Rc & Lc Circuits, Series & Parallel Resonance Circuit, Germanium & Silicon Diodes, Zener Diode, Clipping & Clamping Circuits, Common Emitter Configuration Of a transistor, Common Collector Configuration Of a transistor, Emitter Follower (Transistor), Cascaded Amplifier.


**DISCRETE COMPONENT TRAINER**

Verification of ohm's law, Verification of kirchoff's current law, Verification of kirchoff's voltage law, Verification of superposition theorem, Verification of thevenin's theorem, Verification of reciprocity theorem, Study of diode characteristics, study of Zener diode characteristics.


**VOLTAGE REGULATOR IC 723**

To study and measure the Load Regulation, Line Regulation, To study the Low voltage regulator circuit 2 to 7V, High voltage regulator circuit 7 to 27V, Voltage regulator with increased current capability using external NPN power transistor, Voltage regulator with increased current capability using external PNP power transistor.


**THREE TERMINAL VOLTAGE REGULATOR**

To study the effect of capacitors at input and output of the regulator, To study the effect of ground reference level on the output voltage, To study the minimum voltage differential required for proper working of regulator, To measure load regulation.


**D.C. POWER SUPPLIES AND 2 DUAL RANGE METERS**

Use of a diode as a rectifier (Half wave rectification), Study of full wave rectification using a centre tapped transformer, Study of full wave rectification using a bridge rectifier, Using a zener diode for regulation, To use a transistor as a series regulator, To use a transistor as a shunt regulator.


**DIFFERENTIAL COMPARATOR**

To study and measure the Open loop gain, Differential input resistance, Output resistance, Input offset voltage, Input offset current, Full power response, Study of Use of IC-710 as a voltage comparator, Use of IC-710 as a Schmitt trigger.


**PHASE LOCKED LOOP IC 565**

To study and measure the free running frequency or centre frequency of VCO, To study the VCO sensitivity, To study the VCO linearity PLL Characteristics, To study and measure the capture range and lock range.


**HYBRID PARAMETERS OF A TRANSISTOR**

To measure the hybrid-parameters i.e. H11 , h12, h21 & h 22 of a transistor, at 1 KHz and at different collector current values, To derive Z and Y parameters from the hybrid parameter results.


**OP-AMP PARAMETERS**

Measurement of quiescent supply current of OP-AMP, To null the offset voltage of an OP-AMP, To measure open loop voltage gain under closed loop condition, To measure output resistance, To measure differential input resistance, To measure unity gain bandwidth.To measure the rated output.


**REACTIVE ELEMENTS & TIME DEPENDENT NETWORK ANALYSIS**

To study Charging & Discharging of a Condenser, To Calibrate D.C. meter for A.C. voltage measurements, To construct the vector (phasor) diagram for series L-R circuit and to calculate the power factor and "Q" at 50 Hz, To study series LCR resonance circuit and its "Q".


**OSCILLATORS WITH POWER SUPPLY**

To study R.C. Phase Shift Oscillator of phase advance type, To study R.C. Phase Shift Oscillator of phase retard type, To study Wien-Bridge Oscillator, To study Hartely's Oscillator, To study Colpitt's Oscillator, To study Pierce (X-Tal) Oscillator, To study method of


### MULTIVIBRATORS

Design of multivibrators, To study the waveforms of a free running multi-vibrator, To design and make a bistable multivibrator and to study its D.C. conditions, To design and make a monostable multivibrator and to adjust its delay time, To design and make schmitt-trigger and study its hysteresis.


### OPERATIONAL AMPLIFIER TRAINER

Inverting/Non-inverting A.C. Amplifier, Multiplication by a constant, Synchronised sawtooth generator with negative going pulse trigger, Monostable multivibrator, Monostable multivibrator, Basic reference voltage source with negative output, Sign changer with variable output


### VARIABLE THREE TERMINAL VOLTAGE REGULATOR

Measurement of load regulation of IC LM 317, Study of short circit shut down of LM 317, 1.25 to 20 Volt variable voltage regulator, Increasing the current capacity using external power transistor, Short circuit current limiting by using an external transistor.


### PEAK & AVERAGE VOLTAGE DETERMINATION IN AN A.C. CIRCUIT

To determine the peak voltage of A.C. and from it to calculate the average voltage of rectified half wave A.C, To determine the peak value of A.C. by null deflection method.


### TO CONVERT A GALVANOMETER INTO VOLT/ AMP. METER AND TO STUDY RESISTANCE LAWS

To determine the resistance of a Galvanometer by half deflection method, To determine the figure-of-merit of a Galvanometer, To convert a Galvanometer into an Ammeter of a given range and to calibrate it.


### PHASE DIFFERENCE IN L.C.R. CIRCUITS

To study the phase difference in L-C, L-R, C-R and L-C-R circuits by Vector diagram method, To study the phase difference in L-C, L-R, C-R and L-C-R circuits by Superposition method.


### INTEGRATING SYSTEM USING JUNCTION DIODE

Charging of a condenser by unidirectional varying voltage pulses and then integrate them, Charging of a condenser by alternating voltage pulses and then to integrate them, Charging of a condenser by sinusoidal voltage pulses and then to integrate them.


### TRANSISTOR BIASING TECHNIQUES & STABILITY

Study of Q-point variation due to transistor replacement (Changes in b) in Fixed-bias circuit, Collector to base bias circuit, Self bias (Emitter bias) circuit, Self bias (Emitter bias) in addition to voltage divider bias circuit, A qualitative comparison of the effect of temperature on bias stability of the above four biasing circuits.


### STUDY OF VOLTAGE AND CURRENT REGULATED

To study a zener diode voltage regulator, To study a series pass transistors voltage regulator, To study an IC voltage regulator, To study a transistor current regulator employing one of the following devices : (a) Zener Diode, (b) Silicon Diodes, (c) LED.

36205

### SWITCHING MODE POWER SUPPLY (SMPS)

To observe various voltages and Switching waveforms on the SMPS Circuit, To demonstrate the effect of load variation on the switching waveform, To measure the following : (a) Ripple, (b) Load regulation, (c) Line regulation.

36206

### TRANSISTOR SERIES & SHUNT VOLTAGE REGULATED POWER SUPPLIES

To study a transistor-shunt voltage regulator with fixed current limiting, To study a transistor-shunt variable regulator with fixed current limiting, To study a transistor-shunt voltage regulator with variable current limiting.

36207

### ZENER REGULATED POWER SUPPLIES

To study the standard zener diode voltage regulated power supply, To study the zener diode voltage regulated supply having two zener diodes in series, To study a dual polarity voltage regulated supply employing two zener diodes.

36208

### SINGLE PHASE TRANSFORMER TRAINER

To Study transformer for the Transformation Ratio, To Study transformer for the Copper loss, To Study transformer for the The efficiency of transformer.

36209

### STUDY OF LR CIRCUIT WITH A SOURCE OF ALTERNATING EMF

The power factor, cos f of the inductive load, The equivalent power loss resistance of the inductor, The inductance of the inductor, The phase difference between applied voltage and that across resistance.

36210

### COMPARATIVE STUDY OF CE, CB & CC AMPLIFIERS

Study of Common Emitter (CE) transistor amplifier circuit and evaluation of its input & output resistance, voltage gain, current gain and power gain, Study of Common Base (CB) transistor amplifier circuit and evaluation of its input and output resistance, voltage gain, current gain and power gain.

36211

### STUDY OF DIODE CLIPPING CIRCUITS

Positive base clipping with diode in series, Positive base clipping with diode in shunt, Negative base clipping with diode in series, Negative base clipping with diode in shunt, Negative peak clipping, Positive peak clipping.

36212

### OPTO ELECTRONIC DEVICES CHARACTERISTICS

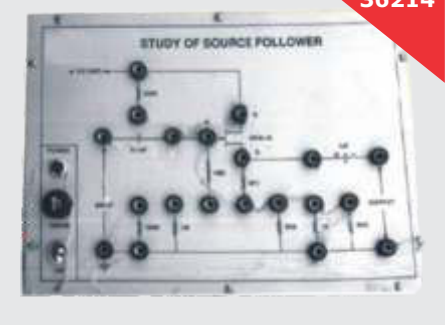
Light Emitting Diode (LED), Photo Diode, Photo Transistor, Light Dependent Resistor (L.D.R.), Photo Voltaic Cell, Optocoupler.

36213

### STUDY OF CRYSTAL DETECTOR

To measure voltage gain of the Source Follower, To measure input impedance of the Source Follower, To measure output impedance of the Source Follower, To study the above parameters with different biasing arrangements.

36214




**STUDY OF SOURCE FOLLOWER**

To measure voltage gain of the Source Follower, To measure input impedance of the Source Follower, To measure output impedance of the Source Follower, To study the above parameters with different biasing arrangements.

36215

**VERIFICATION OF KIRCHOFF'S LAW**

To verify Kirchoff's current law, To verify Kirchoff's voltage law.

36216

**DETERMINATION OF IMPEDANCE OF R-C CIRCUITS AT DIFFERENT FREQUENCIES**

To determine the impedance of a R.C. series combination at different frequencies.

36217

**STUDY OF AUDIO FREQUENCY TRANSFORMER**

To measure the transformer ratio of an A.F. Transformer, To find out the optimum value of load resistance to match with A.F. Transformer, To plot transmission curve for A.F. Transformer, To plot linearity curves for A.F. Transformer.

36218

**STUDY OF FOURIER ANALYSIS**

To determine the Fourier component of : A square wave, A clipped sine wave.

36219

**TIME DELAY RELAY (C.R.)**

To study the time delay relay circuit with controlling ON time, To study the time delay relay circuit with controlling OFF time.

36220

**AUDIO AMPLIFIER (5W, 4 OHMS)**

Study of the Audio Amplifier.
Input & output transformers, AF driver and output stage, Speaker 4 ohms (5W), Volume & tone control, Adequate no. of other electronic components, Mains ON/OFF switch, Fuse and Jewel light.

36221

**DE-SAUTY BRIDGE APPLICATIONS**

To study De-Sauty Bridge Applications. Measurement of capacitance of gang condenser using De-Sauty Bridge, Measurement of a dielectric constant of a non-conducting liquid using De-Sauty Bridge.

36222

**STUDY OF R.C. TRANSMISSION LINE AT 50 HZ**

To study R-C Transmission Line at 50Hz, To draw a curve, showing the variation of magnitude and phase of the Voltages along the R.C. ladder network and to find the Attenuation.

36223

**VERIFICATION OF OHM'S LAW, SERIES & PARALLEL CIRCUITS**

Verification of ohm's Law, To study series circuits, To study parallel circuits.

36224

**STUDY OF DIRECT COUPLED AMPLIFIER**

To study the Measurement of Gain of the Two Stage Direct Coupled Amplifier, To draw the Frequency response curve of Direct Coupled Amplifier.

36225

**STUDY OF COMPLIMENTARY-SYMMETRY TRANSISTOR POWER AMPLIFIER**

To measure the D.C. Voltage at certain test points with signal and without signal, To measure the D.C. bias current (with and without signal) and also to measure the idling current, To measure input and output impedances and power gain.

36226

**POWER & POWER FACTOR IN SERIES LCR CIRCUITS**

Study of Series RLC / R-L / R-C Circuit using Single Phase A.C. and to determine Power & Power Factor and also draw the vector diagram.

36227

**MEASUREMENT OF TEMPERATURE CO-EFFICIENT OF RESISTANCE**

Measurement of positive Temperature Co-efficient of resistance, Measurement of negative Temperature Co-efficient of resistance.

36228

**STUDY OF R-C CIRCUITS WITH VARYING EMF**

To study the charging of a capacitor with pulses of width greater than the time constant of the circuit, To study the charging with rectangular pulses of width much less than the time constant of the circuit, To study the charging with short rectangular pulses of equal and unequal widths (t << RC).

36229

**STUDY OF R-C CIRCUITS WITH A SOURCE OF ALTERNATING E.M.F.**

To study a R-C Circuit with a source of alternating E.M.F., To study of R-C Circuit using A.C. mains, To measure the impedance of a R-C Circuit.

36230

**MAXWELL'S L/C BRIDGE**

To study Maxwell's L/C Bridge, To measure value of unknown capacitance, To measure value of unknown Inductance.

36231

**MEASUREMENT OF CAPACITANCE BY WEIN BRIDGE**

To study Wien Bridge, To measure the capacitance by Wien Series Bridge, To measure the capacitance by Wien Parallel Bridge.

36232

### TO STUDY THE BEHAVIOR OF LIGHT EMITTING DIODE (LED)

To understand the operation of an LED : On D.C. Voltage, On A.C. Voltage, To plot and study the forward voltage current characteristics of different colour discrete LEDs, To practically understand the operation of a seven segment LED display.

36233

### STUDY OF DARLINGTON PAIR AMPLIFIER

To experimentally calculate and compare the following circuits : Emitter Follower Circuit, Darlington pair Amplifier for the following parameters : Input Impedance, Output Impedance, Current gain, Voltage gain.

36234

### STUDY OF BLOCKING OSCILLATOR

To observe on a C.R.O. the waveforms at the base and collector of an Astable Blocking Oscillator: Without connecting the diode, After connecting the diode, To measure the pulse width and the frequency of the pulse-train with various combinations of C and R values.

36235

### STUDY OF HIGH FREQUENCY AMPLIFIER

To study the frequency response, bandwidth and voltage gain of high frequency amplifier, To observe the effect of negative feedback on bandwidth and voltage gain of high frequency amplifier.

36236

### STUDY OF MULTIVIBRATORS (BMV, AMV & MMV) USING IC 555

Study of Multivibrators (BMV, AMV & MMV) using IC 555.
To study Bistable Multivibrator using IC 555, To study Astable Multivibrator using IC 555, To study Monostable Multivibrator using IC 555.

36237

### STUDY OF NULL-BALANCING TECHNIQUES OF OP-AMP

For Inverting OP-AMP Circuit, For Non-Inverting OP-AMP Circuit, For Voltage follower Circuit, Inverting Amplifier, offset voltage applied to the Inverting input, Inverting Amplifier, offset voltage applied to the Non-Inverting input, Off setting circuit for low gain non-inverting OP-AMP.


36238

### STUDY OF MILLER SWEEP CIRCUIT

To get familiar with the Miller Sweep Circuit and experimentally observe the effect of C and R value on the sweep waveform, To experimentally observe the effect of the frequency of input step waveform on the sweep waveform, To observe the linearity of the sweep waveform.

36239

**STUDY OF R.C. CIRCUIT WITH AN ULTRA LOW FREQUENCY AC SOURCE**

To get familiar with the Miller Sweep Circuit and experimentally observe the effect of C and R value on the sweep waveform, To experimentally observe the effect of the frequency of input step waveform on the sweep waveform, To observe the linearity of the sweep waveform.

36240

**MEASUREMENT OF TEMPERATURE WITH THERMISTOR**

To calibrate the ammeter for temperature measurement using in-built electrical oven and a Mercury thermometer, To measure temperature of a hot object.

36241

**STUDY OF LCR CIRCUITS WITH AN AC SOURCE**

To determine the equivalent power loss resistance of an inductor, To analyse a complex LR circuit by drawing vector diagrams, To analyse a complex RC circuit, To study a circuit with two inductors in series, To study a circuit with two capacitors in series, To study if V and V are always in the opposite phase L C.

36242

**STUDY OF CASCODE AMPLIFIER**

To study Cascode Amplifier or CE-CB configuration for AC analysis and to determine the following parameters:
The input resistance, The output resistance, The overall voltage gain, The overall current gain

36243

**STUDY OF TEMPERATURE ON-OFF CONTROLLER WITH THERMISTOR**

To turn ON or OFF an external load at a particular temperature, To control and maintain the temperature of the internal oven.

36244

**MEASUREMENT OF POWER & POWER FACTOR OF L-R CIRCUITS**

Measurement of Power and Power factor of R-L circuit with a single phase of AC voltage source using voltmeters, current meters and wattmeter.

36245

**STUDY OF OP-AMP COMPARATOR**

Non-Inverting Cooperator, Inverting Cooperator, Fast Precision Voltage Comparator, Comparator for signals of opposite polarity, Single ended comparator with Hysteresis and clamped feedback, Comparator for A.C. Coupled signals, Zero Crossing Detector, Schmit Trigger, Voltage


**STUDY OF OP-AMP MATHEMATICAL OPERATIONS**

Inverting Amplifier, Non-inverting Amplifier, Frequency Response of Inverting A.C. Amplifier, Frequency Response of Non-inverting A.C. Amplifier, High Input Impedance Inverting Amplifier, High Input Impedance Non-inverting Amplifier.


**OP-AMP APPLICATIONS**

Square Wave generator, Pulse & Ramp generator, Triangular Generator, Sine Wave Generator using Wien Bridge, Phase Shift Network, Active Filters: Low Pass Filter, High Pass Filter, Band Pass Filter, Notch Filter, Voltage Regulators, Null Detector, D.C. Microammeter,


**TIMER APPLICATIONS IC-555**

To study the Pulse Generator, Timer, Sequential Timer, Pulse Width Modulator (PWM), Time Delay Circuits.


**STUDY OF VARACTOR DIODE CHARACTERISTICS**

To determine the Junction(transition) Capacitance of a Varactor Diode as a function of the reverse bias voltage and to evaluate the internal contact potential, To use the Varactor Diode as a variable capacitor.


**STUDY OF INVERTING & NON-INVERTING OPERATIONAL AMPLIFIER**

To study Inverting Operational Amplifier, To study Non-Inverting Operational Amplifier, To study frequency response of Inverting A.C. Operational Amplifier, To study frequency response of Non-Inverting A.C. Operational Amplifier.


**STUDY OF DIODE DETECTOR**

To modulate the carrier with audio signal and measure modulation index, To demodulate the amplitude modulated waveform by the basic diode detector, To demodulate the amplitude modulated waveform by the improved diode detector, To study the detection efficiency of a Diode by direct method.


**DETERMINATION OF THE RESISTANCE & CAPACITANCE**

To determine the resistance and capacitance of a capacitor using three ammeters and a voltmeter.


**STUDY OF VARIATION OF TOTAL THERMAL RADIATION WITH TEMPERATURE**

To study the variation of the Total Thermal Radiation with Temperature.


**APPLICATIONS OF OPERATIONAL AMPLIFIER**

Inverting Amplifier, Non-Inverting Amplifier, Summing Amplifier or Adder, Voltage Follower or Buffer Amplifier.


**TRANSISTOR AUDIO AMPLIFIER**

To measure the voltage gain of (CE) R.C. Coupled Transistor Audio Amplifier, To plot the frequency response characteristics of (CE) R.C. Coupled Transistor Audio Amplifier, To find out the Input Impedance of (CE) R.C. Coupled Transistor Audio Amplifier, To find out the output Impedance of (CE) R.C. Coupled Transistor Audio Amplifier.


**STUDY OF RECOVERY TIME OF DIODES**

To find out Recovery Time (reverse recovery time) of given Diodes, To study Recovery Time (reverse recovery time) as a function of frequency of operation and switching current.


**DETERMINATION OF ELECTRONIC CHARGE**

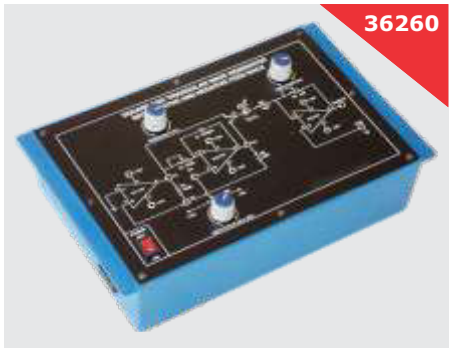
To note, change of current I with change of low voltage V in forward bias case and to plot the variation in log I & V and investigate linear region of the graph, To determine the electronic charge (e) by using rectifier equation.


**STUDY OF PHASE MEASUREMENT BY SUPER POSITION**

To study the relative phase difference between voltage across resistors and capacitors in series, To measure the phase difference between V and V in a simple RC circuit. R C, To study more about phase relationship in an RC network, To study the phase relationship in an LR circuit.


**COMPARATIVE STUDY OF BRIDGE RECTIFIER AND PRECISION RECTIFIER**

Comparative Study of Bridge Rectifier & Precision Rectifier.




**SQUARE AND TRIANGULAR WAVE GENERATOR WITH POSITIVE & NEGATIVE FEEDBACK**

To Study Generation of Square wave & Triangular wave using Schmitt Trigger, Integrator and Inverting Amplifier, To Study Principle of positive & negative feedback.


**SCALING AMPLIFIER**

To Study Scaling Amplifier, configured in such a way so that any type of transfer function i.e. Direct or Inverse with D.C. Offset ( ve or -ve) can be scaled, To Study Adjustment of Angle of Transfer Function.


**ZERO CROSSING DETECTOR**

To generate synchronized pulses whenever A.C. Mains crosses zero line using Comparator, RC Differentiating Circuit etc.


**WINDOW DETECTOR**

To detect certain inputs when lying within specified range of voltages (window) using Inverting and Non-inverting Comparator.


**VOLTAGE TO CURRENT CONVERTER (V TO I)**

To Study the conversion of input voltage into proportional current irrespective of load for Inverting & Non-Inverting modes.


**CURRENT TO VOLTAGE CONVERTER(V TO I)**

To Study principles of voltage controlled current source, To Study conversion of current to proportional voltage in Inverting & Non-Inverting modes.


**VOLTAGE TO FREQUENCY CONVERTER (V TOF)**

To Study the conversion of Analogue D.C. voltage into proportional frequency with 50% duty cycle having linear relationship using Integrator, Schmitt Trigger and Master Slave J.K. flip flop in toggle mode.


**UNDER VOLTAGE MONITORING**

To Study the under voltage state of AC mains with LED indication using OP-AMP as a closed loop Comparator in hysteresis operation.


**ACTIVE LIMITER**

To study active limiting of input at either polarity with adjustable limits using summing amplifier, unity gain amplifier and open loop comparator, To study the comparison between Zener Limiter and Active Limiter.


**R Y B SIGNAL GENERATOR**

To study generation 3 phase R Y B low voltage signals from single phase low voltage input.


**CRYSTAL OSCILLATOR USING CMOS ICS**

To Study Crystal Oscillator using CMOS ICs with crystal of frequency 32.768 Khz.


**BINARY RATE MULTIPLIER**

To Study Binary Rate Multiplier to achieve output of desired frequency in binary steps, by dividing the available clock frequency with a selectable number (which is the Binary Rate) using Binary Rate Multiplier IC 4089.


**SYNCHRONIZED PULSE GENERATOR**

To Study generation of synchronized pulses for triggering of Thyristor at the desired position.


**PHASE SEQUENCE MONITORING**

To study Detection of the Incoming low voltage R Y B phase sequence.


**PHOTO TRANSISTOR TRAINER**

To Study generation of voltage corresponding to the change of light intensity on photo transistor, To Study an application to drive a relay with OP-AMP used in comparator mode and a Transistor as control switch to operate the relay.


**TWO CHANNEL ANALOGUE MULTIPLEXER**

To study multiplexing of two analog signals to give multiplexed output using JFETs.


**STUDY OF SCHMITT'S TRIGGER CIRCUIT**

Upper threshold voltage, Lower threshold voltage, Hysteresis, Effect of feedback on threshold voltage.


**CURRENT AMPLIFICATION FACTOR OF A TRANSISTOR**

To determine the current amplification factor of a Transistor graphically.


**DETERMINATION OF INTERNAL RESISTANCE OF A D.C.**

To determine the internal resistance of a D.C. source by matching a load for maximum power transfer.


**SMPS TRAINER KIT (FOR COLOUR TELEVISION)**

To study different sections of SMPS, To locate typical components and Input/Output signals, To measure the voltages at test points and Input/Output signals, To study the circuit in detail, To create faults by removing components and observe their effect.


**SMPS TRAINER KIT (FOR COMPUTER)**

To study the different sections of SMPS, To locate typical components and Input/Output signals, To measure the voltages at test points and Input/Output signals, To study the circuit in detail, To create faults by removing components and observe their effect.


**SOLAR EDUCATIONAL KIT**

To study Photo Voltaic Module characteristics by plotting I-V curve, To demonstrate the electrical appliances on both the Solar Module and the battery.


**ELECTRONIC SIREN USING TIMER ICS**

To Study an Electronic Siren using Timer Ics, 5V D.C. at 100mA, IC regulated power supply internally connected, Two Timer ICs, Speaker (8W) for output, Two potentiometers, "Push to ON" switch for putting Siren ON, Adequate no. of other electronic components.


**BURGLAR ALARM USING 555 TIMER & LDR**

To Study Burglar Alarm using Timer IC & LDR, 12V D.C. at 1A , IC regulated power supply internally connected, Timer IC, Speaker (8E) for output, LDR mounted on panel, Adequate no. of other electronic components.


**STEFAN'S LAW OF RADIATION BY USING AN IN-CANDESCENT LAMP**

To verify the Stefan's law of radiation by using an incandescent lamp.


**STUDY OF THE CHARGE AND DISCHARGE OF CONDENSER THROUGH A RESISTANCE**

To study the Charge and Discharge of a condenser through a resistance using neon bulb, To study the dependence of the period on the source voltage and deducing striking voltage and extinction voltage of the neon bulb.


**L.C. TRANSMISSION LINE (48 SECTIONS)**

To study Propagation along L-C ladder network having. 48 sections and find out the propagation constant.


**R Y B SIGNAL GENERATOR**

To study generation 3 phase R Y B low voltage signals from single phase low voltage input.


**QUADRATURE OSCILLATOR**

To study constructional features of quadrature oscillator, To verify the generation of two signal (sine & cosine) that are in quadrature i.e. out of phase by 90 , To study the variation in frequency by varying the values of components.


**CONVERSION OF GALVANOMETER INTO A VOLTMETER**

To determine the resistance of a Galvanometer by half deflection method, To determine the figure of merit of the Galvanometer, To convert the Galvanometer into a Voltmeter of a given range and to calibrate it.


**CONVERSION OF GALVANOMETER INTO AN AMMETER**

To determine the resistance of a Galvanometer by half deflection method. To determine the figure of merit of the Galvanometer, To convert the Galvanometer into an Ammeter of a given range and to calibrate it.

36292

**IONISATION POTENTIAL OF MERCURY USING GAS FILLED DIODE**

To find the ionisation potential of mercury using gas filled diode.

36293

**ELECTRICAL THERMIONIC FUNDAMENTALS TRAINER**

Determination of the therminoic work function of tungsten using directly heated valve, Verification of Richardson equation of therminoic emission.

36294

**ZENER REGULATED AND IC REGULATED**

To study unregulated Power Supply, To study zener regulated Power Supply, To study IC regulated Power Supply.

36295

**STAIRCASE GENERATOR**

To study Staircase Generator, 12V D.C. at 30mA IC regulated Power Supply internally connected, Two transistor one NPN and another PNP, One Potentiometer to control division ratio, One Unijunction Transistor, Adequate no. of other electronic components, Mains ON/OFF switch, fuse and jewel light.

36296

**VERIFICATION OF SUPERPOSITION, THEVNIN'S & RECIPROCITY THEOREMS**

To verify the Superpositon Theorem and to calculate current in any branch of a multisource using Superposition Theorem, To verify Thevenin's Theorem and to calculate Thevenin's equivalent of given circuit.

36297

**CRITICAL POTENTIALS OF AN ATOMIC GAS FILLED IN ELECTRONIC VALVE**

Determination of Excitation Potential of an atomic gas filled in electronic valve, Determination of Ionization Potential of an atomic gas filled in electronic valve.

36298

**VOLTAGE CONTROLLED OSCILLATOR (V.C.O.) TRAINER**

Constant frequency, Wide range VCO, variable from near zero to above 1.5 KHz, Wide range VCO with frequency fully variable down to zero, Restricted range VCO, Universal Clock/Square wave Generator, FSK Generator.

36299

**STUDY OF FORBIDDEN ENERGY GAP**

To study the Forbidden Energy Gap in Semiconductor Diode, 2V D.C. at 10mA, regulated Power Supply, Digital Microammeter, 3½ digits having range 200mA D.C., Semiconductor Diode, Thermometer 0-110 °C, Oven, Electrically heated to heat the Semiconductor Diode.

36300

**ACTIVATION ENERGY OF A THERMISTOR**

To determine the activation energy of a thermistor, To determine the material constant of the thermistor material.

36301

**FREQUENCY TO VOLTAGE CONVERTER (F TO V)**

To verify that the output voltage varies in accordance with the input frequency. Frequency to voltage converter IC, Potentiometer to calibrate the output voltage according to input frequency, Adequate no. of other electronic components, Mains ON/OFF switch, fuse and jewel light.

36302

**CLASS A, B, C & AB AMPLIFIER**

To study Class A amplifier, To study Class B amplifier, To study Class C amplifier, To study Class AB amplifier.

36303

**OP-AMP USED AS SCALAR, SUMMER AND VOLTAGE FOLLOWER**

To study Scaling Amplifier, configured in such a way so that any type of transfer function i.e. Direct or Inverse with D.C, Offset ( ve or - ve) can be scaled, To study Summing amplifier or adder, To study Voltage follower or Buffer Amplifier.

36304

**OP-AMP DIFFERENTIATOR AND INTEGRATOR**

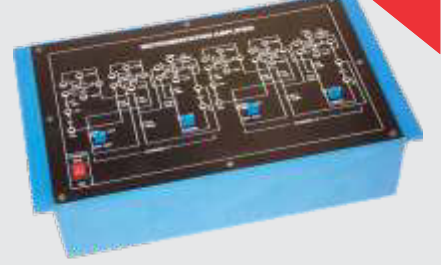
To study Integrating Amplifier for DC input signals, To study Integrating Amplifier for AC input signals, To study Differentiator Amplifier, To study Non-inverting differentiator Op-Amp 741.

36305

**STUDY OF OP-AMP (INPUT-BIAS CURRENT, OUTPUT-OFFSET VOLTAGE & SLEW RATE)**

To study the input-bias current, To study the output-offset voltage, To study the slew rate.

36306



**INSTRUMENTATION AMPLIFIER**

Test the performance & characteristics of an Instrumentation Amplifier circuit, Two independent Instrumentation Amplifiers in a single Training Board, Programmable - gain Amplifier, with an internal high precision feed back network, It has high common - mode - rejection ratio (CMRR).

36307

**PHASE AND FREQUENCY DETERMINATION OF ELECTRICAL SIGNALS USING A CRO (LISSAJOUS FIGURES)**

To study analog CRO, Measurement of time period, amplitude, frequency and phase angle using Lissajous Figures, To study of CRO.

36308

**TRANSISTOR AS A SWITCH**

To study Delay time, To study Rise time, To study On time, To study storage time, To study Fall time, To study Off time, Transistor as a switch application.

36309

**APPLICATION OF THERMISTORS**

To study Temperature / Fire alarm, To study over Temperature control alarm with NTC Thermistor, To study Temperature / Fire alarm, To study under Temperature alarm with PTC Thermistor.

ELECTRONICS

STEM



**Our more Product**

Kenya Shipment

36310

**FEEDBACK AMPLIFIER (4 TYPES USING TRANSISTORS)**

To Design Current series Feed Back Amplifier, To Design Voltage series Feed Back Amplifier, To Design Voltage shunt Feed Back Amplifier, To Design Current shunt Feed Back Amplifier.

36311

**FEEDBACK AMPLIFIER (4 TYPES USING FET & TRANSISTORS)**

To study Voltage shunt Feed back Amplifiers using Transistor, To study Current shunt Feet back Amplifier using Transistor, To study Voltage series Feed back Amplifier using FET, To study Current series Feed back Amplifier using FET.

36312

**WIEN BRIDGE OSCILLATOR USING JFET**

To design and setup a Wien Bridge Oscillator using JFET to generate a sinusoidal signal of three frequencies at 3V PP, 12V DC at 100 mA, IC Regulated Power Supply internally connected, Potentiometer to vary the amplitude.

36313

**MEASUREMENT OF INDUCTANCE BY HAY'S BRIDGE**

To Measure the Value of Unknown Inductance by Hay's Bridge, Hay's Bridge circuit with arm values, ±12V DC at 100 mA, IC Regulated Power Supply internally connected, 1 KHz Sinewave oscillator Output 0 - 15 Vpp.

36314

**MEASUREMENT OF UNKNOWN CAPACITANCE BY SCHERING BRIDGE**

To Measure the Value of Unknown Capacitance by Schering Bridge, Schering Bridge circuit with arms values, ±12 VDC at 100 mA, 1KHz Sinewave oscillator having output 0-15 Vpp.

36315

**MEASUREMENT OF SELF INDUCTANCE BY OWEN'S BRIDGE**

To Measure the Value of Unknown Self Inductance by Owen's Bridge, Owen's Bridge circuit with arm values, ±15V DC at 100 mA, IC Regulated Power Supply internally connected, 1 Khz Sinewave oscillator Output 0 - 15 Vpp.


**VOLTMETER CHARACTERISTICS: OHMS PER VOLT**

Study of Voltmeter characteristics : Ohms per volt, Voltmeter 65mm rectangular dial of 1V range, having resistance of 1K ± 10% and full scale deflection current is 1mA, IC regulated variable DC power supply of 0-20Volt at 100mA, Necessary resistance.


**WHEATSTONE BRIDGE**

To study Wheatstone Bridge, To measure value of unknown resistance, 5V D.C. At 100mA IC regulated power supply internally connected, Galvanometer, 65mm rectangular dial to read 30-0-30.


**OP-AMP CHARACTERISTICS**

To study nullify the offset voltage, To study measure the slew rate, To study the inverting amplifier circuit, To study the non-inverting amplifier, To study the adder circuit in Inverting & Non Inverting Mode.


**PUT CHARACTERISTICS & RELAXATION OSCILLATOR**

To draw the V-I characteristics of PUT, To study PUT relaxation oscillator, 0-10V D.C. At 20mA, IC regulated power supply, 0-3V D.C. At 20mA, IC regulated power supply.


**OPTOELECTRONIC APPLICATIONS USING 741 AND 555**

To Study Burglar Alarm Using Timer IC-555 & Breaking of wire and LDR, To Study Burglar Alarm Using Timer IC-555 Breaking of Wire & Photo Transistor, Burglar Alarm Using Timer IC-555 Breaking of wire and Photo Diode.


**ZENER DIODE (CHARACTERISTICS AND TEMPERATURE EFFECT)**

To study and plot the forward & reverse bias characteristics of a Germanium semiconductor Diode, To study and plot the forward & reverse bias (breakdown) characteristics of a Zener Diode, To study the Temperature Coefficient of Zener Diode and plot Power Rating curves.


**TRANSFORMER WINDING PRACTICE**

To design a step up/step down transformer, To construct and study the step up/step down transformer, This kit consists of Bobbins, E-I core plates, Winding wires, Insulation Paper, Varnish material, Nuts and Bolts.


**AUDIO AMPLIFIER USING IC LM-380**

To measure the voltage gain (A ) of audio v amplifier, To plot the frequency response characteristics of audio amplifier, To find out the input impedance of the audio amplifier, To find out the output impedance of the audio amplifier.


**LOGARITHMIC AMPLIFIERS DESIGN & TEST (USING IC-741 OP-AMP)**

To Design operational amplifier based Logarithmic Amplifier, 0-10V D.C. at 50mA, continuously variable Power Supply, Digital Voltmeter DC 3½ Digit Having Dual range of 200mV / 20V.

36325

**BASIC ELECTRONIC TRAINER - SET OF 6 BOARDS**

To study of basic gates & verification of their truth tables (AND, NAND, NOT, OR, NOR & EX-ORGate), The board consists NAND Gate, NOT Gate, OR Gate, NOR Gate, EX-OR Gate, Switches for logic selection, LED's for visual indication of status.

36326

**POWER & DIFFERENTIAL AMPLIFIER TRAINER**

Study of working principle of Differential Amplifier, Study of working principle of class B push-pull Amplifier, In-built DC power supply, In-built sine wave generator, Compact design.

36327

**BJT AMPLIFIERS & EMITTER FOLLOWER TRAINER**

Determination of Excitation Potential of an atomic gas filled in electronic valve, Determination of Ionization Potential of an atomic gas filled in electronic valve.

36328

**OP-AMP APPLICATIONS TRAINER**

Study and observe Op-Amp as voltage Computer, Study and observe Op-Amp as phase shift oscillator and its phase shift at every RC combination, Study and observe Op-Amp as half wave precision rectifier, Study and observe Op-Amp as active second order high pass filter.

36329

**BUTTERWORTH FILTER (1st & 2nd ORDER)**

To study 1st Order Low Pass Filter, To study 2nd Order Low Pass Filter, To study 1st Order High Pass Filter, To study 2nd Order High Pass Filter, ±12V DC at 50mA, IC regulated Power Supply internally connected, Four Operational Amplifier Ics, Adequate no. of other electronic components.

36330

**TRANSISTOR AMPLIFIER DEMONSTRATOR**

To study the Voltage Gain of Transistor Audio Amplifier (CE), To plot the Frequency Response characterstics, To find out Input Impedance, To find out Output Impedance, To find out Current Gain, To find out Power Gain.

36331

**AC/DC SOURCES EXPERIMENTAL TRAINER**

A very useful component trainer to show all the components used in electronics circuits / laboratory, Useful, low cost. Multipurpose, minilab for linear, digital & hybrid circuits, Saves time and money in experimentation as no soldering is required to try out new circuit and component can be reused.

36332

**SYNCHRO TRANSMITTER & RECEIVER**

Study of Synchro Transmitter, Study of Synchro Transmitter and Receiver pair, Study of Sychro Transmitter and Receiver pair with phase difference, Calibrated dials for reference and output position, Switch for Transmitter and Receiver rotor supply.

36333

**ACTIVATION ENERGY OF A THERMISTOR**

Study the transient response of a series RC circuit and understand the time constant concept, Study the transient response of a series RL circuit and understand the time constant concept, Study the transient response of a series RC circuit and understand the time constant concept with square wave TTL.

36334

**TRANSIENT ANALYSIS TRAINER**

Study the transient response of a series RLC circuit with TTL for under damped, critically damped and over damped cases, Easy experimental illustration of Transient Analysis of RLC circuit, uilt-in Signal Generator.

36335

**TWO PORT NETWORK TRAINER**

Study of Z-Parameters of a Passive Two Port Network, Study of Y-Parameters of a Passive Two Port Network, Study of ABCD-Parameters of a Passive Two Port Network.

36336

**TWO PORT LADDER NETWORK TRAINER**

Study and verification of Transfer Function of Two Port Ladder Network, Exclusive and Compact design, Inbuilt 12 V DC Power Supply.

36337

**T AND PIE ATTENUATOR TRAINER**

Study of Symmetrical T Attenuator, Study of Symmetrical p Attenuator, The board consists Good Quality, reliable terminal/sockets are provided at appropriate places on panel for connections / observation of waveforms.

36338

**INTERCONNECTION OF TWO PORT NETWORK**

Study of cascade connection of two port networks, Study of series connection of two port network, Study of parallel connection of two port network, Study of loading effect with cascade connection of two port networks, Study of loading effect with series connection of two port network.

36339

**POST OFFICE BOX TRAINER**

Determination of unknown resistance, Determination of resistivity of the material of wire, Verification of effects of resistence in series and parallel, Provided with DC power supply, Easy to operate.

36340

**KELVIN BRIDGE TRAINER**

Potentiometer of 1Kohm, 10Kohm potentiometer is a helical 10 turn pot mounted with dial for easy measurement, Block Description Screen printed on glassy epoxy PCB, One LED indicator to indicate Power input.

36341

**TRANSISTOR DESIGNER TRAINER**

To design Common Emitter Amplifier, To design Common Collector Amplifier, To design Combination Amplifier (C.E.& C.C.), To design Common Emitter current feedback Amplifier, To design Phase Shift Audio Oscillator, To design Wien-Bridge Audio Oscillator, To design Free Running Multivibrator, To design Monostable Multivibrator.

36351

**DISCRETE COMPONENT TRAINER KIT**

Study the working of Resistors, Capacitors, Inductors, Potentiometer, Relay, Study the Characteristics study of Si-Diode, FSD-Diode, Ge-Diode, Zener Diode, LED, Varactor Diode, VDR, Study the Characteristics study of BJT in CE, CB and CC mode.


**TRANSISTOR APPLICATION TRAINER**

To identify and check type of Transistor NPN, PNP, CE amplifier-frequency response, signal handling capacity, input and output impedance, Voltage series feedback (negative) amplitude, frequency response, input and output impedance calculation, Series and shunt regulator, calculate ripple factor.


**POWER & DIFFERENTIAL AMPLIFIER TRAINER**

Study of working principle of Differential Amplifier, Study of working principle of class B push-pull Amplifier, In-built DC power supply, In-built sine wave generator, Compact design.


**NETWORKS AND BRIDGES TRAINER**

To study Superposition theorem, To study Thevenin's theorem, To study Norton's theorem, To study Reciprocity theorem, To study Two port network parameter ( Z and Y parameter ).


**ANALOG TO DIGITAL & DIGITAL TO ANALOG CONVERTER TRAINER**

8-bit descrete ADC, 12-bit successive approximation monolithic ADC IC, On-board signal generator with adjustable amplitude levels, On-board LED bank to observe digital outputs, 8-bit binary weighted resistors DAC, 8-bit ladder type D to A converter.


**BUTTERWORTH FILTER (1st & 2nd ORDER)**

To study 1st Order Low Pass Filter, To study 2nd Order Low Pass Filter, To study 1st Order High Pass Filter, To study 2nd Order High Pass Filter, ±12V DC at 50mA, IC regulated Power Supply internally connected, Four Operational Amplifier Ics, Adequate no. of other electronic components.


**TRANSISTOR AMPLIFIER DEMONSTRATOR**

To study the Voltage Gain of Transistor Audio Amplifier (CE), To plot the Frequency Response characterstics, To find out Input Impedance, To find out Output Impedance, To find out Current Gain, To find out Power Gain.


**AC/DC SOURCES EXPERIMENTAL TRAINER**

A very useful component trainer to show all the components used in electronics circuits / laboratory, Useful, low cost. Multipurpose, minilab for linear, digital & hybrid circuits, Saves time and money in experimentation as no soldering is required to try out new circuit and component can be reused.


**POWER ELECTRONICS TRAINER**

Study of Synchro Transmitter, Study of Synchro Transmitter and Receiver pair, Study of Sychro Transmitter and Receiver pair with phase difference, Calibrated dials for reference and output position, Switch for Transmitter and Receiver rotor supply.


**ANALOG, DIGITAL & MIXED - SIGNAL SIMULATION ACADEMIC RESEARCH 5 USER**

More than 25,000 analog, digital and mixed-signal parts including realistic behavioral models for resistors, inductors and capacitors, A large selection of active device models with no less than six distinct MOSFET models including BSIM3 and BSIM4.


**EXPERIMENTATIONS WITH KELVIN'S BRIDGE**

Determination of unknown resistance using kelvin's bridge method, Kelvin's Bridge circuit with arms values, Unknown Resistance 0.5W, 1.0W, 1.5W, The unit is operative on 230V ±10% at 50Hz A.C. Mains.


**DIODE, ZENER DIODE AND LED CHARACTERISTICS**

To study and plot the forward & reverse bias characteristics of a Germanium semiconductor Diode, To study and plot the forward & reverse bias characteristics of a Silicon semiconductor Diode, To study and plot the forward & reverse bias (breakdown) characteristics of a Zener Diode.


**ZENER DIODE VOLTAGE REGULATOR**

Study of Zener Diode as a Voltage Regulator, when input voltage, (Vin) is fixed while load resistance (RL) is variable, Study of Zener Diode as a Voltage Regulator, when input voltage, (Vin) is variable while load resistance (RL) is fixed, To measure the Line and Load Regulation in Zener Diode Voltage Regulator.


**SINGLE AND TWO STAGE R.C. COUPLED TRANSISTOR AMPLIFIER**

To Study of common emitter (CE) single stage transistor amplifier circuit and to measure its voltage gain (A ), To plot the frequency response characteristics, To find out the input-impedance, To find out the output impedance, To find out the current gain, To find out the power gain of the single stage CE Amplifier.


**DE SAUTY BRIDGE WITH OSCILLATOR AND DETECTOR**

To Study of common emitter (CE) single stage transistor amplifier circuit and to measure its voltage gain (A ), To study the working of a De Sauty Bridge and to compare the capacitance of two capacitors.


**F.E.T. CHARACTERISTICS AND AMPLIFIER**

To study the characteristics of Field Effect Transistor, Measurement of IDSS, Plot the static drain characteristics of FET, Drain Current V/s Drain Voltage Characteristics for different fixed values of VGS, Drain Current V/s Gate Bias Characteristics for different fixed values of VDS.


**VOLTAGE MULTIPLIERS WITH AC VOLTAGE 10, 20, 30, 40V AT 10MA.**

Study of Full wave Voltage Doubler, Study of Half wave Voltage Doubler., Study of Voltage Tripler, Study of Voltage Quadrupler.


**TIMER APPLICATIONS USING IC-555**

To Study Pulse Generator using IC-555, To Study Timer using IC-555, To Study Sequential Timer using IC-555, To Study Pulse Width Modulator (PWM) using IC-555, To Study Time Delay Circuits using IC-555, To Study Burglar Alarm Using Timer IC-555 & Breaking of wire and LDR.


**APPLICATION USING OP-AMP IC-741**

To Study Voltage to Frequency Converter using 741, To Study Light Based PWM using 741 & Voltage to Frequency Converter, To Study Shadow Sensing using 741 & LDR, To Study Temperature to Voltage Converter using 741 & Thermistor.


**STUDY OF PROXIMITY SENSOR**

To Study the Inductive Proximity Sensor as a Metal Detector, To Study the Capacitive Proximity Sensor as an Object Detector, To Study the Optical Sensor as an object Detector, To Study Hall Effect Sensor as a Magnetic Pole Detector.


**TO STUDY OF LOGARITHMIC AND ANTI-LOGARITHMIC AMPLIFIER**

To Study Temperature Compensated Logarithmic Amplifier and Study its Frequency Response, To Study Temperature Compensated Anti-Logarithmic Amplifier and Study its Frequency Response, Two Digital DC Voltmeter ranging from ±1.999V displaying input and output voltage, Four OP-AMPs.


**STAIRCASE GENERATOR (USING IC 555 AND OP-AMP IC-741)**

To study the free running Staircase Generator, ±15V D.C. at 60mA IC regulated power supply internally connected, One IC 555 Timer, Two OP AMP 741.


**FREQUENCY MULTIPLIER USING IC-555 AND OP AMP IC-741**

To study frequency multiplier using PLL chip to multiply the input frequency by a factor of five, 10 V and -10 V D.C. at 100mA, IC regulated power supply, 5 V DC at 50mA, IC regulated power supply.

10006

**PC BASED MOTORISED ANTENNA TRAINER**

Variation of field strength with distance, Plot radiation pattern of omni directional antenna, Plot radiation pattern of directional antenna, Polarization of vertical and horizontal antenna.

10008

**ANTENNA TRAINER WITH 11 ANTENNAS**

Sine Waveforms, 750 MHz approximately (output adjustable) RF Generator, 1 KHz approximately (output adjustable) Tone Generator, Forward & Reverse (selectable) Directional Coupler, Slider type Matching Stub, 0-360 deg. Resolution 1 deg. Antenna Rotation.

10009

**ANTENNA TRAINER WITH 22 ANTENNAS**

Sine Waveforms, 750 MHz approximately (output adjustable) RF Generator, 1 KHz approximately (output adjustable) Tone Generator, Forward & Reverse (selectable) Directional Coupler, Slider type Matching Stub., 0-360 deg. Resolution 1 deg. Antenna Rotation.

10010

**MOTORISED ANTENNA TRAINER WITH PLOTTING SOFTWARE AND 22 ANTENNAS**

Microcontroller Based High Precision DC Stepper Motor, Automatic Zero Point setting, 4 Built-in DC Power Supply, Instant Plotting of radiation Pattern, Resolution 1.80, RS232 data link to PC.

10011

**ADVANCED ANTENNA TRAINER WITH VARIABLE FREQUENCY (550 MHz - 850 MHz) AND 11 ANTENNAS**

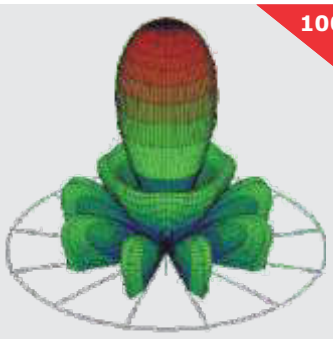
Study of Simple Dipole l/2 Antenna, Performing Polarisation Test and Modulation Test, Study of Reciprocity Theorem, Study of variations in the radiation strength at a given distance from the antenna.

10012

**ADVANCED ANTENNA TRAINER WITH VARIABLE FREQUENCY (550 MHZ - 850 MHZ) AND 22 ANTENNAS**

Study of Simple Dipole l/2 Antenna, Performing Polarisation Test and Modulation Test, Study of Reciprocity Theorem, Study of variations in the radiation strength at a given distance from the antenna.

10014



**PERSONAL COMPUTER AIDED ANTENNA DESIGN SOFTWARE**

3-D color pattern plots, Impedance matching with Smith chart, Analysis of circular planar arrays, V-dipole antenna analysis, Wire loop antenna analysis, Log periodic dipole array analysis, More general wire antenna geometries.

10020

**ANTENNA TRAINER**

RF Generator provides RF generated output of approx. 750 MHZ, Provision for output adjustments provided, Tone Generator provides Tone generated output of approx. 1 Khz, Provision for output adjustments provided, Direction Coupler forward And Reverse Direction Coupler.

10020M

**ANTENNA TRAINER (MOTORISED)**

Slider Type Matching Stub provided, Digital meter is provided for Forward & Reverse Indication, Microcontroller based stepper motor to rotate Antenna in steps, Windows based software, RS232 interfaces to communicate with PC, Goniometer is provided on main panel.

10025

**MOTORISED ANTENNA TRAINER**

Single training system to teach all types of antenna measurement, Covers UHF, L, Sand ISM Bands, Software controlled PLL Systhesized Source and Detector working upto 3GHz with high dynamic range of power Transmission.

10203

**SATELLITE COMMUNICATION TRAINER**

Transmitter with selectable frequency conversion, Simultaneous communication of three different signals, Communicate Audio, Video, Digital data, PC data, Tone, Voice, function generator waveforms etc, 2414 - 2468MHz PLL microwave operation, Communication of external broad band digital signal.

10203B

**SATELLITE COMMUNICATION TRAINER KIT**

Simultaneous communication of three different signals, Communicate Audio, Video, Digital data, PC data, Tone, Voice, function generator waveforms etc, 5740-5880 MHz PLL microwave operation, Communication of external broad band digital signal, Choice of different transmitting and receiving frequencies.

10204

**POWER & DIFFERENTIAL AMPLIFIER TRAINER**

Study of the working of a Doppler Radar, Study of determine the Velocity of the object moving in the Radar range, Study of understand the principle of Doppler Radar of Time and Frequency measurement with the help of moving pendulum, Study of an Alarm System by using Radar.

10205

**DOPPLER RADAR TRAINING SYSTEM**

Demonstrates the principle of Doppler shift of reflected electro magnetic wave from a moving object Speed, rotation, level control, contact less vibration measurement, Observation and measurements with software, High gain Parabolic antenna provided for narrow beamwidth and clutter reduction.

10208

**RF SPECTRUM ANALYSER**

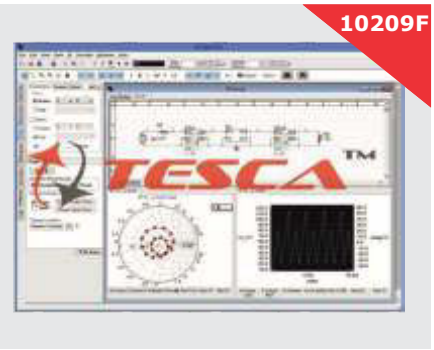
50MHz to 500MHz measurement range, Waveform and modulation independent, Low cost with high performance, Inbuilt frequency counter, Wide input range -85dBm to 20Vp-p, RF modules for experimentation, Tracking signal source for network analysis.

10209

**BASIC RADIO FREQUENCY (RF) LAB**

A very useful component trainer to show all the components used in electronics circuits / laboratory, Useful, low cost. Multipurpose, minilab for linear, digital & hybrid circuits, Saves time and money in experimentation as no soldering is required to try out new circuit and component can be reused.

10209F




**RF DESIGN SIMULATION SOFTWARE ACADEMIC RESEARCH 5/10 USER**

Streamlined user interface and quick schematic entry using a large set of keyboard shortcuts for generic parts and a versatile wiring tool, More than 25,000 analog, digital and RF parts including hundreds of realistic behavioral models for resistors, inductors and capacitors.

10209G


**RF TRAINING KIT (BOARD 1 AND 2)**

Study of RF Matching Circuit, Study of High Frequency Effect, Study of RLC Resonance Circuits, Measurement of DC Bias Circuits, Study of Impedance Matching Network, Study Discontinuities in Microwave Circuits, Study Microstrip transmission line technologies.

10209H

**ADVANCED MICROSTRIP COMPONENT TRAINER (3GHZ)**

Determination of insertion loss (S21) of Microstrip Ring Resonator, Measurement of Isolation Characteristics of Circulator, Measurement of Attenuation Power for Pi Attenuator, Gain Measurement of MMIC Amplifier, PIN Diode Modulator Investigations.

10209 HM

**MOTORISED MICROSTRIP TRANSMISSION LINE TRAINER**

Observation of standing wave pattern at various frequency, Analysis of minima and maxima creation at various frequency, Analysis of various load condition on Microstrip transmission line, Determination of unknown Load Impedance Characterization.

10209I


**3GHZ RF GENERATOR AND DETECTOR**

Determination of insertion loss (S21) of Microstrip Ring Resonator, Measurement of Isolation Characteristics of Circulator, Measurement of Attenuation Power for Pi Attenuator, Gain Measurement of MMIC Amplifier, PIN Diode Modulator Investigations.

10211A

**DOPPLER RADAR TRAINER**

Introduction to Doppler Radar, Study of Doppler Shift and How it is being used in various applications, To find out the time period and frequency of pendulum To measure the speed of fan in RPM, To measure the frequency of peizo electric buzzer.

10211D

**PULSE RADAR SIMULATION SOFTWARE-SINGLE USER**

Antenna, Transmiter, Receiver characteristic simulation, Jammer, surface clutter, rain characteristic simulation, Target data and display characteristic simulation, Study of antenna gain vs range, Study of target RCS vs range, Study of pulse width vs pulse energy.

10211E

**PULSE RADAR SIMULATION SOFTWARE-05 USER**

Antenna, Transmiter, Receiver characteristic simulation, Jammer, surface clutter, rain characteristic simulation, Target data and display characteristic simulation, Study of antenna gain vs range, Study of target RCS vs range, Study of pulse width vs pulse energy.

10212

**GPS TRAINER**

Understanding concept of GPS, Establishing Link between GPS Satellite & GPS Trainer, Measurement of Latitude & Longitude, To Study Effect of DOP, Study of HDOP & VDOP, Analysis of Elevation Azimuth SNR, Study of PRN code.

33501

**DIGITAL LAB**

To Study Logic gates operation, To verify De-morgan's theorem with boolean logic equations, To Study Binary to Gray code conversion, To Study Gray code to Binary conversion, To Study Binary to Excess-3 code conversion, To Study Binary Adder and Subtractor, To Study Binary Multiplier.

33501A

**DIGITAL ELECTRONICS LAB SET UP**

To Study transistor as a switch, To Study AND, OR, NOT, NAND, and NOR gates 03 Logic families (S24), different types of outputs, To Study NAND synthesis, To Study Combinatory circuits 06 XOR AND XNOR, To Study comparator, Decoder, To Study BCD Decoder and BCD to 7 segment decoder.

33502

**ANALOG LAB**

Study of Diodes in DC circuits, Study of Light Emitting Diodes in DC Circuits, Study of Half wave rectifier, Study of Full wave rectifier, Study of Zener Diode as a voltage regulator, Study of Low pass filter, Study of High pass filter, Study of band pass filter, Study of CE configuration of NPN transistor.

33502A

**ANALOG ELECTRONICS LAB SET UP**

Study the Type of Resistor, Study the Type of capacitor, To Study and test Diode as Half wave, Full Wave & Full Wave Bridge Rectifier, Study of Voltage regulator, Study of Voltage Transistor, Study of BreadBoard, Study of Power Amplifier.

33503

**DIGITAL - ANALOG LAB**

Study of Diodes in DC circuits, Study of Light Emitting Diodes in DC Circuits, Study of Half wave rectifier, Study of Full wave rectifier, Study of Zener Diode as a voltage regulator, Study of transistor series voltage regulator, Study of transistor shunt voltage regulator.

33503B

**DIGITAL-ANALOG TRAINING SYSTEM**

Study of Diodes in DC circuits, Study of Light Emitting Diodes in DC Circuits, Study of Half wave rectifier, Study of Full wave rectifier, Study of Zener Diode as a voltage regulator, Study of transistor series voltage regulator, Study of transistor shunt voltage regulator, Study of Low pass filter.

33504

**DIGITAL TRAINER**

To Study AND Gate (static operation), To Study OR Gate (static operation), To Study Dynamic Operation of AND Gate and OR Gate, To Study NOT Gate, To Study NAND Gate, To Study NOR Gate, To Study Exclusive OR Gate (Also called XOR Gate), To Study XNOR Gate, To Study Three State Buffer, To Study RS Latch.

33505

**LOGIC LAB**

To Study Logic gates operation, To Study To prove De-morgan's theorem with boolean logic equations, To Study Binary to Gray code conversion, To Study Gray code to Binary conversion, To Study Binary to Excess-3 code conversion, To Study Binary Adder and Subtractor.

33506

**DIGITAL LAB STATION**

To verify the dual nature of Logic Gates, Study of Flip-Flops RS, JK, D&T, Study of Multiplexer and Demultiplexer, Study of 4 Bit Binary up and down counter, Study of 8 to 3 Line Encoder, Study of 3 to 8 Line Decoder, Study of Shift Register (SIPO).


**POWER PROJECT BOARD**

Unique solder-less large size, spring loaded breadboard consisting of 3 Terminal Strips with 1920 tie points and 5 Distribution Strips with 500 tie points , totaling to 2420 tie points, The unit is operative on 230V ±10% at 50Hz A.C. Mains.


**POWER PROJECT BOARD (I.C. BREAD BOARD SYSTEMS)**

Two full terminal strips, Tie points 1280, One distribution strip, Tie points 100, (total of 1380 tie/contact points) and two terminals (Binding Posts).


**POWER PROJECT BOARD (I.C. BREAD BOARD SYSTEMS)**

Two full terminal strips, Tie points 1280, Three distribution strips, Tie points 300 (total of 1580 tie/contact points) and three terminals (Binding Posts).


**BREAD BOARD CIRCUIT LAB**

Study of basic gates and verification of their truth tables, Study and verifications of the law of Boolean algebra and De-Morgan's Theorems, Study of important TTL terminologies. Verification of important TTL Circuit parameters, Construction and verification of various types of flip - flops using gates and IC's.


**DIGITAL ELECTRONIC TRAINER**

Study of NOT, OR, AND, NOR, NAND, EX-OR, EX-NOR gates, Study and verifications of the law of Boolean algebra and De-Morgan's Theorems, Study of important TTL terminologies, Verification of important TTL Circuit parameters.


**DIGITAL LOGIC TRAINER (TTL)/LOGIC TRAINER BOARD (BASED ON 74 SERIES)**

Study of Quad 2-input NAND Gate, Study of Quad 2-input NOR Gate, Study of Hex Inverter, Study of Quad 2-input AND Gate, Study of Dual 4-input NAND Schmitt Trigger, Study of Quad 2-input OR Gate.


**DIGITAL LOGIC TRAINER (CMOS)/LOGIC TRAINER BOARD (BASED ON 74C/4000 SERIES)**

Study of Quad 2-input NAND Gate, Study of Quad 2-input NOR Gate, Study of Inverter Circuit, Quad 2-input AND Gate, Study of Quad 2-input NAND Schmitt Trigger, Study of Quad 2-input OR Gate, Study of Dual 2-wide 2-i/p AOI Gate.


**DIGITAL I.C. TRAINER (TTL) (FOR VERIFICATION OF TRUTH TABLE)**

Output D.C. Voltage Fixed 5V ±1%, Output Current 1.5 Amp, Load Regulation ±1% of the highest specified output voltage, Ripple And Noise less than 5 mV, Variable Clock Frequency 1 Hz -100 Hz, 100 Hz -10 KHz, 10 KHz - 1 MHZ, Logic Inputs Four switches for High/Low.


**BREAD BOARD TRAINER**

Output D.C. Voltage Fixed 5V ±1%, Output Current 2 Amp, Load Regulation ±1% of the highest specified output voltage, Clock Pulses 1 Hz and 1 KHz by manual pulser, Logic Inputs 8 switches for High/Low.

33514

**LOGIC GATES CIRCUIT TRAINER**

Ripple and Noise less than 5 mV, Clock Input Device Clock pulse of 1 second, Debounced Logic Switch 4 Input voltage of HI level ³ 2.25V, Input voltage of LO level 0.8V, 4Bit LED Ouptut Indicator Maximum input voltage less than or equal to 5V D.C.

33515

**ELECTRICITY TRAINER**

5V. 200 mA DC power Supply, 12V. 200 mA DC power Supply, 6V, lA AC power Supply, 12V Relay, 80 Ohm Galvanometer Resistance, 1 Pole, 2 Way Toggle Type Switch.

33516

**ELECTRICITY LAB**

Switch SPDT, Switch DPDT, Push switch, Logic Switches 2 Push type, Relay 12V DC One change over, Buzzer/Electric Bell, Transformer Input 6-0-6V and Output 6-0-6V.

33517

**POWER ELECTRONICS LAB**

To study the characteristics of SCR and plot its V-I Characteristics, To study the Gate control characteristics of SCR and It's graph, To study the characteristics of UGT and calculate interbase resistance and intrinsic standoff ratio, To study the characteristics of MOSFET, To study the characteristics of IGBT, To study the characteristics of DIAC and plot its V-I Characteristics curve.

33519

**ELECTRICAL & ELECTRONIC SYSTEM TRAINER MASTER UNIT**

less overlay showing circuit & its connect ion tag numbers for easy connectivity, Connection through Sturdy 4mm Banana Sockets & Patch Cords, Hands on learning by constructing circuits using built in power bread board panel as well as optionally using Discrete component panel.

33528

**DIGITAL OVERLAY LEARNING SYSTEM**

Basic logic functions, Boolean algebra and simplification of logic equations, De Morgan's theorem, TTL NAND/NOR gates definitions and operation, NAND/NOR gates definitions and operation, The exclusive-OR and its applications, The full-adder and full-subtractor, The bistable or flip-flop (FF).

33529

**ANALOG OVERLAY LEARNING SYSTEM**

To Study Light Emitting Diodes in DC Circuits, To Study Silicon Diodes in Half Wave Rectification, To Study Silicon Diodes in Full Wave Rectification, To Study use of a Diode Bridge in DC Circuits, To Study use of a Diode Bridge in AC Circuits, To Study Filtering and Regulation of a Pulsating DC Voltage.

33530

**CIRCUIT DEVELOPMENT PLATFORM**

Unique solder-less large size, spring loaded breadboard consisting of two Terminal Strips with 640 tie points and 2 Distribution Strips with 100 tie points each, totaling to 840 tie points, Input for positive or negative pulse triggering from external source.

33534

**ANALOG COMPUTER**

Computer assisted Training through use of Lab view based executables, optionally supported by variety of virtual instrumentation like toggle switches, LEDs, DMM, CRO etc. interface through USB IO module, Emphasis on troubleshooting skill through fault switches, locate hidden the experiment panels.

40501

**AMPLITUDE MODULATION & DEMODULATION TRAINER**

To study Temperature / Fire alarm, To s To observe the carrier waveforms on C.R.O, To modulate carrier with audio signal and to observe waveforms on C.R.O, To measure percentage modulation of the amplitude modulated waveform.

40502

**FREQUENCY MODULATION & DEMODULATION TRAINER**

To observe the effect of D.C. voltage on frequency of carrier waveform, To frequency modulate the carrier with Audio signal, observe F.M. waveform on C.R.O., and measure its modulation index, To demodulate the F.M. singal and observe the output on C.R.O.

40503

**PULSE AMPLITUDE MODULATION & DEMODULATION (PAM) TRAINER**

To demonstrate sampling of a sine wave audio signal thereby converting it into Pulse Amplitude Modulated Signal (PAM), To demonstrate demodulation of PAM signal thereby recovering the sine wave audio signal, To demonstrate the effect of sampling-rate on the distortion in recovered sine wave audio signal.

40504

**PULSE WIDTH MODULATION & DEMODULATION (PWM) TRAINER**

To modulate a pulse carrier with sinusoidal signal to obtain a Pulse Width Modulated signal, To demodulate the Pulse Width Modulated signal to obtain the modulating signal.

40505

**PULSE POSITION MODULATION & DEMODULATION (PPM) TRAINER**

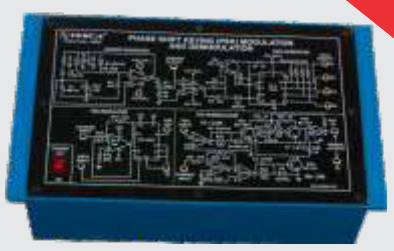
To modulate a pulse train (carrier) with a sinusoidal signal and to obtain a Pulse Position Modulated signal, To demodulate a Pulse Position Modulated signal to recover the modulating signal.

40506

**(FSK) MODULATION & DEMODULATION TRAINER**

Study of NOT, OR, AND, NOR, NAND, EX-OR, EX-NOR gates, Study and verifications of the law of Boolean algebra and De-Morgan's Theorems, Study of important TTL terminologies, Verification of important TTL Circuit parameters.

40507



**PHASE SHIFT KEYING MODULATION AND DEMODULATION (PSK) TRAINER**

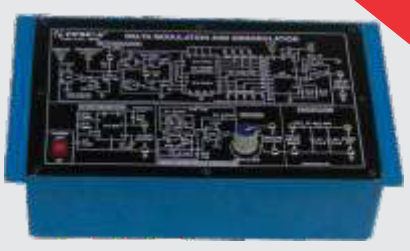
To study the generation of the Phase Shift Keyed output and also to demodulate the PSK output, ± 5V D.C. at 100mA IC regulated power supply internally connected.

40508

**AMPLITUDE SHIFT KEY MODULATION AND DEMODULATION (ASK) TRAINER**

To study the generation of the Amplitude Shift Key output and also to demodulate the ASK output, Binary Counter (Divided by 16 counter), Carrier Signal Generator 4 to 10KHz, Amplitude Shift Key (ASK) Modulator.

40509



**DELTA MODULATION & DEMODULATION TRAINER**

To study delta modulation and demodulation, Quad Op-Amp IC, Two Up/Down counter IC, Digital to Analog convertor DAC IC, The unit is operative on 230V ±10% at 50Hz A.C. Mains.

40510

**TRANSMISSION LINE TRAINER**

Measuring the characteristics of a line, Measuring the attenuation of a line, Measuring the Input Impedance of the line, Phase displacement between the current & voltage at input of line, Frequency characteristic of the line.

40511

**DIGITAL TIME DIVISION MULTIPLEXING TRAINER**

To study Digital Time Division Multiplexing & Demultiplexing, The unit is operative on 230V ±10% at 50Hz A.C. Mains, Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length ½ metre.

40512

**(PCM) TRAINER**

To study Pulse Code Modulation & Demodulation, Data display with LED's. Adequate no. of other electronic components, Mains ON/OFF switch, fuse and jewel light, The unit is operative on 230V ±10% at 50Hz A.C. Mains.

40513

**ANALOG SIGNAL SAMPLING & RECONSTRUCTION TRAINER**

To generate PAM signal by modulating with audio signal by natural sampling, To generate PAM signal by modulating with audio signal by Flat-Top sampling, To generate PAM signal by modulating with audio signal by Sample / Hold circuit, To demodulate using Low Pass Filter to reconstruct input(sine wave).

40514

**DIFFERENTIAL PULSE CODE MODULATION & DEMODULATION TRAINER**

To study Differential Pulse Code Modulation & Demodulation, Audio Frequency Oscillator 10Hz to 100Hz for modulation, DPCM Modulator (DPCM ENCODER), DPCM Demodulator (DPCM DECODER).

40515

**DIFFERENTIAL PHASE SHIFT KEYING MODULATION & DEMODULATION (DPSK) TRAINER**

To study Differential Phase Shift Keying Modulation and Demodulation, IC-2 B & C, IC-3 C & D, IC-4 D-FF2 and Transistor 2, 3 & 4 are used as Demodulator, Adequate no. of other electronic components, Mains ON/OFF switch, fuse and jewel light.

40516

**DSB / SSB AMPLITUDE MODULATION & DEMODULATION TRAINER**

To Study of Amplitude Modulation & Demodulation, Generate AM signal by modulation with audio signal generator. Measure modulation index of A.M. signal, Demodulate AM signal using diode detector(envelope detector), Generate voice signal AM modulation and demodulation using Mic.

40517

**DSB / SSB AM TRANSMITTER TRAINER**

Study of carrier frequency generation, Study of DSB / SSB AM Generation & Transmission, Study of Transmitter tuned circuits, Modulators (Two Nos) : Double Balanced Amplitude modulator, Ceramic Band Pass Filter 452 KHz to 458 Khz.

40518

**DSB / SSB AM RECEIVER TRAINER**

Study of DSB & SSB AM reception & deletion by diode / product detectors, Study of AGC, Study of receiver tuned circuits, Study of Sensitivity, Selectivity & Fidelity of Receiver.

40519

### ADVANCED FREQUENCY MODULATION & DEMODULATION TRAINER

To Study Frequency Modulation via varactor / reactance Modulation, To Study Frequency Demodulation via Detuned Resonant / Ratio / Qudrature / Foster - Seeley / Phase locked loop detector, To Study Separate VCO circuit to demonstrate FM waveform.

40520

### DSB/SSB AM TRANSMITTER TRAINER

Study of carrier frequency generation, Study of DSB & SSB AM generation & Transmission, Study of Transmitter tuned circuits, Study of Modulation index.

40521

### DSB/SSB AM RECEIVER TRAINER

Study of DSB & SSB AM reception & detection by, diode / product detectors. Study of AGC, Study of Receiver tuned circuits, Study of Sensitivity, Selectivity & Fidelity of Receiver.

40522

### FREQUENCY MODULATION/DEMODULATION TRAINER

Study of 2 types of FM modulators & 5 different types of demodulators, Effect of noise on FM transmission & Study of tuned circuits, Separate VCO circuit to demonstrate FM Waveforms.

40523

### FM COMMUNICATION TRAINER

To Study Frequency deviation and modulation index, To Study Marker insertion to evaluate frequency deviation, To Study Spectrum of FM signal, To Study FM demodulation (PLL Detector).

40524


### NOISE-AUDIO AMPLIFIER TRAINER

Examine the operation of a noise generator, Examine the operation of a signal attenuation network, Measurement of the frequency response and power output.

40525

### SYNCHRO AM DETECTOR

Study and observe the working of Amplitude Modulator, Study and observe frequency of Synchronous detector, A self contained learning platform, Functional blocks indicated on board mimic, On board modulator and demodulator.

40526

### FDM TRAINER

Study of Frequency Division Multiplexing / Demultiplexing with sinusoidal & audio inputs, Study of Fourier Spectrum of FDM, Study of DSBSC modulation / Demodulation, Study of Fourier Transform of DSBSC Modulation.

40527

### SAMPLING & RECONSTRUCTION TRAINER

Study of Signal Sampling and Reconstruction Technique, Study of Nyquist criteria for sampling & reconstruction, Study of Aliasing & Effect on Reconstruction of Signal due to various Sampling Frequencies, Study of Effect on Amplitude of Reconstructed signal by varying Sampling.

40528

**TDM PULSE AMPLITUDE MODULATION AND DEMODULATION TRAINER**

To Study Pulse Amplitude Modulation technique, To Study Time Division Multiplexing and Demultiplexing, To Study PLL as Frequency Multiplier to generate clock from sync signal.

40529

**TDM PULSE CODE MODULATION AND TRANSMITTER TRAINER**

To Study Pulse Code Modulation, To Study A/D Converter, Parallel to Serial Data conversion, To Study Time Division Multiplexing of PCM Data, To Study Synchronization by Pseudo random Code, To Study Error Check Codes with switched faults.

40530

**TDM PULSE CODE MODULATION RECEIVER TRAINER**

To Study PCM Demodulation Technique, To Study Time Division Demultiplexing of PCM data, To Study Clock Regeneration by PLL, To Study Effect of induced faults in the transmitter & receiver, To Study Signal recovery in 3 connecting modes between transmitter & receiver.

40531

**DELTA, ADAPTIVE DELTA AND DELTA SIGMA MODULATION / DEMODULATION TRAINER**

Delta Modulation & Demodulation, Effect of slope overload and increased integrator gain in Delta Modulation, Transmitter and Receiver on same board, Clock generation from crystal, Switch selectable sampling rates.

40536

**PAM-PPM-PWM MODULATION & DEMODULATION TRAINER**

PAM-PPM-PWM Modulation & Demodulation techniques, using Natural & Flat-top sampling, Analog Sample, Sample & Hold and Flat-top outputs, Selectable 4 different sampling pulse frequencies on board, Input-output and test points provided on board.

40539

**DIFFERENTIAL PULSE CODE MODULATION(DPCM) TRAINER**

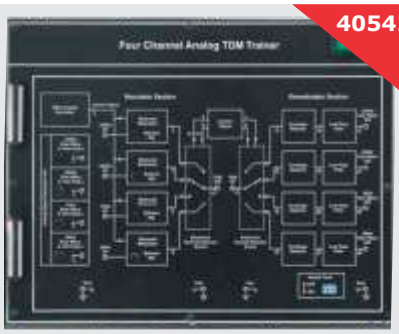
Onboard DPCM Transmitter and receiver, Onboard Signal generator block, Onboard Audio input processing circuit, Onboard audio output processing circuit, Clock and entire control Signal section.

40541

**MSK MODULATION/DEMODULATION TRAINER**

Self contained and easy to use, Functional blocks indicated on board mimic On board Data Generator, On board Carrier Generator, On board clock generators, MSK Modulator, MSK Demodulator.

40542



**FOUR CHANNEL ANALOG TDM TRAINER**

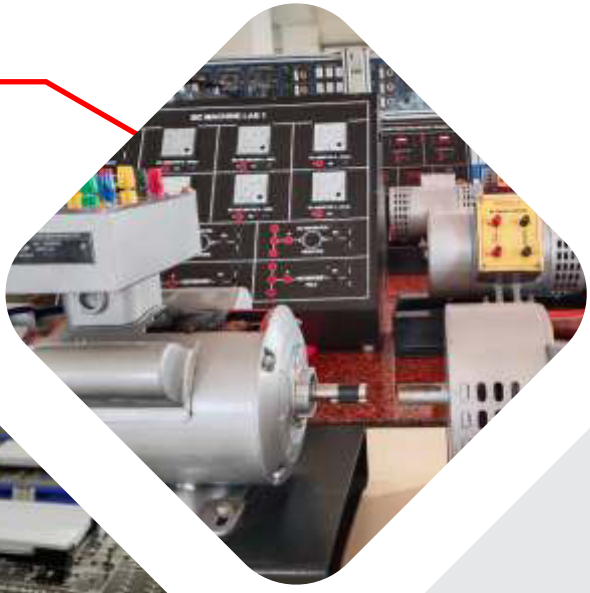
Study of DSB & DSBSC AM generation. Study of Time division multiplexing & demultiplexing of analog signals, Study of the effect of induced faults, Study of carrier frequency generation, Study of DSB & DSBSC AM reception & detection by Envelope detectors.

40543

**BASIC CDMA TRAINER**

To study theory of CDMA DSSS modulation & Demodulation, To generate CDMA-DSSS signal, To demodulate CDMA-DSSS signal using BPSK, To study pseudo random bit sequence generation.


**CDMA - DSSS/FHSS TRAINER**
Study of Data and PN Sequence Generation, Study of Direct Sequence Spread Spectrum (DSSS) Based Modulation, Study of Demodulation of DSSS Modulation, Study of Generation of PN Sequence, To Study Generation of FHSS Modulation Signal, Demodulation of FHSS Modulation.



Iraq Shipment 2023

# Shipments


**PC BASED 32 CHANNEL LOGIC ANALYZER: 250MHZ, 256K MEMORY, 2 TRIGGER LEVELS (EXPANDABLE TO 64 CHANNELS)**
High sampling (Up to 250M Sa/s), 32 data input channels, Data buffer (up to 256K samples per channel), High data bandwidth of 125MHz, Connects to Desktop PC or Notebook via USB Interface (Version 1.1/2.0).

Greece Shipment 2023

Rwanda Shipment 2023


**BASIC GSM TRAINER**
GSM 900 / 1800, E - GSM, Asynchronous, Transparent GSM data services, Transparent modes 14.4 kbits/s, 3 V SIM Interface, 63 dB Dynamic range.


**OPTIONAL APPLICATION MODULE FOR BASIC GSM TRAINER**
4"Scienterminal" software tool, Description / Explanation / Visualization of the AT commands on one screen, Study of GSM real time working fundamentals, Appliances switching by SMS using AT commands.


**ISDN TRAINER WITH POWER SUPPLY**
To Study Star, Ring, Bus Topology, To Study 5 Port Hub, To Study 4 port ADSL connection with router, To Study WLAN access, To Study Access point creation.

40554

**DATA COMMUNICATION TRAINER**

Study of Synchronous Serial Communication, Study of Asynchronous Serial Communication, Study of PC-PC Serial Communication using RS-232 cable, Study of different Modem used in Serial Communication.

40555

**LAN TRAINER**

Study & implementation of cable designs in networking, Implementation of PC to PC with IEEE 802.3, Implementation of Star topology using 100BaseTx, Implementation of Bus topology using 10Base2, Implementation of Ring topology using Db9, Implementation of Peer to Peer network.

40555A

**LOCAL AREA NETWORK TRAINER**

Study of network topologies, Study of Ethernet LAN and Wireless LAN, Study of data encryption and decryption, Implementation and study of stop and wait protocol, Implementation and study of go back to n protocol.

40555B

**LAN NETWORK TRAINER**

Study the working of PC to PC Communication, Study the working of Bus Topology, Study the working of Star Topology, Study the working of Wireless Communication, Study the working different protocols such as Stop and wait, Go back n, Selective repeat and sliding window.

40556

**LAN TRAINER**

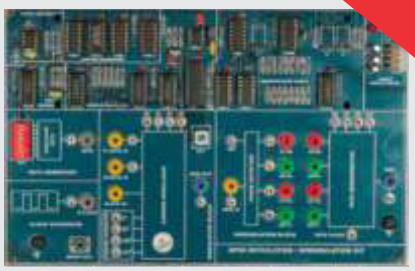
Three sets of onboard cabling setup for Ethernet, On board parallel port direct cable connection setup, On board serial port direct cable connection setup, A 10 mbps hub is provided onboard with the circuitry exposed, The power supply circuit for Hub is provided onboard.

40557

**ADVANCED COMMUNICATION SYSTEM TRAINER**

To Study DC Characteristics of transmitter diodes, To Study Sensitivity of Optical Fiber, To Study AC Frequency Response - Analog Link & B.W, To Study Digital Frequency Response - Digital Link & B.W, To Study Numerical Aperture, To Study Losses in cable.

40611



**QPSK MODULATION/DEMODULATION TRAINER**

All interconnections are made using 2mm banana Patch cords, Test points are provided to analyze signals at various points, All Ics are mounted on IC Sockets, Bare board Tested Glass Epoxy SMOBC PCB is used.

40612

**TDM PULSE AMPLITUDE MODULATION/DEMODULATION TRAINER**

Study of Time Division Multiplexing and Demultiplexing using Pulse Amplitude modulation and demodulation, Study of TDM Pulse Amplitude modulation and demodulation With Channel Identification Information, Study of TDM Pulse Amplitude modulation and demodulation using PLL method.

40613

**TDM PULSE CODE MODULATION TRAINER**

Study of Pulse Code Modulation, To study the principles of Analog to Digital and Digital to Analog Conversion, Study of Pseudo Random Sequences, Study of Error Check Code Logic None Parity Coding, Odd Parity Coding, Even Parity Coding, Hamming Coding.


**TDM PULSE CODE DEMODULATION TRAINER**

Study of Pulse Code Demodulation, Study of Error Check Code Logic - None Parity Coding, Odd Parity Coding, Even Parity Coding, Hamming Coding, Study of Synchronization techniques using PLL, Study of effect of faults in Modulation & Demodulation Techniques.


**DELTA/ADAPTIVE DELTA MODULATION/DEMODULATION TRAINER**

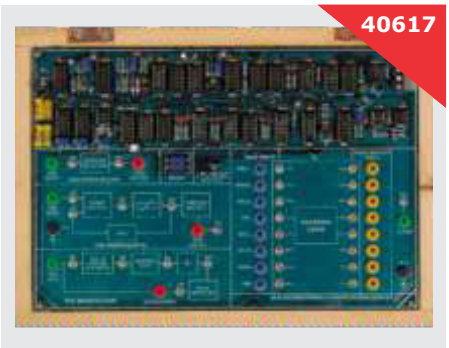
Study of delta modulation and delta demodulation, Study of Slope Overload and Increased Integration Gain in Delta Modulation, Study of Adaptive Delta modulation and CVSD, Study of companding systems, Study Voice modulation and Demodulation (Delta).


**DATA CONDITIONING TRAINER**

Study of Data Coding and Decoding Techniques for Non return to Zero Format, Study of Data Coding and Decoding Techniques for Phase Encoded Format, Study of Data Coding and Decoding Techniques for Return to Zero Format and Multilevel binary format, Study of Amplitude Shift Keying Modulation Techniques.


**LINE CODING & DECODING KIT**

Study of Data Coding and Decoding, All interconnections are made using 2mm banana Patch cords, Techniques for Non-return to Zero Format, Study of Data Coding and Decoding, Techniques for Phase Encoded Format, Study of Data Coding and Decoding Techniques for Return to Zero Format and Multilevel binary format.




**DATA RECONDITIONING TRAINER**

Study of different Data formats to NRZ-L Format, Study of Amplitude Shift Keying Demodulation Techniques, Study of Frequency Shift Keying Demodulation Techniques, Study of Phase Shift Keying Demodulation Techniques.


**FDM TRAINER**

Study of Carrier Frequency Generation, Study of DSBAM Generation Circuit, Study of DSBAM Demodulation Circuit, Study of Generation of Frequency Division Multiplexer signal, Study of Generation of Frequency Division De-multiplexer signal.


**SYNCHRO AM DETECTOR**

Study and observe the working of Amplitude Modulator, Study and observe frequency of Synchronous detector, A self contained learning platform, Functional blocks indicated on board mimic, On board modulator and demodulator.


**BPSK/DEPSK/DPSK MODULATION/DEMODULATION TRAINER**

Study of Frequency Division Multiplexing / Demultiplexing with sinusoidal & audio inputs, Study of Fourier Spectrum of FDM, Study of DSBSC modulation / Demodulation, Study of Fourier Transform of DSBSC Modulation.


**QPSK/DQPSK DEMODULATION TRAINER**

List of experiments are same for both 40620 and 40621, 40620 and 40621 are combined to perform the experiments, Receiver Clock generated by PLL method, Switch faults are provided to study its effects on circuits.

40622

**BASE BAND TRANSMISSION/RECEPTION TRAINER**

Study of pulse amplitude modulation of digital data for base band transmission, Study of data extraction and recovery in base band digital transmission, Study of transmission and reception of band limited pulse train in base band digital transmission system, Study of eye pattern.

40623

**QAM/DQAM MODULATION TRAINER**

To study the elements of 8-QAM / DQAM system, Tribit coding technique of NRZ-L data format, Differential Encoding of Data, 8-QAM Modulation technique, DQAM Modulation technique, To study of constellation Diagram of QAM.

40624

**QAM/DQAM DEMODULATION TRAINER**

To study Tribit decoding technique, To study Differential decoding of Data, Observation of constellation diagram, To study bandwidth efficiency of 8-QAM/DAQM, To study 8-QAM Demodulation technique, To study DQAM Demodulation technique.

40625

**DPCM/ADPCM MODULATION/DEMDULATION TRAINER**

To study DPCM modulation and Demodulation, To study ADPCM modulation Demodulation, To study Quantization Error, To study voice communication for DPCM / ADPCM.

40626

**MSK MODULATION/DEMODULATION TRAINER**

On Board synchronized RF carrier signal generators with frequencies of 120 KHz, 200 Khz, All interconnections are made using 2mm banana Patch cords, Bare board Tested Glass Epoxy PCB is used, Set of 2mm Patch cords for interconnections.

40627

**CRC CODE/DECODE TRAINER**

8 bit Digital Data generator to generate any binary input word, Selection of Data using 8-way DIP Switch, One LED indicator to indicate Power input, CRC Encoder/ Transmitter Circuit for 16 bits CRC Polynomials, CRC Decoder/ Receiver Circuit for 16 bits CRC Polynomials, Data Receiver Circuit for 8 Data bits.

40628

**DATA COMMUNICATION TRAINER**

Study of Serial and Parallel Port, Study of Serial Communication, Study of flow controls in Serial Communication, Study of Protocols in Serial Communication, Study of Fibre optic Communication, Study of Modem Communication, Study of Wire less Communication.

40628A

**GPS TRAINER KIT**

Study of satellite azimuth and elevation window using sky plot, Geographical location with (GMT/IST) with navigation window, To study geographical position using survey plotting, Study of NEMA received sentences using trace window.

40629

**GSM TRAINER**

Study of GSM technology, Getting started with GSM trainer, Study of GSM MODEM and it's components, Voice communication using AT commands, Sending text message using AT Commands, Study of SIM, Introduction to AT commands, Data communication using AT commands.

40629A

**4G GSM TRAINER**

Study of GSM technology, Getting started with GSM trainer, Study of GSM MODEM and it's components, Study of SIM, Introduction to AT commands, Voice communication using AT commands.

40630

**ASK, FSK, BPSK, DBPSK, MODULATION & DE-MODULATION**

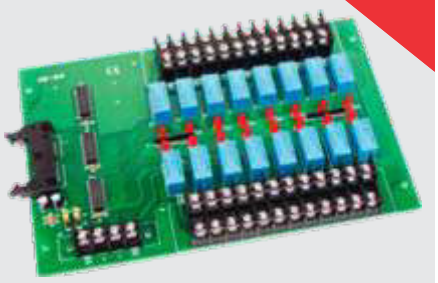
Study and analysis of Amplitude Shift Keying Modulation and Demodulation, Study and analysis of Integrator and Comparator block, Study and analysis of Differential encoder and decoder, Study and analysis of Differential Binary Phase Shift Keying Modulation and Demodulation.

40631

**16 BIT PCI DAS CARD**

The 40631 card has a universal PCI interface supporting both 3.3 V and 5 V PCI bus, This card features a continuous, 250 k Samples/Sec 16-bit resolution A/D converter, 8 K samples hardware FIFO, 2-ch 16-bit D/A converter, 32-ch programmable digital I/O and DO read back.

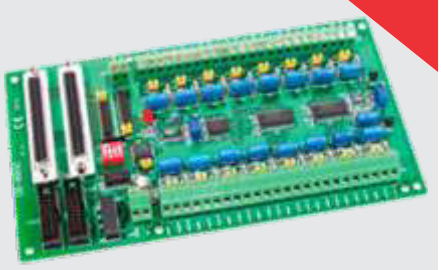
40632



**16 CHANNEL RELAY OUTPUT BOARD**

The 40632 16 channel Relay Output Board consists of 16 form c relays for efficient switch of load by programmed control, It is connector and functionally compatible with 785 series board but with industrial type terminal block.

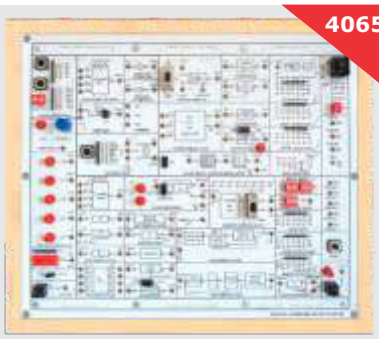
40633



**16 CHANNEL MULTIPLEXER BOARD**

The 40633 is an expansion multiplexer/ amplifier board for use with 82X, 1800 series 818 families, Each 40633 multiplexes 16 differential analog input channels into one analog input of the DAS board, The high grade instrumentation provides software programmable gains of 0.5 ,1,5 ,10,50, 100, 500,and 1000.

40651



**VLSI BASED ADVANCE DIGITAL COMMUNICATION TRAINING SYSTEM**

Study of Carrier Frequency Generation, Study of DSBAM Generation Circuit, Study of DSBAM Demodulation Circuit, Study of Generation of Frequency Division Multiplexer signal, Study of Generation of Frequency Division De-multiplexer signal.

40652

**ADVANCED DIGITAL COMMUNICATION TRAINING SYSTEM**

Study of BPSK modulation and demodulation, Study of transmission and reception of band limited pulse train in base band transmission system, Measurement of bit error rate using digital data, Study of DPCM modulation and demodulation.

40653

**SOFTWARE DEFINED RADIO PRINCIPLE OF COMMUNICATION ENGINEERING CONSISING OF SDR HARDWARE (350 MHz TO 3.5GHz)**

Single-core ARM® Cortex™-A9 MPCore™ @ 667 MHZ, Streams up to 4MSPS with no dropped samples, Quad-core 64-bit @ 1.4GHz, Orthogonal Frequency Division Multi plexing (OFDM) Modulation.

40681

**AMPLITUDE MODULATION TRANSMITTER KIT**

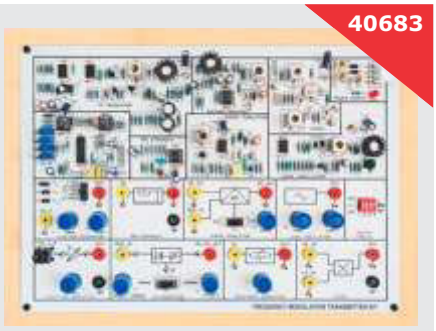
Study of double side band AM generator, Study of single side band AM generator, Study of adjustment of transmitter tuned circuits, Voice transmission with DSB/SSB AM transmission.

40682

**AMPLITUDE DEMODULATION RECEIVER KIT**

Study of DSB, SSB reception using envelope diode detector and product detector, Study of image frequencies, Study of adjustment of receiver tuned circuits, Voice reception using DSB/ SSB AM receiver (super heterodyne receiver).

40683



**FREQUENCY MODULATION TRANSMITTER KIT**

Study of varactor modulator, Study of frequency modulation via phase modulator, Study of phase modulation, Voice transmission on various modulation methods, Effect of switch faults.

40684

**FREQUENCY DEMODULATION RECEIVER KIT**

Study of FM demodulators, Foster seely detector, Ratio detector, Quadrature detector Phase locked loop detector, Study of phase demodulator, Voice reception on various demodulation methods.

40685

**NOISE POWER SPECTRAL DENSITY MEASUREMENT KIT**

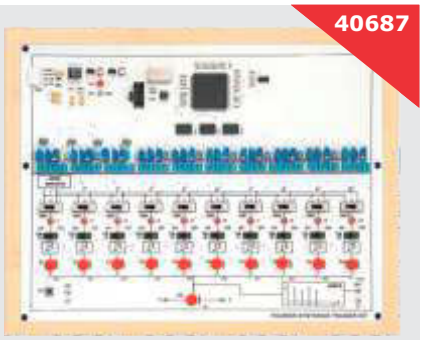
To observe the effect of noise on various analog systems, To calculate signal to noise ratio, To calculate noise figure, To calculate noise power and noise power spectral density, To study the effects of low pass filter on noisy signal, To study the effects of switch faults.

40686

**FDM TRANSMITTER / RECEIVER KIT**

To study frequency response of band pass filters, Study of DSB modulation, To study the operation of frequency division multiplexing, Study of DSB demodulation, To study the operation of frequency division demultiplexing, To study the effects of out of band signaling, To study effect of switch faults.

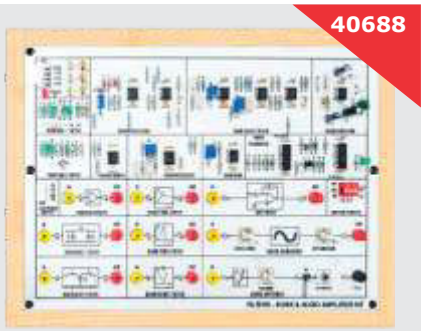
40687



**FOURIER SYNTHESIS KIT**

To study square wave synthesis, To study triangular wave synthesis, To study saw-tooth wave synthesis, To study AM wave synthesis.

40688



**FILTERS/NOISE AND AUDIO AMPLIFIER KIT**

Examine the operation of a noise generator, Examine the operation of a signal attenuation network, Measurement of S/N ratio, Measurement of noise figure, Measurement of the frequency response and power output of an audio amplifier.

40689

Transmitter Recieveer

**ANALOG COMMUNICATION TRAINING SYSTEM**

The System is completely self-contained with all required Modulating Signals, Carriers generated on Board and the students can connect respective functional blocks using patch-chord to build their required Modulation / Receiver Scheme.


**TELEPHONE TRAINER**

Understanding of telephone, Study of telephone features, Study of speech circuit, Study of ringer, Study of tone dialing, Study of pulse dialing, Study of switching mechanism between subscriber.


**PA (PUBLIC ADDRESS) SYSTEM TRAINER**

To study the circuit & operation of a PA system and observe various intermediate waveforms, The complete circuit of a public address amplifier is printed on a single PCB, All part are soldered on PCB, Explanation, Observation, Alignment and adjustment of internal and external control possible due to single PCB.


**GSM MOBILE PHONE TRAINER**

Study of Transmitted/Received RF signals, Study and observe signal constellation of GMSK signal (Tx I/Q), Study of switch faults in Battery section, Study and observe signals of LCD display section, Study of switch faults in LCD display section.


**4G MOBILE PHONE TRAINER**

To study the 4G Smart Phone Trainers, Study of Block Diagram of the trainer, Working of 4G Smart Phone Trainer, Charging of 4G Smart Phone Trainer, Voltages and signals at different test points.


**DVD-VCD-CD TRAINER**

The complete circuit of a CD/VCD player is printed on a single P.C.B., The digital signal processing section is in assembled open out P.C.B., Explanation, Observation, Alignment and adjustment of Internal and external possible due to single P.C.B., Easy identification of different parts and Mechanism at a glance.


**AM / FM RADIO TRAINER**

To Study AM Radio Reciecer, To Study FM Radio Reciever, 520 KHz – 1620 KHz Tuning Range, 455 KHZ IF Frequency, 3 db from 700 KHz to 1400 KHz Tracking, 10 db Signal to Noise at 200 microvolt typical, Uses Ratio detector and full time auto frequency control, 10 db Signal to Noise at 12 microvolt typical.


**MULTIMEDIA COMPUTER TRAINER**

The Different circuit boards of PC/AT Computer are exposed on a PCB, Troubleshooting and fault finding procedure explained in details, Artificial fault creation facilities are provided by the switches, About more than 60 faults can be demonstrated at a glance.


**LAPTOP TRAINER**

Study of Switching Transformer, Study of PWM switching device, Study of Optocoupler, Study of Regulation, Study of SMPS with Variac input.


**COLOUR TV TRAINER 36 CM**

Study of RF-Section through test points, fault simulation & rectification, Study of VIF- section through test point, fault simulation & rectification, Study of Video/Chroma section through test points, fault simulation & rectification, Study of System Control Section through test points, faults simulation & rectification.

10908

**COLOUR TV TRAINER 51 CM**

Study of RF-Section through test points, fault simulation & rectification, Study of VIF-section through test point, fault simulation & rectification, Study of circuit of Horizontal & Vertical Oscillator & Output sections, Study of circuit of Horizontal & Vertical output sections through test points fault simulation & rectification, Study of RGB video output Section.

10909

**OSCILLOSCOPE/ DEMONSTRATOR TRAINER**

Amplifier, Time base, Channel section signal available on test points, Separate sections for PS, EHT, VA, HA, TB & Trigger for easy identification, Fault creation & rectification provided, Track printing with different colours on different sections on component board for easy circuit training.

10911

**FACSIMILE DYNAMIC DEMONSTRATOR**

Facsimile Demonstrator is a complete educational system designed to give a clear accurate and realistic in-sight into the working of the Fax Trainer, This trainer is designed on CAD system.

10912

**POWER SUPPLY TRAINER**

Study of Transformers and its working, Study of Two diode Full Wave Rectifier, Study of Full Wave Bridge Rectifier, Study of Demonstration Bridge, Study of Ripple Factor and to calculate Ripple Factor of Half Wave, Full Wave and Bridge Rectifier, Study of LC and ð filter, Study of Bleeder Resistor and its effect on load current.

10913

**SMPS TRAINER**

Study of Switching Transformer, Study of PWM switching device, Study of Optocoupler, Study of Regulation, Study of SMPS with Variac input, Study of various faults and their removal in SMPS circuit.

10914

**UPS TRAINER**

Study of PWM Technology, To understand the overall functioning of UPS Trainer, Study of AVR transformer section of UPS, To study the UPS circuit in load condition, To identify different faults and to study the systematic procedure of their troubleshooting in UPS circuit, To study Temperature / Fire alarm.

10915

**FUNCTION GENERATOR TRAINER**

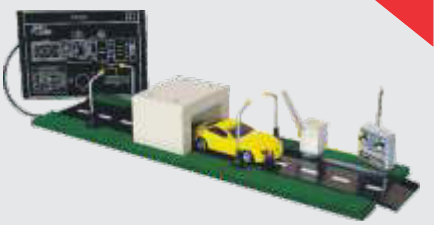
Study of Electrical Waveforms generated by Function Generator, Study of Triangular Waveform Generation, Study of Sinusoidal Waveform Generation, Study of Square Waveform Generation, Study of Duty Cycle of Square Waveform, Study of TTL Waveform Generation.

10916

**FREQUENCY COUNTER TRAINER**

Study of Frequency Counter, Study of Attenuator Circuit, Study of Wave Shaping Circuit, Study of Frequency Divider Circuit, Study of Frequency Counter and Display Driver Circuit, Study of Gate Time Circuit, Study of Sensitivity of Frequency Counter.

10917



**RFID TRAINER**

Highly integrated analog circuitry to Demodulate, Decode and Respond, 3.56 MHz multi protocol support, Provided with LCD and software, RS-232 Interface, On board LED Indication. On board Buzzer indication.


**ATM TRAINER**

Study of ATM Demonstrator operation, Study of Micro controller based ATM card, Study of Microcontroller processing with Keypad and LCD, Study of ATM PC interfacing, Study of ATM Application Software.


**BLUETOOTH TECHNOLOGY TRAINER**

Study the functioning of Bluetooth Trainer, Pairing of Slave unit with Master unit using software, Study of AT commands, Data Communication using UART, Data Communication using USB. Study of Communication using internal data, Study of RF signals.


**INVERTER TRAINER**

To understand the function of Inverter Trainer, To understand the function of Inverter in presence of main supply and understand the charging of battery, To understand the working of Relay, To study the AC Mains sensing circuit of Inverter, To study the Inverter circuit.


**INVERTER TRAINER**

Study of PWM Technology, To understand the overall functioning of Inverter Trainer, Study of AVR transformer section of Inverter, To study the Inverter circuit in load condition, To identify different faults and to study the systematic procedure of their troubleshooting in Inverter circuit.


**BAR CODE TECHNOLOGY TRAINER**

To Understand the working of Barcode Trainer, To study the conversion of Light into an Electrical signal, To understand the scanned output of ADC Barcode signal, To study Digital Signal Processing Block, To understand the generation of Barcodes, To understand commercial applications of Barcode.


**REFRIGERATION TRAINER**

To study the Simple Vapour Compression Refrigeration System (SVCR), To calculate the Co-efficient of Performance (C.O.P), To calculate the power consumption of the compressor.


**BERNOULLI'S THEOREM TRAINER**

To verify Bernoulli's Theorem, To observe (visually) types of flow (laminar or turbulent) and calculation of Reynolds Number.

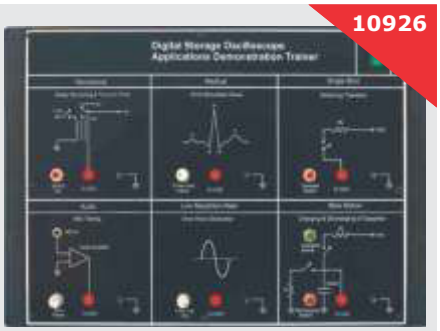

**SMD TECHNOLOGY TRAINER**

SMD Identification Board The user is familiarized with different SMD Components -Resistors, Capacitors, Inductors, Diodes, Transistors & IC's packages, Proto BOARDS are special PCB's with readymade solder pads for various SMD components & IC's, which makes the soldering much easy, SMD Soldering Jig.


**SPECTRUM APPLICATION DEMONSTRATOR TRAINER**

The manual describes 18 experiments that can be performed with this trainer and Spectrum Analyzer, All experiments are housed in a single attractive box which is self contained, ready to use having built- in DC power supplies.

10926



**DSO DEMONSTRATOR TRAINER**

Switching transient of a push to on switch is demonstrated, Charging and discharging of an electrolytic capacitor, ECG Simulated wave with pulse rate adjustment, Sine wave generator of low frequency, Relay bouncing and turn ON time, MIC Testing with variable gain audio amplifier.

10927

**TAPE RECORDER TRAINER**

Compact design, Fault creation and diagnosis, 42 Test Points, More than 15 faults can be demonstrated on this trainer, No soldering and de-soldering is required to simulate faults, The main IC's are provided on socket to provide a facility to check similar IC' and also to create the faults by inserting faulty IC's in the sockets.

10928

**EPABX TRAINER**

Generation of various Tones Dial, Tone, Busy Tone, Ring Back Tone, Measurement of Ring generation, Study & Analysis of Cross point Space Division switching, Study & Analysis of Manual switching, Analysis of Pulse / DTMF dialing from telephone, Measurement of Relay & Ring control signals.

10929

**FM STEREO TRAINER**

A self contained trainer with built in power supply, Functional block indicated on board mimic, Various test points provided on board, Switch fault are provided to study different effects on circuit, Operation manual provided, Complete FM Stereo Receiver with on board stereo, Signal (LED) indicator, Capable of receiving signal between 88 to 108 Mhz.

10930

**VCD PLAYER TRAINER**

Manual and remote control operation, * Video CD 1.1 and 2.0 and Audio CD Compatible 31 Test points, MP-3 Audio playback, NTSC/PAL formats, Composite video and RF output, PLL Based clock synthesizer (27 MHZ), Operating manual with test point details and fault diagnose.

10934

**RFID TRAINER**

Software for understanding/working on Applications, Demo, Product Videos, Contactless RFID Reader at 13.56 MHz with 6cm range, Can be used for Active RFID tags, Read/Write ISO 14443A protocol Mifare 1K memory RFID cards, 16 x 2 LCD Display with 89C51 Micro controller, On board Breadboard with 840 tie points for designing other applications.

10935

**ELEVATOR TRAINING SET**

It is composed of the floor, has car, stroke limit institutions, call light, car door, control panel, control motor, sensor, actuator, etc, Electrical aspects is composed of dc reducer motor and sensors, limit switch, light, etc, Configure configuration software, and provide application guidance and application engineering example.

10936

**THREE LEVEL ELEVATOR TRAINING SET**

Open and close control experiment, Second floors inside choose up and down, open close control experiment, Thirds floors inside choose up and down control experiment, Third floors outer call up and down, open and close control experiment, Third floors elevator comprehensive control experiment.

10937

**LED TV TRAINER**

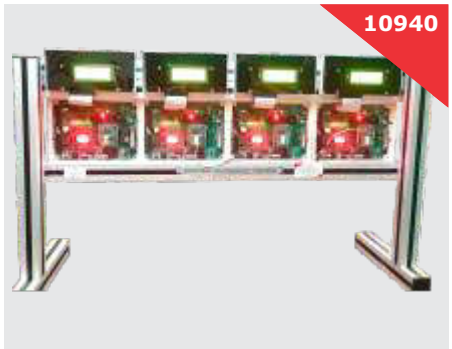
Study the specifications of full HD LED Television, Study the block diagram and operating principle of LED TV, Study the functions of front panel controls/ keys of LED TV, Study the functions of controls on Remote, Study of circuit description and functions of different sections.


**LED HD TV TRAINER - 24 INCH**

LED/HD TV kit Mounted in all open fashion on a PVC board, firmly supported on compact table top aluminium profile demo rack for easy viewing through transparent acrylic cover provided, LED/HD TV kit provided with the trainer is the latest one which based on modern Technology with remote control and not on any outdated ICs.


**GSM MOBILE TRAINER KIT**

SIM identification for getting self number, network name etc, Execution of AT commands via PC, Voice communication using AT commands, Study of text or PDU data formats & interface with modem, Network status intimation via AT commands, Read Message Delete Message on PC.




**BLUETOOTH WIRELESS TECHNOLOGY TRAINER**

Operating Freq. Band ISM 2.4Hz 2.48GHz, Modulation Method : Gaussian Freq. Shift Keying Output, Output Interface: UART, Serial UART speed up to 921 .6kbps, Bluetooth Specification : v2.0+EDR, Transmit Power Max. 18dBm, Receiving Sensitivity : 30dBm (0.1%BER), Compact size 27.5 X 30.0 X 14.0 (mm).


**ZIGBEE WIRELESS TECHNOLOGY TRAINER**

Operating Frequency Band ISM 2.4GHz, Indoor/Urban : Up to 133`(400m), Outdoor line-of- sight : up to 400`(120m), Transmit Power : 2mW ( 3dBm), Receiver Sensitivity, 95dBmRF Fata Rate:250,000bps, TX Current: 40mA (3.3V) RX Current : 40mA (3.3V).


**LOCAL AREA NETWORK TRAINER**

Set of Users Guide provided with each unit, Table top setup made using light but sturdy aluminum profile (4X2) Rack complete with cables connectors, Optionally external USB to RS232 Converter is Provided, One PC with serial required for monitoring or as user not in scope of supply, Useful for post Graduate projects and research purpose.


**PRINTER/SCANNER/FAX/ PHONE TRAINER**

Various components of the printer are made accessible to the students by spreading out on a cuboid demo rackmade from aluminum profile, Non-destructive simulated faults have been implemented through slider s witches located on Fault Panel to teach section wise faults & their troubleshooting.


**LED TV TRAINER**

To Study Specifications of HDTV, To Study the Block Diagram and working principle, To Study Input/output signals of different sections, To Study Complete circuit with different sections. To Study Remote Section, To understand/observe the function of external and Internal controls.


**SMPS TRAINER BOARD**

Study of Switching Transformer, Study of PWM switching device, Study of Optocoupler, Study of Regulation, Study of SMPS with Variac input.


**EPABX TRAINER**

Non-Blocking type tone dialling, Distinctive Ringing, Line Status Indication on the Exchange, Executive Telephone with special features, Control methods, Abbreviated Dialing, DTMF/ Pulse Dialing, Music on hold.

10947

**REFRIGERATION & AC TRAINER**

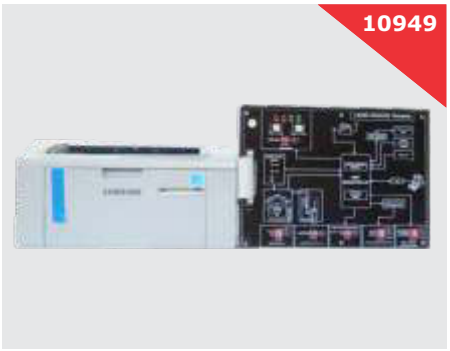
± 12V/500 mA, +5V/300mA, Unregulated 17V dc/750 mA, line Synchronizing signal, 13V / 3 Amp, Multi channel DPM for digital display of process parameters, 20pin FRC power bus to supply power to neighbouring panels.

10948


**DIGITAL SATELLITE RECEIVER TRAINER**

Introduction and basics of DTH System, Understanding various components of DTH receiver system, Study of various blocks of DTH system, Various types of fault creation and Troubleshooting, Study of working principale of DTH system.

10949



**LASER PRINTER TRAINER**

Study of Laser Printer based on ARM-9 Processor, To understand the overall functioning of Laser Printer, Study the section of Laser Printer, To identify different faults CRUM, Thermistor, Stepper Motor, Pickup Clutch, Feed Sensor, Width Sensor, Power Switch, Printer Switch and to study the troubleshooting in Laser Printer.

10950

**COPIER/SCANNER/LASER PRINTER TRAINER**

Study of Laser Printer based on ARM-11 Processor, To understand the overall functioning of Copy, Scan, Laser Printer. Study the section of Copy, Scan, Laser Printer, To identify different faults CRUM, Thermistor, Stepper Motor, Pickup Clutch, Feed Sensor, Width Sensor, Scanner, Stepper Motor, Scanner Sensor and to study the troubleshooting in Laser Printer.

10951

**WASHING MACHINE TRAINER**

To study of Fully Automatic Washing Machine, To study the different sections of Washing Machine, To identify different faults of Washing Machine like Buzzer, Pressure sensor, Drain Actuator, Feed Valve Safety Lid sensor, Motor clock wise and Motor anticlockwise, To study the Functions of Keypad like Power On Start/ Hold, Process, Program and Water Level.

10952

**CCTV TRAINER**

Display : 9"Diagonal Size ,Flat panel LED/LCD display, Analog Video Input : RGB VGA (HD-15), Analog Video Input : S-Video, Composite Video Input : RCA Yellow, Audio Input : RCA- Left (White), Right (Red), Antenna RF Input : RF - SDTV/ PAL.

10953

**MICROWAVE OVEN TRAINER**

Study of Microwave oven, Study the hardware details of Microwave trainer, Understand the working of Microwave trainer, To measure the Voltages at various test points, Study of fault switches.

10954

**THREE LEVEL ELEVATOR TRAINING SET**

To accelerate the wheels by increasing the RPM and pressure consumes by the wheels during press the brake pedal, USB To connect the data logging software with computer, Light reflects the braking effort being brake pedal applied.

10955

**MIXER GRINDER TRAINER**

Motor Power : 550 Watt, Flow Breaker and Easy Lock Jars, Attractive Metal Enclosure, Mixer Grinder Body : Metallic ABS, Jar : Liquidizer Jar 1.8 Ltr, Dry, User Manual for Experiments, AC Input : 190 to 260 V 10%, 50 Hz.


**MULTIMETER DEMONSTRATOR TRAINER**

Study of DC and AC Current Measurement, Study of DC and AC Voltage Measurement, Study of Resistance Measurement, Study of Continuity Tester.


**BLUETOOTH + ZIGBEE + GPRS + WI-FI TRAINER KIT**

To Study Configuring Bluetooth as Master and Slave, To Study Data Communication with Master Module to Slave Module Interfacing The Peripherals, To Study Interfacing on board Peripherals like LEDs and Switches, Relay, ADC using Variable Resistor, Temperature Sensor.


**AUTOMATIC AND INTELLIGENT WEATHER MONITORING TRAINER**

High Accuracy Reliability, Communication over cloud, Battery Charging from Solar Panel, Real time Data Access on Web, Low Maintenance.


**TRAFFIC CONTROL SIMULATOR BOARD/TRAINER**

Arduino UNO, LED - Red, Yellow, Green Circuit Diagram, USB cable for interfacing Type-A to Type-B, Dimension: 200 x 300 x 73mm, Weight:500gm.


**ELECTRONIC TRAFFIC COUNTER**

Object Counting, Debounce, Serial Monitoring, Flag-Based Counting, Adjustable Timing, User-Friendly Interface, Visual Feedback, Compact and Portable Design.


38606

**LOGIC TRAINING BOARD OR/NOR FUNCTION**

To study the principle of OR/NOR logic gates and to compare the truth table with experimental results, + 5V D.C. at 100mA, IC Regulated Power Supply internally connected, 3-input NOR gate followed by an inverter (NOT gate) to give 3-input OR/NOR gate, Switches for logic selection, LEDs for visual indication of status.

38607

**LOGIC TRAINING BOARD AND/NAND FUNCTION**

To study the principle of AND/NAND logic gates and to compare the truth table with experimental results, + 5V D.C. at 100mA, IC Regulated Power Supply internally connected, 3-input NAND gate followed by an inverter (NOT gate) to give 3-input AND/NAND gate, Adequate no. of other Electronic Components.

38608

**LOGIC TRAINING BOARD NOT/BUFFER FUNCTION**

To study the principle of NOT/BUFFER logic gates and to compare the truth table with experimental results, Adequate no. of other Electronic Components, Mains ON/OFF switch, Fuse and Jewel light, The unit is operative on 230V ±10% at 50Hz A.C. Mains.

38609

**LOGIC TUTOR BOARD**

To study OR/NOR Function, To study AND/NAND Function, To study NOT/BUFFER Function, To study Simple function of several variables, To study Distributive Law, To study Commutative Law, To study Associative Law, To study De Morgan's Theorem.

38610

**LOGICOM**

Study of Compound Logic Function, Verification of "AND/NAND" Function, Verification of "OR" Function (inclusive OR), Study of Function F=A . (B C), Study of Coincidence Function F = A . B, Study of Majority Logic F=ABC AC AB BC, To study Exclusive OR, To study Half Adder, To study Full Adder.

38611

**LOGICOM-I**

To study and verify AND/NAND function, To study and verify OR function, To study and verify Function F=A. (B C), To study and verify Exclusive OR function, To study and verify Coincidence circuit, To study and verify Full Adder, To study and verify Majority logic, To study and verify Even parity check, To study and verify Odd parity check, To study and verify Binary storage elements.

38612

**LOGICOM-II**

To study and verify the OR/NOR function, To study and verify the AND/NAND function, To study and verify the Exclusive OR function, To study and verify the Function F=A. (B C), To study and verify the Coincidence circuit, To study and verify the Majority logic.

38613

**LOGICOM-III**

To study and verify the OR/NOR function, To study and verify the AND/NAND function, To study and verify the Exclusive OR function, To study and verify the Function F= A. (B C), To study and verify the Coincidence circuit, To study and verify the Majority logic, To study and verify the Minority logic.

38614

**LOGICOM-IV**

To study Up-Counter, To study Down Counter, To study Decimal Counter, Nine J-K Flip-Flops, A clock generator with a repetition frequency of 500 Hz, Two LED driver circuits each of which individually drives a LED and is connected to the binary output of the Filp-Flop, Two pulsar switches.

38615

**LOGIC LABORATORY (LOGICOM I, II, III, IV)**

To study Half Adder, To study Majority logic, To study Set-Reset Flip-Flop, To study Type D Flip-Flop, To study J-K Flip-Flop, To study Master Slave J-K Flip-Flop, To study UP-Counter, To study DOWN Counter, To study Minority logic, To study Even parity check, To study Type T Flip-Flop, To study OR/NOR function.

38616

**LOGIC TRAINING BOARD ON COUNTERS & SHIFT REGISTERS**

To design, fabricate and test Ripple Counters, To Study Synchronous Counters, To Study Series Parallel Counters, To design, fabricate and test Ring Counter, To Study Johnson Counters.

38617

**ANALOG TO DIGITAL CONVERTER (A TO D)**

To study the basic principle on conversion of analog signal to digital signal, To study the working of Digital Voltmeter, Seven LEDs to display the state of various important points, Two seven segment displays for visual indication of output status, Provision for manual pulses as well as for internal clock.

38618

**DIGITAL TO ANALOG CONVERTER (D TO A)**

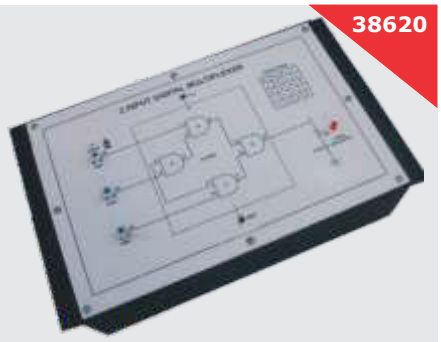
To study the basic principle on Digital to Analog Conversion, D.C. Voltmeter, 65mm rectangular dial to read 0-5V, Four, D-type Flip-Flops, Four Level Amplifiers, Continuous monitoring of analog signals on a voltmeter.

38619

**BINARY TO DECIMAL ENCODER**

To study the Binary To Decimal Encoder, BCD-to-7-Segment Decoder/Driver, A selector switch to set digits from 0 to 9 with corresponding binary code indicator, A DPDT switch for lamp test of seven segment display, Switch for logic selection, LEDs for visual indication of binary code A,B,C,D.

38620



**2 INPUT DIGITAL MULTIPLEXER**

To study the operation of a 2-Input Digital Multiplexer, One Digital Multiplexer IC, Three switches to set the data and control bits, LED for visual indication of selected channel, Adequate no. of other Electronic Components.

38621

**DIGITAL I.C. TRAINER**

NAND CMOS, NOR CMOS, Boolean Algebra (CMOS), Astable Multivibrator & Schmitt Trigger With Adjustable Triggering (CMOS), Monostable Multivibrator (CMOS), Flip Flops (CMOS), Half & Full Adder (CMOS), Presettable Devide-by-n Counter (CMOS).

38622

**BOOLEAN ALGEBRA TRAINER**

To study Single variable theorems, To study More than one variable theorems, To study Demorgan's theorems, Three switches for giving binary logic input states, Two LEDs, driven by LED driver circuit for visual indication of output.

38623

**STUDY OF OR, AND, NAND GATES TRAINER**

To Study the OR, AND & NAND logic gates and to verify the truth tables, To make various logic functions (OR, NOR, NOT, AND & EX-OR gates) by using NAND gates and verify their truth tables.

38624

**STUDY OF OR, AND, NOT LOGIC GATES (USING DISCRETE COMPONENTS) AND COMPARISON WITH TTL IC'S**

To study the OR, AND, NOT logic gates using discrete components and compare it with TTL IC, Three switches for giving binary logic input states, Two LEDs, driven by LED driver circuit for visual indication of output, Adequate no. of other Electronic Components.

38625

**TO STUDY THE CHARACTERISTICS AND OPERATION OF A PROGRAMMABLE COUNTER**

To study the Programmable Counter in up-mode and carry pulse, To study the Programmable Counter in down-mode and borrow pulse, To study the presettable mode of the Programmable Counter.

38626

**STUDY OF UNIVERSAL LOGIC GATES & APPLICATIONS**

To study the operation and characteristics of a TTL NAND / NOR gate, To prove the De-morgan's Theorem by using NOR & NAND gates, To perform various logic functions using NOR and NAND gates i.e. OR, AND, NOT, NOR, NAND, Exclusive OR (EX-OR), Half adder and Full adder.

38627

**STUDY OF VARIOUS MODULE COUNTERS**

To construct & study Count-Up mode, To construct & study Count-Down mode, To construct & study Count-Up/Down mode, To construct & study Four stage Ring Counter, To construct & study Variable Modulo Counters.

38628

**STUDY OF (ARITHMETIC LOGIC UNIT) ALU CHIP**

To study the Arithmetic Logic Unit (A.L.U.) chip 74181, To study Arithmetic operation, To study Comparison of Two Binary numbers, One Logic state indicator to check the logic state of various pins of IC, Switches for logic selection, LEDs for visual indication of output data.

38629

**STUDY OF VARIOUS DECODERS USING IC**

To study the operations of a BCD to decimal decoder, To demonstrate the operations of BCD to seven segment decoder/Driver, Adequate no. of other Electronic Components, 08. Mains ON/OFF switch, Fuse and Jewel light, The unit is operative on 230V ±10% at 50Hz A.C. Mains.

38630

**STUDY OF VARIOUS TYPES OF FLIP-FLOPS**

To Study R.S. Flip-Flop without clock, To Study R.S. Flip-Flop with clock, To Study D Flip-Flop, To Study J-K Flip-Flop, To Study T Flip-Flop, To Study Master Slave J-K Flip-Flop.

38631

**STUDY OF DECADE COUNTER USING ICS 7490 & 7493**

Study of Decade Counter using IC 7490 in 2 X 5 mode, Study of Decade Counter using IC 7490 in 5 X 2 mode, Study of Decade Counter using IC 7493 in direct clearing mode.

38632

**STUDY OF LEFT AND RIGHT SHIFT REGISTER & RING COUNTER**

To study right shift register, To study left shift register, To study ring counter, Two dual J-K Flip-Flop with preset & clear arrangement, One inverter (NOT gate), One press switch for clear & one pulser switch for the clock, Four switches to preset the Flip-Flops.

38633

**DECIMAL TO BCD CONVERTER**

To study Decimal to BCD converter, Four, 2-input NAND gates, One driver circuit to drive LEDs, Nine switches to enter the decimal data, LEDs for visual indication of BCD output conditions, Adequate no. of other Electronic Components.

38634

**1024 X 4 BIT STATIC RANDOM ACCESS MEMORY (2114)**

To study the Write operation of 1024 X 4 Bit Random Access Memory, To study the Read operation of 1024 X 4 Bit Random Access Memory, To study the Dynamic checking of 1024 X 4 Bit Random Access Memory.

38635

**STUDY OF EX-OR AND EX-NOR GATES**

To study the EX-OR logic gate and verify its truth table, To construct the EX-OR logic gate using NAND gates and verify its truth table, To study the EX-NOR logic gate and verify its truth table, To construct the EX-NOR logic gate using NAND gates and verify its truth table.

38636

**BILATERAL SWITCH (CAPABLE OF TRANSMITTING AND RECEIVING DATA BETWEEN DATA BUSES)**

To Study Functioning of a Bilateral Switch and to understand two way data communication between 4-bit data buses using IC 74LS243, Two Tristate Octal Buffers ICs 74LS244, Quad Bus Transceiver (Bilateral Switch) IC 74LS243.

38637

**8-BIT ANALOG TO DIGITAL CONVERTER (A TO D) (BASED ON ADC 0800) TRAINER**

To Study Conversion of Analog signal to 8-bit Digital signal using IC ADC 0800, ± 5V D.C. at 50mA, IC regulated power supply internally connected, Timer IC 555, A to D convertor IC ADC 0800, Buffer IC 74240, LEDs for visual indication of status.

38638

**8-BIT MULTIPLYING DIGITAL TO ANALOG (D TO A) CONVERTER (BASED ON AD1408) TRAINER**

To Study 8-Bit Multiplying Digital to Analog Converter with 8-Bit Input Digital Signals and Analog output signal representing the product of Inputs and Reference source.

38639

**PRESETTABLE COUNTER USING CMOS IC-4018 AND 4011**

To study beginning of counting for a Preset initial number, To study divide by N programmable counter to give gating pulse of desired duration, 10V D.C. at 50mA, IC regulated power supply internally connected, Timer 555 IC, Presettable Counter IC 4018, Two NAND GATE ICs 4011.

38640

**DIGITAL MULTIPLEXER (8-BIT)**

To Study 8-bit Digital Multiplexer with 8 inputs & one multiplexed output using IC 74151, 5V D.C. at 50mA , IC regulated power supply internally connected, Multiplexer IC 74151, LEDs for visual indication of status, SPDT switches for logic selection.

38641

**1:8 LINE DEMULTIPLEXER (DIGITAL)**

To Study 8-bit 1:8 Line Demultiplexer using IC 74138, 5V DC at 50mA, IC regulated power supply internally connected, Demultiplexer IC 74138, Timer IC 555, SPDT switches for logic selection, LEDs for visual indication of status, Adequate no. of Electronic Components.


**MONOSHOT MULTIVIBRATOR USING CMOS IC-4047**

To Study Monoshot Multivibrator in both rising edge and falling edge triggering mode with different RC Combinations using CMOS Ic4047, 10V D.C. at 50mA, IC regulated power supply internally connected, 02. Monoshot Multivibrator CMOS IC 4047, 03. DPDT and single pole three way switches, 04. SPDT switches for logic selection.


**UNIVERSAL SHIFT REGISTER USING IC-74LS 194**

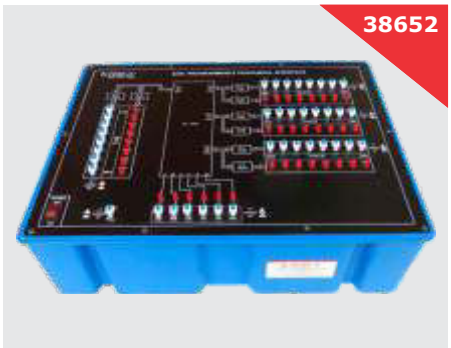
To Study the shifting of 4 bit data using IC 74LS194 Serial Left IN - Serial Left OUT, To Study Serial Left IN - Serial Right OUT, To Study Serial Right IN - Serial Left OUT, To Study Serial Right IN - Serial Right OUT, To Study Serial Left IN - Parallel OUT.


**8212 SINGLE INPUT/OUTPUT (I/O) PORT**

To Study Input and output modes of IC 8212 I/O Port, 5V D.C. at 50mA, IC regulated power supply internally connected, Single I/O port IC 8212, Tristate buffer IC 74244, Transistor BC 177.


**8155 SIMPLE PROGRAMMABLE INTERFACE**

To Study 8155 simple programmable interface for Memory operations in IC 8155, To Study Interface operations to configure different ports as input port or output port or in combinations of Input/Output, To Study Different modes of Timer Operation.




**8255 PROGRAMMABLE PERIPHERAL INTERFACE**

To Study 8255 programmable peripheral interface IC for interface operations to configure different ports as input port or output port or in combination of input/output.


**8253 PROGRAMMABLE TIMER**

To Study MODE 0 - Interrupt on Terminal Count, To Study MODE 1 - Programmable one shot, To Study MODE 2 - Rate Generator, To Study MODE 3 - Square Wave Generator, To Study MODE 4 - Software Triggered Strobe, To Study MODE 5 - Hardware Triggered Strobe.


**4 LINE TO 16 LINE DECODER/1 TO 16 DEMULTIPLEXER**

To demonstrate the operation of a 1 line to 16 line demultiplexer, To demonstrate the operation of 4 line to 16 line decoder, To demonstrate how 4 line to 16 line decoder can be used to sequence among any number of states, between one and fifteen.


**16 LINE TO 1 LINE MULTIPLEXER**

To verify the operation of 16 line to 1 line digital multiplexer, To demonstrate how multiplexer can be used to convert a parallel data input to a serial data output device.


**16 X 4 BIT STATIC RANDOM ACCESS MEMORY (7489)**

To study Operation of a 16 X 4 Bit Static Random Access Memory, 5V D.C. at 50mA, IC regulated power supply internally connected, Switches to set the memory data and address, LEDs for visual indication of output data (Read out).

38657

**1024 X 1 BIT STATIC RANDOM ACCESS MEMORY (2102)**

To study Operation of a 1024 X 1 Bit Static Random Access Memory, 5V D.C. at 50mA, IC regulated power supply internally connected, Switches to set the memory data and address, LEDs for visual indication of output data ( read out).

38658

**DIGITAL DEMULTIPLEXER**

To study the operation of a Digital Demultiplexer circuit, A separate LED provides the indication of logic level of any pin of IC, Adequate no. of other electronic components, Mains ON/OFF switch, fuse and Neon Indicator are provided.

38659

**DECIMAL-TO- BCD (BINARY) ENCODER USING DIODE- MATRIX**

To demonstrate conversion of Decimal to BCD (binary coded) using diode matrix encoder, Diodes arranged in matrix, LEDs (14 No's) for visual indication of status, 'Push to ON' (10 No's) switches for decimal selection, Adequate no. of other Electronic Components, Mains ON/OFF switch, Fuse and Jewel light.

38660

**STUDY OF PARITY CIRCUITS**

Verification of even parity or odd parity by using EX-OR gates (parity checker), To generate odd and even parity (parity generator), Two, Quad 2-Input Exclusive OR gate Ic's, Hex Inverter IC. LEDs (24 No's) for visual indication of status, SPDT (9 No's) switches for logic selection.

38661

**8-BIT ANALOG TO DIGITAL CONVERTER (A TO D) (BASED ON ADC 0800) TRAINER**

To Study Conversion of Analog signal to 8-bit Digital signal using IC ADC 0800, ± 5V D.C. at 50mA, IC regulated power supply internally connected, Timer IC 555, A to D convertor IC ADC 0800, Buffer IC 74240, LEDs for visual indication of status.

38662

**8-BIT MULTIPLYING DIGITAL TO ANALOG (D TO A) CONVERTER (BASED ON AD1408) TRAINER**

To Study 8-Bit Multiplying Digital to Analog Converter with 8-Bit Input Digital Signals and Analog output signal representing the product of Inputs and Reference source.

38663

**CONSTRUCTION OF MULTIVIBRATORS USING DIGITAL IC**

To design and demonstrate Astable multivibrator, To design and demonstrate Monostable multivibrator, To design and demonstrate Bistable multivibrator.

38664

**DUAL NATURE OF LOGIC GATES**

To demonstrate a combinational logic function and to provide practice in using Boolean variables, To provide practice in evaluating a truth table, To verify dual nature of logic gates.

38665

**4 BIT BINARY FULL ADDER & SUBTRACTOR**

To study the operation of 4-bit binary full adder and subtractor for Addition of two 4-bit binary numbers, To study the operation of Subtraction of two 4-bit binary numbers.

38665A

**HALF & FULL SUBTRACTOR TRAINER**

Study and verification of the Truth Table of Half Subtractor, Study and verification of the Truth Table of Full Subtractor, AND gate IC 7408, NOT gate IC 7404, OR gate IC 7432, X-OR gate IC 7486, Four LEDs for visual indication of status.

38665B

**HALF AND FULL - ADDER & SUBTRACTOR TRAINER**

To study the Half Adder and Verify the Truth Table, To study the Half Subtractor and Verify the Truth Table, To study the Full Adder and Verify the Truth Table, To study the Full Subtractor and Verify the Truth Table.

38666

**BINARY MULTIPLIER**

To demonstrate Binary multiplier using combinational logic gates by verifying truth table for a two bit by two bit multiplier and compare the binary and decimal multiplication tables.

38667

**AUDIBLE LOGIC PROBE USING 555**

To study of constructional and operational features of Audible Logic Probe using timer IC. (for TTL and CMOS Ics), 5V & 12V D.C. at 100mA, IC regulated power supply internally connected, 0-12V D.C. at 20mA, continuously variable power supply also provided.

38668

**BINARY TO GRAY AND GRAY TO BINARY CONVERTER**

To study of Binary to Gray code conversion, To study of Gray to Binary code conversion, Quad 2-input Ex-OR gate, Switch for code selection, Switches for logic selection, LEDs for visual indication of status.

38669

**OPEN COLLECTOR WIRE-OR & WIRE-AND CONNECTION**

To study open collector gates, To study the logic function of 1 Wire-OR connection of logic gates, 2 Wire-AND connection of logic gates, Four SPDT Switches for logic selection.

38670

**INTERFACING CMOS IC'S TO TTL & TTL TO CMOS IC'S**

To study interfacing of TTL IC to CMOS IC, To study interfacing of CMOS IC to TTL IC, Quad, 2-input NAND gate TTL IC, 05. Quad, 2-input NAND gate (open collector) TTL IC, 06. Quad, 2-input NAND gate CMOS IC.

38671

**CHARACTERISTICS OF CMOS IC**

To study Switching characteristics, To study Current sourcing characteristics of a CMOS inverter, To study Current sinking characteristics of a CMOS inverter, To study Paralleling of outputs (current sourcing), To study Paralleling of outputs (current sinking).

38672

**VERIFICATION OF EXCESS-3 TO DECIMAL CONVERTER**

To verify Excess-3 to Decimal converter, 5V D.C. at 100mA IC regulated Power Supply internally connected, Two, Quad, 2-input NAND gate IC, Hex invertor IC, Two, Tripple, 3-input NAND gate IC.

38673

**60 HZ CLOCK PULSE GENERATOR (USING IC 5369)**

To construct 60Hz, 10Hz & 1Hz using IC 5369 and observe the output of 60Hz, 10Hz & 1Hz, 5V D.C. at 50mA IC regulated Power Supply internally connected, IC precision time base for digital clock, Two, Decade counter Ics, Crystal of frequency 3.58 MHz.

38674

**BCD TO BINARY CONVERTER**

To study of BCD to Binary conversion, Two, BCD to Binary Convertor Ics, 8, SPDT switch for logic selection, One, SPDT switch for Enable/Disable, 15, LEDs for visual indication of input and output status, Adequate no. of other Electronic Components.

38675

**4 BIT MAGNITUDE COMPARATOR**

To understand logic system of IC 7485, To study how to connect it with other components, 5V DC at 100mA, IC Regulated built in Power Supply, Toggle switch SPDT and LED have been provided for input simulation, For output of IC, three LED have been provided for these logic states.

38676

**DUAL 4 LINE TO 1 LINE MULTIPLEXER**

To study Dual Four Line to One Line multiplexed output, Dual 4 Line to 1 Line Multiplexer IC, 14 LEDS for visual indication of logic status, 12 SPDT switches for Logic selection, Circuit of the IC displayed on the panel for better understanding.

38677

**DUAL 1 LINE TO 4 LINE DEMULTIPLEXER**

To study DUAL one line to four line Demultiplexer, Demultiplexer IC, 6 SPDT switches for Logic selections, 14 LEDS for visual indications of the status, Adequate no. of other Electronic Components.

38678

**OCTAL TO BINARY ENCODER**

To Study of Octal to Binary Encoder, 5V DC at 100 mA, IC Regulated Power Supply internally connected, 8 Data lines to 3 lines IC-74148, 9 SPDT switches for Logic selections, 14 LEDs for visual indications of the status, Adequate no. of other Electronic Components.

38679

**BCD TO SEVEN SEGMENT DISPLAY**

To demonstrate the working of BCD to seven segment display, 5V at 100mA, IC regulated Power Supply, Seven segment display of Common Anode, LED type, Decoder Driver IC, Four SPDT switches corresponding to four variables A, B, C and D for giving logic '1' and logic '0' inputs, Adequate no. of other Electronic Components.

38681

**HEXADECIMAL TO BINARY DECODER**

To study of Hexadecimal to Binary Encoder, 16 data lines to 4 lines Ics, 16 SPDT switches for logic selections, 20 LEDs for visual indications of the status, Mains ON/OFF switch, Fuse & Jewel light.

38682

**DIVIDE BY 12 - COUNTER USING IC-74177**

To Measure Clock Frequency using Divide by 12 Counter, The unit is operative on 230V ±10% at 50Hz AC Mains, Good Quality, reliable terminal/sockets are provided at appropriate places on panel for voltage measurements.

38684

**KARNAUGH MAPPING APPLICATIONS**

To simplify any given boolean function of four variables using karnaugh mapping, Designing & Implementation of two level circuits, Seven segment decoder : One BCD to Seven Segment Decoder/ Driver IC with termination, The unit is operative on 230v ± 10% at 50 Hz A.C. mains, Mains ON / OFF Switch and LED indicator are provided.

38685

**LOGIC SIMULATOR**

Output D. C. Voltage : Fixed 5V, Output Current : 200mA, Load Regulation : ± 1% of The Highest Specified Output Voltage, Ripple And Noise : Less Than 2mV, Logic Inputs : 10 Switches For High/low, Output Indicators : 10mm bright Red LEDs.

38686

**ELECTRONIC SEQUENCER WITH 4 MM SAFETY SOCKETS**

Study Of Basic Gates And Verification Of Their Truth Tables, Study And Verifications Of The Law Of Boolean Algebra And De-morgan's Theorems, Study Of Shift Register (sipo).

38687

**ELECTRONIC SIMULATOR WITH 4 MM SAFETY SOCKETS**

Study Of Basic Gates And Verification Of Their Truth Tables, Study And Verifications Of The Law Of Boolean Algebra And De-morgan's Theorems, Construction and verification of various types of flip-flops using gates and IC's, Construction and verification of various Types of combinational circuits.

38688

**ADVANCE LEVEL LOGIC TRAINER**

To study Re-triggerble Monostable Multivibrator using IC 555 and output through LED, To study Synchronous Counters, To study Series Parallel Counters, To study Serial to Parallel Data Converter, To study 1024 X 4 Bit Static Random Access Memory (2114).

38689

**ANALOG COMPUTER TRAINER**

To study building blocks, To study summing amplifier (Adder), To study the inverting amplifier, To study summing & difference amplifier (Adder & Subtractor), To study analog computer.

38690

**SEQUENTIAL LOGIC TUTOR**

Study Of Basic Gates And Verification Of Their Truth Tables, Study And Verifications Of The Law Of Boolean Algebra And De-morgan's Theorems, Study Of Shift Register (sipo).

38691

**LOGIC GATES TUTOR**

Study of basic gates and verification of their truth tables, Study and verifications of the law of Boolean algebra and De-Morgan's Theorems, Study of important TTL terminologies, Verification of important TTL Circuit parameters, Construction and verification of various types of combinational circuits.

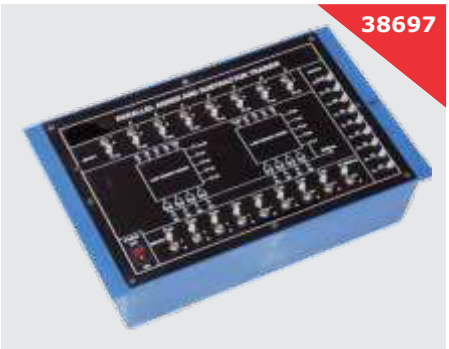
38695

**UNDERSTANDING AND EXPERIMENT WITH DIGITAL IC**

Study of Adder and subtractor, Study of Multiplexer and De-Multiplexer, Study of BCD to 7 Segment Display, Study of Encoder, Decoder and Generator, Study of Code Converter, Study of Magnitude Comparator, Study of Flip-Flop, Study of Register, Study of Counter.


### TTL AND CMOS CHARACTERISTIC TRAINER

To study TTL NAND Gate, To study TTL Schmitt trigger NAND gate, To study TTL NOT gate, To study TL Schmitt trigger NOT gate, To study CMOS NAND gate, To study CMOS Schmitt trigger NAND gate.




### PARALLEL ADDER AND SUBTRACTOR TRAINER

To study 4 bit binary addition & subtraction operation, To study 8 bit binary addition & subtraction operation, 4-bit/8-bit Binary Addition & Subtraction, Easy switching between addition and subtraction modes, LEDs fo6/isual indication of input-output & carry out logics.


### BCD TRAINER AND SUBTRACTOR TRAINER

Study of 1bit to 8Bit BCD Addition operation, Study of 1bit to 8bit BCD Subtraction operation, Facilitates 1 bit to 8bit BCD addition and subtraction modes, LED's for visual indication of input output logic states, Easy switching between addition and subtraction modes.


### SOP AND POS IMPLEMENTATION TRAINER

Design a function sing K-map and verify its performance using SOP and POS Form, Use QUINE McCLUSKEY method for designing function and realize its Nor Or implementation, Stand alone System, Easy illustration of different types of canonical forms, LEDs for visual indication of input and output logic states.


### MULTIPLEXER - DEMULTIPLEXER 8:1 AND 1:8

Study and verification of the Truth Table of 8-to-1 Line Multiplexer, Study and verification of the Truth Table of 1-to-8 Line De-Multiplexer, Multiplexer IC 74151, De-multiplexer IC 74138, Eight LEDs for visual indication of status, Eleven SPDT switches for logic selection low and High.


### TO VERIFY THE TRUTH TABLE OF BASIC LOGIC GATES OR AND NOR, NAND,EX-NOR, EX-OR, EX-NOR AND NOT

To verify the Truth Table of with Two input, To verify the Truth Table of Basic Logics Gates with Three input, To verify the Truth Table of Basic Logics Gates with Four input.


### MULTIPLEXER-DEMULTIPLEXER 4:1 AND 1:4

Study of verification of the truth table of 4 to 1 line multiplexer, Study of verification of the truth table of 4 to 1 line demultiplexer, 5V DC at 100mA IC regulated power supply internally connected, Multiplexer IC 74153, De-multiplexer IC 74139, Five LED`s for visual indication of status.

38704

**ENCODER & DECODER TRAINER (8:3 AND 3:8 LINE)**

Study and verification of the Truth Table of 8-to-3 Line Encoder, Study and verification of the Truth Table of 3-to-8 Line Decoder, 5V D.C. at 100mA, IC regulated power supply internally connected, AND gate IC 7411, NOT gate IC 7404.

38705

**DIGITAL TRAINER WITH ZIF SOCKET**

To Study NAND CMOS, To Study NOR CMOS, To Study Boolean Algebra (CMOS), To Study Astable Multivibrator & SCHMITT Trigger with adjustuble triggering (CMOS), To Study Monostable Multivibrator (CMOS), To Study Flip Flops (CMOS).

38706

**TTL/CMOS TRAINER**

To Study NAND CMOS, To Study NOR CMOS, To Study Boolean Algebra (CMOS), To Study Astable Multivibrator & SCHMITT Trigger with adjustuble triggering (CMOS), To Study Monostable Multivibrator (CMOS), To Study Flip Flops (CMOS).

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**ELECTRICAL SPECIMEN BOARD**
Low voltage electrical C25 m6 conical busbar insulator for 1500V-01 set, 600 x 455mm, using aluminum steel, for batter safety, rigidness and contrast. Fixed on iron box with black powder coated.


**WIRING SPECIMEN BOARD**
F-cable 2 wire, F-cable 3 wire, 600 x 455mm, using aluminum steel, for batter safety, rigidness and contrast. Fixed on iron box with black powder coated.


**STUDY OF DIFFERENT RESISTORS & COLOUR CODING**
Carbon Resistors 1/4,1/2,1 & 2 Watt of different tolerances, Metal Film Resistors 1/4, Watt, High Precision, Wire Wound Resistors of different types with complete theory description, Total 20 Resistors.


**STUDY OF DIFFERENT POTENTIOMETERS**
Vertical Preset, Horizontal preset, Carbon linear, Carbon log, Carbon ganged (Dual) Multi-turn Horizontal Trimpot, Vertical Trimpot, Cermet, Sliding and wire wound pot with complete theory, description, Total 10 pots.


**STUDY OF DIFFERENT CAPACITORS & COLOUR CODING**
Ceramic disc, Mica button, Tantalum radial, Tantalum axial, Non-electrolytic disc, Electrolytic Radial, Polyster foil, Styroflex, Ceramic Tabular paper, Metalised Polyster, Metalised Poly-Carbonate, Metalised Poly - proplyene, Metalised film, Trimmer and Gang Condenser with theory and description, Total 16 Capacitors.


**STUDY OF DIFFERENT SWITCHES**
PUSH to 'ON', PUSH to 'OFF', Slide, Key Board,DIP Switch, Leaf Switch, SPSTToggle, Miniature DPDTToggle, Rocker and Rotary Thumb wheel with complete theory and description, Total 13 Switches.


**STUDY OF DIFFERENT BAND SWITCHES**
1 Pole 11 Way, 2 Pole 5 Way, 4 Pole 3 Way for Radio etc, 1 Pole 11 Way Miniature and 2 Pole 5 Way Miniature, 6 Pole 3 Way for Transistors Mega type Band switches with complete Theory and description, Total 7 Band Switches.


**STUDY OF DIFFERENT DIODES**
Silicon detector, Silicon rectifier, Bridge rectifier, Germanium diode, Hot Carrier diode, Power diode, Varactor diode, Photo diode, Trigger Diode and Zener diode with complete theory and description, Total 10 diodes.


**STUDY OF DIFFERENT TRANSISTORS**
A small signal, IF/RF Amplifier, High speed switching Power, General purpose, All above are PNP & NPN both type, Matched pair, Darlington Pair, High Voltage, Photo transistor, UJT, FET and MOSFET, Total 19 transistors.

38010

**STUDY OF SEMICONDUCTOR DEVICES AND HOW TO TEST THEM**

Silicon Diode, Germanium Diode, Zener Diode, Varactor Diode, Varistor, Thermistor, U.J.T., Transistor NPN & PNP, Power Transistor NPN & PNP, JFET, MOSFET, SCR, TRIAC, LED, Photo Diode, LDR, Photo Transistor and Opto Coupler with Theory and testing procedure, Total 20 devices.

38011

**STUDY OF DIFFERENT WIRES & CABLE**

Study of Bare Copper, Cotton Cover, Enamelled Copper, PVC Insulation, Multiwire Flexible, Electrical Wire and Flat Cable, Transmission Cable, Wave Guide Rectangular and Single Fibre Cable.

38012

**STUDY OF DIFFERENT CONNECTORS**

To study Eyelet, Test pin, Insulated post, IC bases, Relay socket, Vacuum tube socket solder type, PCB terminal, One peice edge connecter, Two peice connector, Rack and panel connector, Plug & receptacle connector, Cylindrical connector and Tape cable connector.

38013

**ELECTRONIC SIMULATOR WITH 4 MM SAFETY SOCKETS**

Board Size 300 X 400mm, with better safety, rigidness and contrast, Symbolic representation of Components, Actual components mounted right across the place, Individual working without direct teacher supervision, Stimulates independent student activity.

38014

**TRANSFORMERS DEMONSTRATION UNIT**

Isolation Transformer, Pulse Transformer, Voltage Transformer, Current Transformer, Impedance Transformer, AutoTransformer, Power Transformer, Constant Voltage Transformer.

38015

**DISPLAY BOARD ON DIFFERENT IC'S**

IC CD 7680 VIF & SIF stage, TC TDA 2611A sound output stage, IC STMB 78237VM / 23A9950F System control, IC TA7698 Chroma section, IC 8085A Microprocessor, IC 8155A Programmable I/O Ports & Timer, IC 8255A Programmable peripheral Interface, IC 8253 Programmable interval timer.

38016

**SEQUENTIAL LOGIC TUTOR**

Board Size 300 X 400mm, with better safety, rigidness and contrast, Symbolic representation of Components, Actual components mounted right across the place, Individual working without direct teacher supervision, Stimulates independent student activity.

38017

**TRANSFORMER DEMONSTRATION BOARD**

Isolation Transformer, Pulse Transformer, Voltage Transformer, Current Transformer, Impedance Transformer, AutoTransformer, Power Transformer, Constant Voltage Transformer.

38018

**DEMONSTRATION TRANSFORMER**

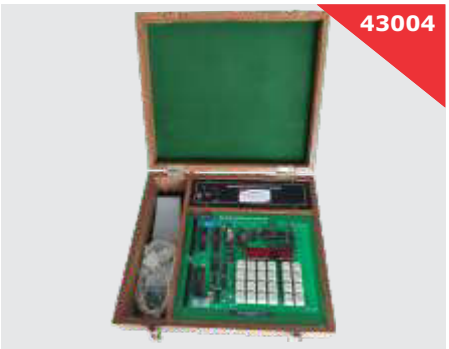
In the basic transformer set all coils are fitted with 4mm socket connections, All coils are of enamelled copper wire wound round on high impact plastic moulded bobbins 75mm long with cheeks 75 x 60mm, A simple channel and wing-nut clamping arrangement facilitates quick assembly and interchange of coils.


**8085 MICROPROCESSOR TRAINING BOARD**

Program to perform integer division 8-bit by 8-bit, Program to perform integer division 16-bit by 8-bit, Transfer of a block data in memory to another place in memory in the direct and reverse order, Finding the parity of number, Sorting of array in Ascending order, Sorting of array in Descending order.


**8086 MICROPROCESSOR TRAINER**

Program to perform 16-bit addition, Program to perform 16-bit subtraction, Program to perform 16-bit multiplication, Program to perform 16-bit division, Program to display largest no. in an array.




**8031 MICROCONTROLLER TRAINER**

Terminal emulation software is supplied along with the trainer. This supports UP LOAD and DOWN LOAD function, In addition to this, it has features to modify and display internal as well as external memory locations, Dump memory contents in some other location as specified, Execute from a specified memory location.


**8051 MICROCONTROLLER TRAINER**

Dump memory contents in some other location as specified, Move a block of memory from a source address to destination address, Execute from a specified memory location, Display contents of all register and alter a few or all registers, Facility to stop execution once a break point location reaches.


**DSP LAB - DSK6713**

To Study Sampling & Waveform Generation, To Study PCM Encoding, To Study Delta Modulation, To Study Digital Modulation Schemes (ASK, PSK, FSK), To Study Read Write from CODEC.


**COMPUTER INTERFACE TRAINER**

To Study Traffic Light Controller, To Study 5 x 7 Matrix LED Display, To Study Forward Reverse LED Display, To Study Running Message Display, To Study Seven Segment Display as a Calculator. Counter and Timer, To Study Controlling of Electrical Appliances using PC.


**TMS320C6745 DSP TRAINER KIT**

1 Pole 11 Way, 2 Pole 5 Way, 4 Pole 3 Way for Radio etc, 1 Pole 11 Way Miniature and 2 Pole 5 Way Miniature, 6 Pole 3 Way for Transistors Mega type Band switches with complete Theory and description, Total 7 Band Switches.


**8085 MICROPROCESSOR TRAINER**

8K Bytes of EPROM with 8K bytes of Battery Backup RAM, 46 I/O Lines, Three Channel Timer/Counter, PC Serial Interface, Seven Segment Display with 28 Keys Hex Keypad, Power-full Command like Single Stepping, Break Point, Full Clock Execution, Examine Memory/ Register, Uploading & Downloading to and from PC in Windows98/XP/NT.


**8085 MICROPROCESSOR TRAINER (LCD)**

Based on 8085 CPU operating at 6.144 Mhz, 16K bytes of Powerful Monitor Program using 27512 EPROM, 8K bytes of RAM using 6264 with Battery Backup using NICD Battery, On-board one memory expansion up to 56KB, Uploading & Downloading to and from PC in Windows98/XP/NT.

43211

**8086 MICROPROCESSOR TRAINER**

8086/8088 CPU operating at 2.5/5MHz, 8086 Processor can be replaced by 8088 Processor, On-board sockets provided to facilitate the use of 8087 Coprocessor and 8089 I/O Processor, 16K bytes of RAM using two nos. of 6264 with Battery Backup expandable up to 256KB, 16K bytes of powerful monitor EPROM using two nos. of 27512.

43212

**8086 MICROPROCESSOR TRAINER (LCD)**

8086 Processor can be replaced by 8088 Processor, On-board sockets provided to facilitate the use of 8087 Co-processor and 8089 I/O Processor, 6K bytes of RAM using two nos. of 6264 with Battery Backup expandable up to 256KB, 16K bytes of powerful monitor EPROM using two nos. of 27512.

43212A

**8086 MICROPROCESSOR TRAINER**

16K Bytes of EPROM with 16K bytes of Battery Backup RAM, 72 I/O Lines, Three Channel Timer/Counter, PC Serial Interface using USART, Interrupt Controller, 20x2 LCD Display with 101 ASCII Keyboard, Power-full Command like Single Stepping, Break Point, Full Clock Execution, Examine Memory/ Register.

43215

**8051 MICROCONTROLLER TRAINER (LCD)**

8051/89C52/89C51RD2/89C61X2 CPU operating @ 11.0592MHz, 32K user RAM using 6264 with Battery Backup using NICD Battery, One socket is provided for RAM expansion up to 64K, 16K bytes of powerful monitor EPROM using 27512, 48 I/O lines using 2 Nos. of 8255 brought at 26 Pins FRC Connector to interface with IC-XX Series.

43215A

**LABVIEW I/O INTERFACE LAB**

A/D and D/A converters provide signals to analog/digital hardware device for various input and output applications, Hardware such as stepping motors, EEPROMs and LCDs as well as external hardware can be used for control application, DC power supplies are provided for internal and external circuits.

43216

**80196KC MICROCONTROLLER TRAINER**

16K Bytes of EPROM with 16K bytes of Battery Backup RAM, 24 I/O Lines, Three Channel Timer/Counter, PC Serial Interface, Seven Segment Display with 25 Keys Hex Keypad, Power-full Command like Single Stepping, Break Point, Full Clock Execution, Examine Memory/ Register.

43217

**8085 MICROPROCESSOR TRAINER**

8K Bytes of EPROM with 8K bytes of Battery Backup RAM, 22/24 I/O Lines Using 8155/8255, 46 I/O Lines Using 8255/8155, 48 I/O Lines Using 8255, Three Channel Timer/Counter, PC Serial Interface, Interrupt Controller, USART, RTC, Seven Segment Display with 28 Keys Hex Keypad.

43218

**MICROPROCESSOR TRAINER (LCD)**

16K Bytes of EPROM with 8K bytes of Battery Backup RAM, 48 I/O Lines, Three Channel Timer/Counter, PC Serial Interface, ADC, DAC, Relay, Opto, Interrupt Controller, USART, EPROM Programmer, 20x2 LCD Display with 101 ASCII Keyboard.

43219

**8085 MICROPROCESSOR TRAINER**

8K bytes of EPROM with 8K bytes of battery backup RAM, 48 I/O Lines, Three Channel Timer/Counter, PC Serial Interface, Seven Segment Display with 28 Keys Hex Keypad, Power-full Command like Single Stepping, Break Point, Full Clock Execution, Examine Memory/ Register.


**ADC-0809 INTERFACING MODULE**
Connect to 8255 using 26 pin FRC Connector.


**DAC-0800 INTERFACING MODULE**
Connect to 8255 using 26 pin FRC Connector.


**8AD574 INTERFACING MODULE**
Connect to 8255 using 26 pin FRC Connector, ADC module using ADC-0809, 8 bit accuracy ADC chip, Eight Channel on-chip multiplexed ADC, A/D Conversion time 100 micro sec, SOC, EOC, O/P enable can be accessed by user.


**DIGITAL INPUT & OUTPUT INTERFACING MODULE**
8 Digital Inputs provided through 8 way DIP Switch, 8 Input LED Indicators are provided, 8 Output LED Indicators are provided, Connect to 8255 using 26 pin FRC Connector, User's Manual with Sample Programs.


**ELEVATOR SIMULATOR INTERFACING MODULE**
Four Floor Elevator Simulator model, Each Floor LED indication are provided, Up & Down Lift position indication by 10 LEDs, Four Keys are provided to access each floor, Connect to 8255 using 26 pin FRC Connector.


**IC TESTER INTERFACING MODULE FOR IC-7400**
14 Pin IC-7400 IC is provided, lOn-board two nos. of 14 pin socket and one no. of 16 pin, Socket provided, l Connect to 8255 using 26 pin FRC Connector, l User's Manual with Sample Programs.


**FOUR DIGIT SEVEN SEGMENT DISPLAY MODULE**
Four Digit Seven Segment display, Serial in Parallel out shift register technique is used to display, Two port pins are used to display in seven segment, Connect to 8255 using 26 pin FRC Connector, User's Manual with Sample Programs.


**STEPPER MOTOR CONTROLLER CARD WITH MOTOR**
Two/Four phase motor can be controlled, Half Step, Full Step can be controlled, Clock Wise & Anti Clock wise rotation can be controlled, Speed can be controlled by this controller, Maximum 2Kg cm Motor can be controlled, 0.25Kg cm Motor supplied along with module.


**5X4 KEY'S MATRIX KEYBOARD INTERFACING MODULE**
5x4 Keys matrix Keyboard, Keyboard consist of 20 keys, Consist of Hexadecimal numerals from 0 to 13, Keys are organized as Four Rows & Five Columns, Connect to 8255 using 26 pin FRC Connector.


### 16X1 LCD DISPLAY MODULE

16x1 Liquid Crystal Display, One 16 rows Alphaneumeric Characters will be Displayed, Facility for backlite display, Connect to 8255 using 26 pin FRC Connector.


### 16X2 LCD DISPLAY MODULE

16x2 Liquid Crystal Display, Two 16 rows Alphanumeric Characters will be Displayed, Facility for backlit display, Connect to 8255 using 26 pin FRC Connector.


### TRAFFIC LIGHT CONTROLLER MODULE

Single square traffic light display controller, East, west, north, south post are defined on the PCB for the square, For each post four LEDs are provided in form of Red, Yellow & Green, Connect to 8255 using 26 pin FRC Connector.


### TEMPERATURE MEASUREMENT MODULE

ADC module using ADC-0809, 8 bit accuracy ADC chip, A/D Conversion time 100 micro sec, Op amps are provided for signal conditioning to output from sensor, K-type thermocouple are used for the measurement.


### DC MOTOR CONTROLLER CARD WITH MOTOR

8 bit accuracy DAC chip using DAC-0800, SPDT Relay is provided for direction control, Clock Wise & Anti Clock wise rotation can be controlled, Speed can be controlled by this controller, 9 Volt DC Motor, 9 Volt AC Adaptor.


### RELAY & OPTO COUPLER INTERFACING MODULE

Four SPDT Relay are provided, NO, NC, COM Relay outputs are provided at Screw Terminals, Four Opto isolater inputs are provided using MCT2E, Opto Inputs are provided through 10 pin FRC Connector.


### 8X8 LED MATRIX DISPLAY MODULE

8x8 LED Matrix Display, Display consists of 64 nos. 3mm LEDs, LEDs are organized as Eight Rows & Eight Columns, All LEDs should be buffered, Connect through 26 pin FRC Connector using 8255.


### THUMB WHEEL SWITCH CARD

Two Digit Thumb Wheel Switch, l Thumb wheel switch can be set from 00 to 99, l Output of Thumb wheel switch should be in BCD Format, l Connect to 8255 using 26 pin FRC Connector .


### OPTO ISOLATED INPUT MODULE

8 bit OPTO Isolated input using MCT-2E IC, OPTO inputs indication are provided by 5mm LEDs, OPTO inputs are provided through 16 pin Connector, Connect to 8255 using 26 pin FRC Connector.


**OPTO ISOLATED INPUT MODULE**

8 bit OPTO Isolated output using MCT-2E IC, OPTO outputs indication are provided by 5mm LEDs, OPTO output are provided through 16 pin Connector, External +12V provision is provided for isolation, Connect to 8255 using 26 pin FRC Connector.


**SEVEN SEGMENT DISPLAY WITH MATRIX KEYBOARD MODULE**

5x4 Keys matrix Keyboard, Keyboard consist of 20 keys, Consist of Hexadecimal numerals from 0 to 13, Keys are organized as Four Rows & Five Columns, Study of techniques like software debouching, Keyboard scanning, key closer, two key lockout, keyboard encoding & Pausing.


**16X2 LCD DISPLAY WITH MATRIX KEYBOARD MODULE**

5x4 Keys matrix Keyboard, Keyboard consist of 20 keys, Consist of Hexadecimal numerals from 0 to 13, Keys are organized as Four Rows & Five Columns, On-board 16x2 Liquid Crystal Display, Two 16 rows Alphanumeric Characters will be Displayed.


**8 BIT AD/DA INTERFACING MODULE**

ADC module using ADC-0804, 8 bit accuracy ADC chip, Single channel ADC, A/D Conversion time 100 micro sec, 8 bit accuracy DAC chip using DAC-0800, DAC Settling time 100 ns.


**LEVEL SIMULATOR MODULE**

Four Level Simulator model, Each Level LED indication are provided, Up & Down Level position indication by 10 Nos. Of LEDs, Lower & upper level limit can be set by software.


**SIX DIGIT SEVEN SEGMENT DISPLAY MODULE**

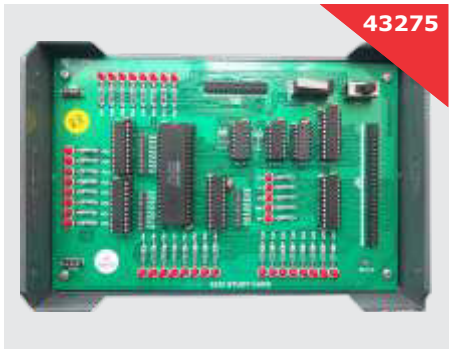
Six Digit Seven Segment display, Decoder technique is use to display, Two port pins are used to display in seven segment, Connect to 8255 using 26 pin FRC Connector.


**PARALLEL TO SERIAL & SERIAL TO PARALLEL MODULE IC 74595 & IC-74165**

8 bit Parallel to serial convertor using IC-74165, Eight Parallel Input are indicated by LEDs, Serial to 8 bit parallel convertor using IC-74595, Eight Parallel Output are indicated by LEDs, Connect to 8255 using 26 pin FRC Connector.


**TWO SQUARE TRAFFIC LIGHT MODULE**

Two square traffic light Display Controller, East, west, north, south post are display on the PCB for the square, For each post four LEDs are provided in form of Red, Yellow & Green, Connect to 8255 using 26 pin FRC Connector.




**8255 (PPI) STUDY CARD**

24 bit I/O using 8255 Programmable Peripheral IC, All Input/Output ports pins are terminated on 3 eight pin terminals & 26 pin FRC Connector, All Input/Output ports are indicated by 3 mm LEDs, Data lines from AD0 to AD7 are indicated by 3mm LEDs, Chip Select, A0, A1, Read, Write are indicated by 3mm LEDs.


**8253 (PTC) STUDY CARD**

Three channel Timer/Counter using 8253 Programmable, Timer Counter IC, All Input/Output ports pins are terminated on terminals & 10 pin FRC Connector, Clock for Counter-0 is internally provided, Data lines from AD0 to AD7 are indicated by 3mm LEDs.


**8155 (PPI WITH TIMER) STUDY CARD**

22 bit I/O with single channel timer using 8155 Programmable Peripherals IC, All Input/Output ports pins are terminated on 3 eight pin terminals & 26 pin FRC Connector, All Input/Output ports are indicated by 3 mm LEDs, Data lines from AD0 to AD7 are indicated by 3mm LEDs, Chip Select, IO, Memory, Read, Write are indicated by 3mm LEDs.


**8251 (USART) STUDY CARD**

Serial communication using 8251 UniversalSynchronous/ Asynchronous Receiver Transmitter IC, Output are provided on 9 pin D-Type connector, Data lines from AD0 to AD7 are indicated by 3mm LEDs, Chip Select, Read, Write, A0, A1, DTR, DSR, RTS, CTS, TxRDY, RxRDY are indicated by 3mm LEDs.


**8257 (DMA) STUDY CARD**

Programmable Direct Memory Access controller using 8257 IC, On-board 2K RAM Provided using 6116 IC for DMA Operation, 8 Inputs are fed through input terminals with 3 mm LED indicator.


**8259 (PIT) STUDY CARD**

8 Channel Programmable Interrupt controller using 8259 IC, 8 Inputs interrupts are fed through input terminals, Data lines from AD0 to AD7 are indicated by 3mm LEDs, Chip Select, Read, Write, INTA, INTR are indicated by 3mm LEDs.


**8279 (PKDC) STUDY CARD**

Programmable Keyboard Display Controller using 8279 IC, All scan lines/return lines are fed through input terminals & 26 pin FRC connector, Data lines from AD0 to AD7 are indicated by 3mm LEDs, Chip Select, Read, Write, INTA, A0 are indicated by 3mm LEDs.


**8212 (LATCH) STUDY CARD**

8 bit Latch output using 8212 IC, 8 buffered latch output are indicated by 3mm LEDs, Hardware Single Step and Full Clock Execution modes are provided, Single stepping can be performed using micro switch provided on board.


**LATCH / BUFFER STUDY CARD**

8 bit Latch output using 74373 IC, 8 bit Buffer input using 74245 IC, 8 buffered latch output are indicated by 3mm LEDs, Eight Way DIP Switch is provided for buffer input, Eight bit buffered output are indicated by 3mm LEDs, Chip Select for IC-74245 and IC-74373 are indicated by 3mm LEDs.


**6116/6264/62256 RAM STUDY CARD**

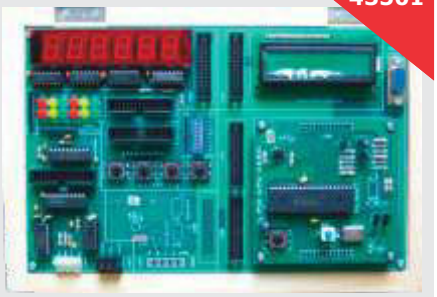
Data lines from AD0 to AD7 are indicated by 3mm LEDs, Chip Select, Read, Write are indicated by 3mm LEDs, Hardware Single Step and Full Clock Execution modes are provided, Single stepping can be performed using micro switch provided on board.

43307

**68000 MICROPROCESSOR TRAINER (16 BIT)**

Operates on single +5V power supply with a PC compatible system through its RS 232 C serial communication interface, Powerful system monitor permits entry of programs, debugging through breakpoint, trace and instruction step facilities, Hardware debugging through Read loop, Write loop and Test memory commands.

43501



**89C51 EMBEDDED TRAINER**

Philips 89C61X2 Microcontroller CPU, ISP Programming facility, 8 LEDs to display Digital Output, 8 Switches to give Digital Input each indicated by LED, 16*2 Alphanumeric LCD, 4 digit Seven segment displays.

43502

**LPC2148 ARM EMBEDDED TRAINER**

Philips LPC 2148 Microcontroller CPU, ISP Programming facility, 8 LEDs to display Digital Output, 8 Switches to give Digital Input each indicated by LED, 16*2 Alphanumeric LCD, 4 digit Seven segment displays.

43503

**PIC16F877A/18F452 EMBEDDED TRAINER**

Microchip 16F877A / 18F452 Microcontroller CPU, ISP Programming facility, Temperature sensor interface Lm35, Temperature sensor interface DS18B20 24 I/O Lines Provided on a 26 pin FRC Connector for external interface, On board supply /- 12V, 5V is provided.

43504

**ATMEGA32 AVR EMBEDDED TRAINER**

ATMEL Atmega32 Microcontroller CPU, ISP Programming facility, 24C512 EEPROM (64KB), DS1307 RTC with suitable battery, 4 Channel 8bit ADC & 8 bit DAC using PCF8591.

43505

**PIC EMBEDDED TRAINER KIT**

Microchip 18F4550 CPU operating on crystal frequency @ 20MHz, On-chip 32KB Flash memory and 2048 byte SRAM, On-chip 256byte EEPROM, On-chip UART, SPI, I2C, PWM, On-chip 8 Channel 10 bit ADC, On-chip 32 I/O Lines are provided in four 16 pin Connector, CPU provided on ZIF Socket.

43506

**PIC DEVELOPMENT KIT**

16F877A / 18F452 Microcontroller Microchip, 5ISP Programming facility All I/O Lines should be provided in 2mm connector for Bread board connectivity through 2 mm to 0.8 mm Patch Cord, On board Reset key, On board 10 pin connector for ISP Programming facility with separate USB based ISP Programmer module for burning the controller.

43507

**MICROCONTROLLER TRAINER KIT**

Atmel 89s52 Microcontroller operating @ 11.0592 MHZ crystal, 40 Pin ZIF socket for Microcontroller, All I/O Lines should be provided in 4 separate 16 pin female connector for Bread board connectivity through single stand wires & 50 PIN FRC connector for external interface, 8K flash memory.

43511

**UNIVERSAL EMBEDDED TRAINER**

16 LED's to display Digital Output, 16 Switches to give Digital Input indicated by LED's, 16x2 Alphanumeric LCD backlit display, 4x4 Matrix Keyboard, Miniature Buzzer.


**UNIVERSAL EMBEDDED TRAINER**

Piggy Bag Daughter Board, On board USB JTAG Programmer for configuring XILINX Device, Display Indicator, 16 LED's indicator for input/output ports of the FPGA, Six digit seven segment display.


**PIGGY BACK MODULE FOR 89C51/89C61X2**

Philips 89C61x2 CPU operating @ 11.0592MHz, On-chip 64KB Flash memory and 1KB RAM, On-chip UART, PWM, On-chip 32 I/O Lines are provided in 40 pin, On-board Reset Key, On-board ISP Programming.


**PIGGY BACK MODULE FOR PIC16F877A**

Microchip 18F452 operating @ 4MHz, On-chip 32KB Flash memory and 1536 byte RAM, On-chip 256byte EEPROM, On-chip UART, SPI, I2C, PWM, On-chip 8 Channel 10 bit ADC, On-chip 32 I/O Lines are provided in 40 pin, On-board Reset Key.


**FPGA XC3S50 TRAINER**

Clock generator, On-board 50MHz, 10MHz, 5MHz, 1MHz, 1 0 0 K H z & 100Hz, 5Power on Reset and configuration reset key, 5Power selection : On-board of 5V, 3.3V, 2.5V, 1.5V & 1.2V, I/O expansions are provided through 26 pin FRC Connector for other application interface.


**MICRO CONTROLLER DEVELOPMENT BOARD WITH PROGRAMMER AT89S51/52**

To Study the USB Port Programmer Procedure to Program Atmel AT89S51/52MCU, To Study Procedure PC Serial Communication with 43555 Board.


**PIC MICRO CONTROLLER DEVELOPMENT BOARD WITH PROGRAMMER**

Study of PIC Microcontroller architecture, Pin to pin study of MCU, To study serial protocol(I2C/SPI), To study internal PWM, To study internal ADC, To study RTC, To study Interface various external MCM series modules.


**AVR MICRO CONTROLLER DEVELOPMENT WITH PROGRAMMER AT90S8515**

To Study the Procedure of Flash programming of AVR MCU from USB Port Programmer, To Study Procedure PC Serial Communication, ATMEL ATMEGA8515 MCU clocked at 4MHz, Expansion connectors for plug in modules and Prototyping area, Serial Port Interface to PC for Communication.


**ARM-7 DEVELOPMENT BOARD WITH PROGRAMMER LPC-2294**

Study and analysis of interfacing of LEDS, Study and analysis of interfacing of Switches, Study and analysis of interfacing of 16 x 2 Alphanumeric LCD, Study and analysis of interfacing of 12 bit Internal ADC.


**ARM 7 DEVELOPMENT BOARD**

Study of ARM 7(LPC2148) Microcontroller architecture, Study of Pin to pin study of MCU, Study of serial protocol (I2C/SPI), Study of internal PWM, Study of Timer/Interrupt, Study of RTC, Study of internal ADC and DAC.


**FIBRE-OPTIC SIMPLEX ANALOGUE TRANSCEIVER TRAINER**

To study Gain characteristics of a fibre optic Linear Intensity Modulation System Vin (ac) Vs Vo (ac) for fixed carrier power Po and signal frequency, Frequency Response of ac fibre-Optic Linear Intensity Modulation System. Vout (ac) Vs fo at fixed carrier power Po and Vin (ac).


**FIBRE-OPTIC SIMPLEX DIGITAL TRANSCEIVER TRAINER**

Microchip 16F877A / 18F452 Microcontroller CPU, ISP Programming facility, Temperature sensor interface Lm35, Temperature sensor interface DS18B20 24 I/O Lines Provided on a 26 pin FRC Connector for external interface, On board supply /- 12V, 5V is provided.


**ADVANCED FIBRE-OPTIC ANALOGUE TRANSCEIVER TRAINER**

To determine the Numerical Aperature of optical fibre, Losses in Optical Fibres at 660nm and 850nm and other cables, Study of E/O Characteristic of Fibre Optic 660nm and 850nm, Study of O/E Characteristic of Fibre Optic photo transistor.


**ADVANCED FIBRE-OPTIC DIGITAL TRANSCEIVER TRAINER**

Design and study of a Fibre-optic digital link, Study of rise-time and fall-time distortions, Study of propagation delay, Encoding methods for fibre-optic digital transmission.


**FIBRE-OPTIC TRAINER FOR NUMERICAL APERTURE AND FIBRE LOSS MEASUREMENT**

Study of Fibre Optic Transmitter and Receiver, Study of Numerical Aperture of PMMA Fibre, Study of Loss in 1 Mtr / 5 Mtr. PMMA Patch Chords, Study of Electrical - Optical Converter Characteristics.


**FIBRE OPTIC VOICE TRANSMITTER AND RECEIVER TRAINER**

Study of fibre - optic transmitter and receiver for audio signal transmission, Study of fibre - optic transmitter and receiver for voice signal transmission, Fibre-Optic transmitter @ 660nm.


**LASER FIBRE OPTIC TRAINER**

Laser Diode transmitter module, 6V DC at 100mA, IC Regulated Power Supply internally connected, SPDT switch to select Automatic Current Control (ACC) or Automatic Power Control (APC), Potentiometer to set power output, Adequate no of other electronic components.

28508

**PHYSICS OF FIBRE OPTICS TRAINER**

On-board Function Generator, Transmitter, Receiver, Fibre Optic Analog Link, Fibre Optic Digital Link, Signal strength indicator.

28509


**DIGITAL FIBRE-OPTIC POWER METER**

Measures –10dBm to –30dBm, Digital Display., Measures Power at 660nm and 850nm wavelength, Portable with compact size and light weight.

28510

**ELEMENTARY FIBRE OPTICS TRAINER**

Characteristics of Photo Detector, Setting of Fibre Optic Voice Link using Amplitude, Frequency & PWM Modulation, Measurement of Numerical Aperture, Propagation loss using Optical Power Meter, Frequency Modulation System, Study of Propagation Loss in Optical Fiber, Study of Bending Loss.

28510A

**OPTICAL FIBRE COMMUNICATION (BIT ERROR RATE, EYE PATTERN)**

Study of Propagation Loss in Optical Fiber, AM system using Analog & Digital Input Signals, Study of Bending Loss, Characteristics of Fibre Optic Communication Link, Frequency Modulation System, Measurement of Numerical Aperture.

28511

**ADVANCED FIBRE OPTIC TRAINER-DUAL CHANNEL & PC-PC COMMUNICATION FACILITY**

Study of Characteristics of Fibre Optic Communication Link, Study of Setting of Fibre Optic Voice Link using Amplitude, Frequency & PWM Modulation, Study of V-I Characteristics of LED ( E - O converter), Frequency Modulation System and Pulse Width Modulation System.

28512

**MULTIPLEXER / DEMULTIPLEXER - CODER / DECODER TRAINER**

Study of 4-channel Analog Time Division, Multiplexing / Demultiplexing, Study of 16-channel Time Division Mux / Demux, Multiplexing/DemuItiplexing. Study of Pulse Position Modulation/Demodulation, Study of Manchester Coding and Decoding.

28513

**OPTICAL VIDEO LINK TRAINER**

To compare video input signal and video output signal via optical video link, To observe LASER modulator input signal and optical detector output signal, To observe triangular, square, sine etc. Signal transmission via optical video link.

28514A

**WDM TRAINER WITH CHROMATIC DISPERSION**

Study of Wavelength-Division Multiplexing and De-multiplexing, Study of Data Communication using WDM, Study of PC to PC communication using WDM, Study and measurement of Chromatic Dispersion.

28516

**FIBRE OPTICS - DIGITAL LINK**

Setting up Fibre Optic Digital Link, Study of Intensity Modulation Technique usingDigital Input Signal, Characteristics of E-O Converter, Measurement of Numerical Aperture.

28517

**FIBRE OPTICS - ANALOG LINK**

Setting up Fibre Optic Analog Link, Study of Intensity Modulation Technique using Analog Input Signal, Measuring Losses in the fiber, Measurement of propagation loss in the Fiber, Fibre Bending Loss.

28518

**OPTICAL POWER METER**

Input : 180 V Fixed DC, Detector : Silicon detector, Range : 0 dBm to -60 dBm, Display : 12 mm LCD, Wavelength : 660 & 950 nm, Connector : SMA.

28519

**ATMEGA32 AVR EMBEDDED TRAINER**

Self contained and easy to operate, Sensitive, linear & accurate, On board transmitter and receiver, Built in DC power supply, Functional blocks indicated on board mimic, 2 mm sockets for measurement, Null adjustment for atmospheric light.

28520

**CONNECTORIZATION KIT CONNECTORIZATION & SPLICE KIT**

Crimp Tool, Red No Nik tool, Jacket Stripper, Diamond Scribe, Polish Films 2 Part Epoxy, Syringe & Needle, polishing Disc, Polishing Pad, Work Mat Glass Plate, Measuring Scale.

28521

**FIBRE OPTIC CONNECTORIZATION KIT WITH MECHANICAL SPLICE**

Crimp Tool, Red No Nik tool, Jacket Stripper, Diamond Scribe, Polish Films 2 Part Epoxy, Syringe & Needle, polishing Disc, Polishing Pad, Work Mat Glass Plate, Measuring Scale.

28522

**FIBRE OPTIC CONNECTOR TRAINER**

Simple, rugged and low cost, SC connectors use a ceramic ferrule to deliver accurate alignment of the SMF. The SC connector comes with a locking tab that enables push on / pull off operation.

28523

**FIBRE OPTIC CABLES KIT**

Fibre Optic Connectors Kit and Fibre Optic Cables Kit are displays for Fibre Optic Connectors & Cables firmly mounted on a colorful sheets, Only popular type of connectors & cables are selected which are used in Fibre Optic networking.

28524

**FIBRE OPTIC POWER METER**

Use of Germanium photodiode, Wavelength range : 850nm, 1310nm,1550nm, Measure-ment range : +3dbm~50dbm, 0.4dBm, Output: 1mV per 1dB, Low battery indicator, Connector: ST, FC, Multi (option).

28525

**FIBRE OPTICS MODULATION/DEMODULATION TRAINER**

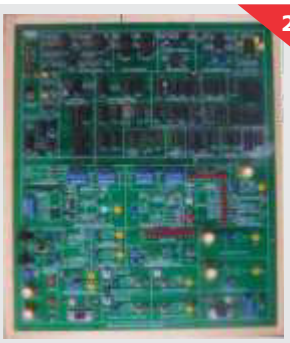
Two Nos. Of Photo Detector., On-board Sine & Square wave generator, On-board 4th Order Low Pass Filer, On-boad Fault Switch, In-Built Power Supply.

28526

**FIBRE OPTICS COMMUNICATION TRAINER WITHOUT PC COMMUNICATION FACILITY**

Setting up Fibre Optic Analog Link, Setting up Fibre Optic Digital Link, Study of Intensity Modulation Technique using Analog Input Signal, Study of Intensity Modulation Technique using Digital Input Signal, Study of Bending Loss.

28527



**ADVANCE FIBRE OPTIC TRAINER**

660nm and 850/950nm Transmitter, Two Nos. Of Photo Detector, On-board Sine & Square wave generator, On-board Manchester Coding/ Decoding Technique, On-board Noise Generator & PRBS Generator, On-board Bit Error Rate Measurement.

28529A

**OPTICAL POWER METER**

Input Supply: 9 volt DC/1 A, Display: 4 Digit LCD Display, Switch: Push button switch to 660nm /990nm, Measuring unit: dBm.

28541

**FIBRE OPTICS CABLE - PMMA**

Optic fiber light is a night lighting ideal light source, by using the theory of total reflection, light transmission through optical fiber to people need light anywhere for lighting, Optical fiber safety, itself is not charged, not afraid of water, can suite many environment, Optical fiber small size, soft and flexible, easy to create and make whatever you want shape.

28551

**CONSTRUCTION AND STUDY OF MODE PROPERTIES OF PLANAR WAVEGUIDE CONSTRUCTION**

Determination of the mode structure of a step index planer waveguide, Determination of the mode structure of waveguide for TM polarization state, Establishing the design of a single mode step index waveguide, Calculation of Brewster's angle.

28552

**PHYSICS OF FIBRE OPTIC LAB**

Demonstration of laws of reflection and refraction with measurement, Measurement of attenuation of an optical fiber by cutback method, Measurement of coupling loss of an optical fiber.

28553

**FIBRE OPTIC COMMUNICATION TRAINER**

Measurement of numerical aperture, Study of frequency modulation and demodulation using fiber optic link, Setting up a fiber optic digital link, Study of modulation and demodulation of light source by pulse position modulation (PPM) techniques, Study of characteristics of fiber optical LED and detector.

28554

### ADVANCED FIBRE OPTIC COMMUNICATION TRAINER

Setting up a fiber optic analog link and digital link, Characteristics study of LED's and Photo detectors, Study of losses in optical fiber, Study of framing in synchronous time division multiplexing, Measurement of bit error rate, Measurement of numerical aperture.

28555

### FIBRE OPTIC TRAINER KIT FOR GLASS AND PLASTIC FIBRE WITH OPTICAL POWER METER FIBRE

To plot the electrical and optical characteristics of different light sources.
TO Study Numerical aperture of fiber.
To estimate the numerical aperture of given fiber.
To measure the attenuation of given MM / SI fiber.

28556

### DUAL WAVELENGTH FIBRE OPTIC LASER SOURCE AND DETECTOR MODULE

All Connectors are suitable for ST type of connector interface, Display to indicate forward voltage across and forward current flowing through LASER source, Voltage and current is varies using intensity control potentiometer, Built in pulse generator with pulse widths of 30ns and 100ns.

28557

### FIBRE OPTIC PASSIVE COMPONENT MODULE

To measure the insertion losses and coupling coefficient in fiber optic multiplexer, To measure insertion loss of fiber optic isolator, To measure isolation rate of fiber optic isolator, To measure insertion losses of fiber optic coupler, To measure coupling coefficient in fiber optic coupler.

28558

### SINGLE MODE FIBRE OPTIC CABLE MODULE

Uniform length of fibers is provided inside the cabinet and end points are provided on the front, panel making it easy for the students tohandle long lengths of fiber, Length of fiber 100m, 500m, 1000m, Type of fiber : 9/125 m single mode buffer 0.9mm PVC SRPC-STPC.

28559

### CHROMATIC DISPERSION MODULE

Specially designed to perform chromatic dispersion experiment, Type of fiber : Single mode, Chromatic dispersion : 3.5ps/(nm.km) @ 1285 nm ~ 1330nm ), Length of fiber : 25Kilometer, Cable cutoff wavelength : 1260nm.

28560

### COARSE WDM AND BRAGG GRATING MODULE

To Study Optical circulator characterization, To Study Optical communication system, To Study Bragg Grating characterization, To Study Diode laser characterization, To Study 4 Channel CWDM by internal & external modulation, To Study Component characteristics.

28561

### ERBIUM DOPED FIBRE AMPLIFIER MODULE

Demonstrates amplification of 1550 nm wavelength along with the detection and measurement of amplified signal, EDFA System enables student to experimentally investigate the principles and characteristics of EDFA in C Band ( 1530nm – 1565 nm), Facility to implement Forward and Backward Pumping and Study Gain Characteristics.

28563

### OPTICAL TIME DOMAIN REFLECTOMETER

Automatic Measurement Mode, 0.3 to 180 km Distance scope, Multi Wavelength Analysis, Different Waveform Comparison, 1310 / 1550 nm Wavelength, 32 / 30 dB Dynamic range, Trace Fixing Function.

28564


**OPTICAL SPECTRUM ANALZSER**

Channel Power Measurement, Channel Threshold Detection, Multiple traces viewed simultaneously, User-friendly GUI for Measurement and Analysis.

28565

**FIBRE OPTICS MODULATION/DEMODULATION TRAINER**

Two Nos. Of Photo Detector., On-board Sine & Square wave generator, On-board 4th Order Low Pass Filer, On-boad Fault Switch, In-Built Power Supply.

## Instrumentation Trainers

52001

**LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) TRAINER**

Study of Linear Variable Differential Transducer (L.V.D.T.), Adequate no. of patch cords stackable 4mm spring loaded plug length ½ metre, Good Quality, reliable terminal/sockets are provided at appropriate places on panel for connections /observation of waveforms.

52002

**MEASUREMENT AND CONTROL OF TEMPERATURE USING RTD TRANSDUCER**

Measurement and control of temperature using RTD transducer, ±12V DC at 100 mA, IC Regulated Power Supply, 6 V DC at 100 mA, IC Regulated Power Supply, Implementation of Wheatstone Bridge in Temperature Control System, Four Op-Amp. Ics.

52003

**LOAD CELL DEMONSTRATOR**

To study Load Cell Demonstrator, Load Cell of 3kg with 200mV output, DPM of 3½ digit display for 3kg, Adequate no. of other electronic components, Mains ON/OFF switch and fuse.

52003A

**STRAIN GAUGE TRAINER**

To study strain measurement using strain gauges and cantilever assembly, To determine the linear range of operation of strain measurement, To determine sensitivity of the trainer.

52004

**OPTICAL TRANSDUCER TRAINER**

To Study Characteristics of filament Lamp, To Study Characteristics of Photovoltaic Cell, To Study Characteristics of Photoconductive Cell, To Study Characteristics of Photo transistor, To Study Characteristics of PIN Photo diode, To Study Light Controlled Switch System.

52005

**ULTRASONIC DIGITAL DISTANCE METER**

To measure unknown distance between 0.3 metre to 3 metres, The unit is operative on 9V DC Battery cell, Good Quality, reliable terminal/sockets are provided at appropriate places on panel for connections/ observation of waveforms.

## Fibre Optic Trainers

52006

**TEMPERATURE MEASUREMENT TUTOR USING AD - 590**

To study the Characteristic of AD - 590, Oven for heating AD-590, Two AD-590, One for study of characteristic and one for maintaining the set temperature, 31/2 digits digital panel meter for temperature display, 31/2 digits digital panel meter with switch selection to read voltage range 0 - 200V and to read current 0 - 1999uA.

52007

**D.C. MOTOR SPEED CONTROL TRAINER**

Effect of loading on the speed of the motor in the open loop, Steady state error variation with forward gain, System time constant variation with forward gain, Effect of forward gain on disturbance rejection, Determination of the motor transfer function and tachometer characteristics.

52008

**CONTROL SYSTEM LAB**

To study and observe Voltage to Frequency converter, To study and observe Frequency to Voltage converter, To study and implement Light intensity control using PWM method, To study and observe Characteristics of Photoconductive Cell (LDR).

52009

**FIBRE OPTIC PASSIVE COMPONENT MODULE**

Study of thermal Process Control, Study of Temperature Controller, Study of Use of Industrial Process Control Elements, Study of Signal Conditioning, Study of Control Quality and Optimum Control.

52009A

**TEMPERATURE PROCESS CONTROL TRAINER**

Study of open loop (Manual control), Study of on/off controller, Study of proportional controller, Study of integral controller, Study of derivative controller, Study of PID controller.

52009B

**FLOW PROCESS CONTROL TRAINER**

Study of open loop (Manual control), Study of on/off controller, Study of proportional controller, Study of integral controller, Study of derivative controller, Study of PID controller.

52009C

**TEMPERATURE PROCESS CONTROL TRAINER (AIR)**

Study of open loop (Manual control), Study of on/off controller, Study of proportional controller, Study of integral controller, Study of derivative controller, Study of PID controller.

52009D

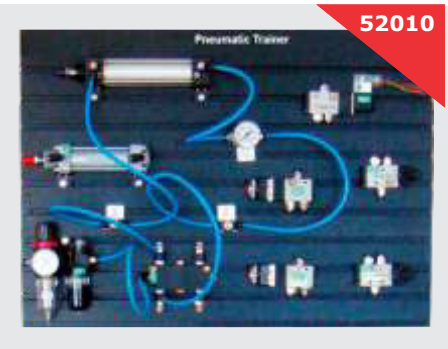
**LEVEL PROCESS CONTROL TRAINER**

Trainer having control panel should provided in 40X40mm Aluminum profile rack with sturdy table top flat panel, Should have ABS plastic panel mounted on the aluminum rack with mimic diagram., All input & output are terminated in 4mm shrouded connector, Should provide 4mm banana cable for experiments.

52009E

**PRESSURE PROCESS CONTROL TRAINER**

Study of open loop (Manual control), Study of on/off controller, Study of proportional controller, Study of integral controller, Study of derivative controller, Study of PID controller.




**PNEUMATIC TRAINER**

Study of the operation of a Single Acting cylinder, Study of the operation of a Double Acting cylinder, Observation of the piston movement of a Single Acting cylinder manually by using Push button, To study manual control of piston movement of double acting cylinder.


**TEMPERATURE TRANSDUCER TRAINER**

Characteristics of IC temperature Sensor, Characteristics of NTC Thermistor, Characteristics of NTC Bridge Circuit, Characteristics of Platinum RTD, Characteristics of K type Thermocouple, Temperature Controlled Alarm System.


**RELAY CONTROL TRAINER**

Eight identical switched relays (DC 12V) O/E/N-58-06-1C, Power input positions to the relays using 3 pole terminal blocks, DB25 connector to the parallel port of a PC, Protection of Parallel port on PC in case of accidental disconnection, Diode protection for transistors.


**PRESSURE TRANSDUCER TRAINER**

Differential Input Pressure Transducer, Precise Signal conditioning, Self-contained and easy to operate, Sensitive, Linear, Stable & Accurate, Functional blocks indicated on board mimic, On board Digital Voltmeter, On board Indicators Buzzer & LED.


**PLC TRAINER**

To Study Drink Machine (For cola, lime and lemon), To Study Car Parking (For three cars), To Study Tank Level Control (High level, low level and empty), To Study Step Sequence (Use of timer at different time interval), To Study How to create delays (Off delay, pulse, extended pulse), To Study Light Intensity variation.


**UNIVERSAL PLC PLATFORM**

Study the difference between digital and analog signals and how to bring them into a PLC, process them and send them back out, Exposure to technology of Programmable Logic Controller (PLC) and understanding the importance of automation in industries, To study variety of ladder logic instruction to create complete PLC program from scratch.


**UNIVERSAL PLC (SIEMENS) TRAINER WITH HMI**

Study the difference between digital and analog signals and how to bring them into a PLC, process them and send them back out, Exposure to technology of Programmable Logic Controller (PLC) and understanding the importance of automation in industries.


**PLC TRAINER**

Micro PLC from Delta, On board NO/NC switches, Sample of Annunciator given on board, Most user friendly, most powerful instruction sets, High execution speed, PC Based Programming, Soft copy of PLC introduction and Tutorials.


**PLC (DELTA) TRAINER 24 INPUT - 22 OUTPUT, 4 ANALOG IP 2 ANALOG OP**

Study of NO, NC & Coil Operation, Study of Interlock Operation, Study of Latch Operation, Study of Set & Reset Operation, Study of Rising & Falling Edge Operation, Study of Addition, Subtraction, Multiplication & Division Operation.


**PLC (DELTA) TRAINER 8 INPUT - 6 OUTPUT WITH ON BOARD APPLICATIONS**

Study of Set & Reset Operation, Study of Rising & Falling Edge Operation, Study of Timer & Counter Operation, Study of Right & Left Shift Operation, Study of Data Move Operation.


**UNIVERSAL PLC (DELTA) TRAINER WITH HMI**

To study variety of ladder logic instruction to create complete PLC program from scratch, Exposure to technology of Programmable Logic Controller (PLC) and understanding the importance of automation in industries.


**PLC TRAINER**

Micro PLC from Fatek, On board NO/NC switches, On board IR switches, Sample of Annunciator given on board, Most user friendly, most powerful instruction sets, PC Based Programming, Soft copy of PLC introduction and Tutorials, Choice of PLC and expansion module.


**PLC (FATEK) TRAINER 14 INPUT / 10 OUTPUT**

Installation of output relay helps to increase load current, Easy-to-use, windows-based development software, Input-simulation switches function as level and pulse input for different input signal, Installation of output relay helps to increase load current.


**TEMPERATURE PROCESS CONTROL TRAINER**

7" Human Machine Interface (HMI) display, Fatek PLC with 12 digital inputs, 8 digital outputs, 4 analog inputs and 2 analog outputs, Toggle switches, push to ON switch, proximity sensor, selector switch, visual indicator, audio indicator, DC motor, relay card, contactor and voltage display.


**UNIVERSAL PLC (ALLEN BRADLEY) TRAINER WITH HMI**

Bradley PLC with 20 digital inputs, 12 digital outputs, 4 analog inputs and 2 analog outputs, PC based ladder and HMI programming, Extremely easy and student friendly software to develop different programs, Practice troubleshooting skills.


**WATER LEVEL CONTROL TRAINER**

Study of water level, Study and use of timers and memory bit, Water level control by PLC through ladder program, Ready to use application board, Exhaustive learning material.


**ELEVATOR CONTROL BY PLC**

Study of elevator, Study and use of latch switches and timers, Elevator control by PLC through ladder program, Ready to use application board, Exhaustive learning material.


**TRAFFIC LIGHT CONTROL BY PLC**

Study of traffic light, Study and use of memory bit and timers, Traffic light control by PLC through ladder program, Study of signal indications for two direction, User friendly and powerful instruction sets, Ready to use application board, Exhaustive learning material.

52024

**TRAFFIC LIGHT CONTROL BY PLC**

Study of traffic light, Study and use of timers, Traffic light control by PLC through ladder program, Study of all three signals Red, Green and Orange i.e. Ready, go and stop, Having signal indications for all direction at any square.

52025

**CONVEYOR BELT TRAINER**

Real time conveyor control by PLC, Product sorting, Works on both Auto/Manual mode, Provision for user to expand the number of sensors.

52026

**PID CONTROLLER TRAINER**

Real time conveyor control by PLC, Product sorting, Works on both Auto/Manual mode, Provision for user to expand the number of sensors, Exhaustive course material & references.

52027

**DIGITAL CONTROL SYSTEM TRAINER**

Identification of the controlled process, Study of sampling period variation, Designing P, PI, PD and PID controllers, Advanced algorithms implementation.

52028

**AC SERVOMOTOR STUDY**

Study of Inertia and friction parameters, Study of Time constant, Study of Transfer function, 2-phase a.c. servomotor - 12V/ 50Hz per phase, Small generator for loading, 4-digit speed display, 3-digit time constant display.

52029

**DC MOTOR STUDY**

To Study Torque-speed characteristics, To Study Inertia and friction parameters, To Study Back e.m.f. constant, To Study Time constant, To Study Transfer function.

52030

**DC POSITION CONTROL SYSTEM**

Operation of the position control system for different values of the forward gain to angular position commands, Step response studies for various values of forward gain, Study of the effect of velocity feedback on the transient and steady state performance of the system as well as its stability.

52031

**A.C. POSITION CONTROL SYSTEM**

To Study Error detector characteristics, phase reversal, To Study Amplifier gain measurement, To Study Phase difference between control and reference windings, Step response study.

52032

**DC MOTOR SPEED CONTROL SYSTEM (PWM, SCR)**

Open loop speed control for PWM Controller, with and without load, Open loop speed control for SCR Controller, with and without load, Closed loop speed control for SCR Controller with and without load, Observation and measurements on the voltage waveforms.

52033

**TEMPERATURE CONTROL SYSTEM**

Study of Proportional Controller (P Control) having adjustable coefficients, Study of Proportional-Integral Controller (PI Control) having adjustable coefficients, Study of Proportional-Integral-Derivative Controller (PID Control) having adjustable coefficients.

52033A

**TEMPERATURE SENSOR TRAINER**

Study the NTC Thermistor sensor, Study the Platinum RTD sensor, Study the K-type Thermocouple Temperature sensor, Study the IC LM335 type Temperature sensor.

52034

**PID CONTROLLER TRAINER**

Open loop response of various process configurations, P, PI, PD and PID design and performance evaluation (10 in all) in each case, Simulated blocks – dead time (transportation lag), integrator, time constants, error detector and gain.

52035

**Study of Synchro Devices**

Operation and error study of the transmitter-receiver pair as a simple open loop position control at a very low torque. This is a rarely used application but is used to demonstrate the direction of the resultant magnetic field in the receiver.

52037

**MAGNETIC LEVIATION SYSTEM**

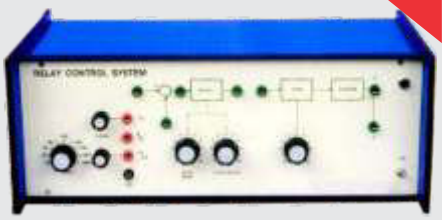
Object suspended in air by magnetic force, Controller design to maintain stability, Position changing by reference, Built-in power supplies, meters etc, 220V/50Hz operation.

52038

**STUDY OF STEPPER MOTOR**

Study of speed and direction control logic by recording the pulse sequence for both clockwise and counter clockwise motions, Study of resonance effect at various speeds - it provides an idea of the dynamic behaviour of the motors.

52039



**RELAY CONTROL SYSTEM**

Simulated electronic relay using high speed Ic's, Simulated 2nd order linear plant. Facility for displaying x and x signals, Dead zone variable from 0-600mV, Hysteresis variable from 0-500mV.

52040

**COMPENSATION DESIGN TRAINER**

Simulated 'uncompensated' system having adjustable damping, Peak percent overshoot MP, variable from 20% to 50%, and steady state error variables from 50% to 0.5%, Compensation network implementation through built-in variable gain amplifier, Gain is adjustable from 1 to 11.

52041

**STUDY OF SECOND ORDER NETWORKS**

Active second order network, Damping control – over-, critical, and under-damping, Built-in square wave signal, Built-in sine wave signal, Needs an external CRO for response study, Operates with 220V/50 Hazard, Exhaustive learning material.

52042

### LINEAR SYSTEM SIMULATOR

Study of Open loop step response of First Order system, Study of Closed loop step response of First Order system, Study of Closed loop step response of Second Order systems, Study of Closed loop step response of Third Order systems, Study of Disturbance rejection, Study of Additional experiments may be perform.

52043

### POTENTIOMETRIC ERROR DETECTOR

High quality servo-potentiometers of 360° shaft rotation, Built-in signal and power sources, 3½ digit DVM for measurements, 220V±10%, 50Hz mains operation, Requires an external CRO for a.c. Studies.

52044

### LIGHT INTENSITY CONTROL SYSTEM

Study of Characterization of light panel and light sensor blocks, Study of a practical single loop feedback control system, Study of Performance improvement through P-I control, Study of Evaluation of dynamic behaviour, Study of Seven lamps 6V/300mA, Study of 5Hz square wave and triangular wave for dynamic response study.

52045

### MICROPROCESSOR DEVICE CONTROLLER

Study of Light the 8 LEDs in a cycle, in binary sequence, as a bar graph display etc, Study of Operate the 2 relays with software controlled timing, Study of Operate the 7-segment display through segment control, Study of Sense the state of the 4-switches as input and send out suitable signals to various output devices.

52046

### STUDY OF TEMPERATURE TRANSDUCERS

Study of Gain and CMRR of the Instrumentation Amplifier, Study of Characteristics of a Negative Temperature Coefficient Thermistor (NTC), Study of Characteristics of a Positive Temperature Coefficient Thermistor (PTC), Study of Characteristics of semiconductor Sensor, AD590 up-to 90 ºC only.

52047

### STROBOSCOPE

Non-Contact-type - no error due to friction drive, suitable for small motors and also motors in inaccessible locations, High intensity XENON flashes - operation possible from a reasonable distance (0.5m) in usual ambient light in a room. Detachable lamp unit with 1.5m cable, 4-digit speed display in rpm - operating range of 500- 9900 rpm, resolution 1 rpm. High accuracy crystal controlled LED display.

52051

### TRANSDUCER & INSTRUMENTATION TRAINER

An introduction to basic control systems, An evaluation of the various Input devices, Practical investigation of the various output devices, Practical investigation of the Display devices, Applications in practical systems, evaluation of input requirements, In depth investigation/analysis of the numerous signal conditioning circuits.

52052

### PLC TRAINER & APPLICATIONS - ALLEN-BRADLEY

An introduction to relay ladder logic, Programming the controller, Input, Output and Auxiliary relays, Latched relays, Master and Zone control relays, Counters and timers, Sequencers, Using the remote programming software.

52053

### PC BASED ANALOG & DIGITAL MOTOR CONTROL TRAINER

To study Time and frequency response, To study Principles of feedback, To study Proportional position control, To study Behaviour of second order systems, To study Position control with velocity feedback, To study 3-Term or PID control.

52054

**DC POSITION SERVO TRAINER (ANALOG & DIGITAL)**

To Study DC Motor Angular Position Servo System, Measurement of Dead Zone, To Study the different Characteristics of Servo System, To Study Hunting, To Study Repeatability, To Study Noise Free.

52054A

**DC SERVO MOTOR**

Speed control of a 30V/2A, permanent magnet d.c. motor, Speed range: 0 to 2000 rpm (typical), Opto-interrupter based speed sensing, 4-digit speed display in rpm, Electronic tachogenerator for feedback.

52057

**MOTION, SOUND & FORCE TRAINER**

Linear variable differential transformer, Linear variable capacitor, Strain guage Humidity Sensor, Dynamic microphone, Ultrasonic receiver.

52058

**ROTATIONAL & AIR SENSOR TRAINER**

Positional Resistance Transducers, Wheatstone Bridge Measurements, Rotational speed or position Measurement, Linear or Rotational Motion, Display Devices, Control Systems Characteristics.

52059

**SIGNAL CONDITIONING TRAINER**

Buffer, Low pass filter with switchable time constant, Inverters, Precision full-wave rectifier, Comparator with switchable hysteresis, Sample and hold circuit, Amplifiers with gain and offset control, Integrator with switchable time constant, Current amplifier.

52060

**MOTOR CONTROL TRAINER**

To Study Stepper motor's forward/ reverse control, To Study Stepper motor's positioning control, To Study Stepper motor's speed and position control in the self-starting zone, To Study Stepper motor's speed and position control in the accelerating/ decelerating zone, To Study Encoder in the stepper motor closed-loop control .

52061

**PROGRAMMABLE LOGIC CONTROLLER DEMONSTRATOR**

The Pico family of Nano PLCs from Allen Bradley, are smallest & most Economical Controller, They offer Performing Simple Logic, Timing, Counting & Real Time Clock Operations, DT-4001, is built around Allen Bradley's PICOLOGIX, Built in power supply (24V DC), Input voltage Category (24V DC).

52062

**CNC ENGRAVING & MILLING CONSOLE TRAINER**

Spindle Speed Range : 6000-24000RPM, Spindle Power: 1.5KW (2HP) Air cooled (VFD Control), Feed Rate Range: 600mm/min for X, Y & Z axis, Suitable for engraving on Steel, Soft metals and plastic, Suitable for Milling on all soft metals and plastics / acrylic.

52063

**PID CONTROLLED OVEN**

An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel, All wiring must be completed before power in turned on to prevent electric shock, fire or damage to instrument and equipment.


**SIEMENS LOGO PLC TRAINER**

Siemens Logo PLC TrainerTo Study NO (Normally Open) And NC (Normally Close) Switch Function, To Study Latching (Set) And Unlatching (Reset) Bit Function, To Study AND Gate, To Study OR Gate, To Study NOT Gate, To Study And Use Timer Instruction.


**SELEC PLC TRAINER**

7 segment LED display, Stepper motor, 16SPDT slider switches, 13DPDT slider switches, 29 Tact switches, 174 LEDs available onboard.


**LIGHT & TEMPERATURE TRAINER**

Describe the characteristics of an IC temperature sensor, Describe the construction and characteristics of a platinum RTD resistance, Describe the construction and characteristics of an n.t.c. Thermistor, Discuss the characteristics of n.t.c. thermistor bridge circuits.


**HYDRAULIC TRAINER**

Choice of 2 top models Hydraulic/Electro Hydraulic trainer (Optionally PLC may be supplied.) / Use of aluminium profile grooved plate (CD=25mm) experiment board. Optionally table with drawers (3 nos.) To store components when not in use & 4 Nos. of caster wheels.


**MINI HYDRAULIC TRAINER**

Light weight, easy to carry, lockable, rigid enclosure with caster wheels and trolley puller, Low cost, Water compatible hydraulic components and accessories, MS fabricated black powder painted mounting frame, Water pressure pump with self illuminated ON/ OFF switch.


**ELECTRO HYDRAULIC TRAINER**

Quick release socket plug arrangement for building circuits, Lighter pneumatic components are mounted using lever operated mounted adapters for quick release & placement, List of components may be modified as per your requirement.


**ELECTRO HYDRAULIC TRAINER**

Motor : 1/2 HP, 3 foot /flange motor, Oil Tank : 20 litre capacity (oil to be provided by the purchaser, Suction Filter Pressure Gauge, Oil Level Indicator, Pressure Relief Valve.

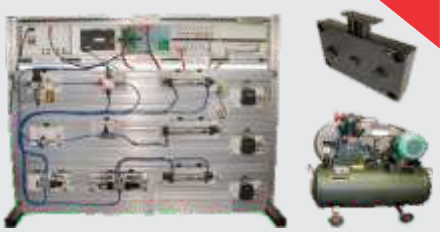

**ELECTRO HYDRAULIC TRAINER**

Study and implementation of NOT gate using PLC, Mounting panel for Hydraulic components, Study and implementation of AND gate PLC, Study and implementation of NAND gate PLC.


**PNEUMATIC TRAINER**

Flow & pressure Regulator (FRL) unit with Pressure gauge *(10bar) 1/4" BSP (F), Manifold 4 way, 1/4"BSP (F) with ON/OFF 4 nos, ball valve, One way flow control adjustable valve 1/4"BSP (F), Bal Valve 1/4" BSP for ON-OFF (M-F) Silencer, 3/2 way directly actuated valve [with push button 1/4" BSP (F)].

52070



**ELECTRO PNEUMATIC TRAINER**

Flow & pressure Regulator (FRL) unit with perssure gauge (10bar), 1/4" BSP (F), Manifold 4 way 1/4" BSP (F) with 4 BALL on / off valve, One way flow control adjustable valve 1/4"BSP (F), Silencer.

52070A

**ELECTRO PNEUMATIC TRAINER**

Air Filter, Regulator & Lubricator Unit (FRL Unit), Pressure Manifold with Four ON / OFF Valves for multiple connections, Manifold with 3/2 Way Hand Slide Valve, Single Acting Cylinder, Double Acting Cylinder.

52070B

**PNEUMATIC TRAINER SYSTEM**

2/2 Way Direct Acting Solenoid Valve, Pressure Manifold with Four ON / OFF Valves for multiple connections, 5/2 Way Roller Valve, Single Acting Cylinder, Electro Magnetic Relay.

52071

**IDCS**

Intelligent Industrial controller mounted on ESD protective Workbench, On-board 24V 6A Power-Supply, I/O Signals brought out on breakout panels for interfacing, PLC Programming IEC-61131-3 standards with KW-Multiprog, Provision for Industry standard DIN-rail mounted units.

52072

**IOT - TRAINER**

To Study Gyroscope sensor Module, To Study IR sensor Module, To Study PIR sensor Module, To Study Remote sensors, To Study Natural Gas Sensor, To Study Humidity Sensor, To Study Temperature Sensor.

52072A

**MOTOR CONTROL TRAINER**

To Study Interfacing 4x4 keypad matrix, To Study Controlling LED using Push button, To Study Generating tone using buzzer, To Study Sensing envi ronment humidity by interfacing humidity sensor DHT11.

52072B

**RASPBERRY APPLICATION BOARD**

Starting Raspbian OS, Familiarising with Raspberry Pi Components and interface, Connecting to ethernet, Monitor, USB, Displaying different LED patterns with Raspberry Pi, Displaying Time over 4-Digit 7-segment Display, Setting up Wireless Access Point using Raspberry Pi.

52072C

**ARDUINO APPLICATION BOARD**

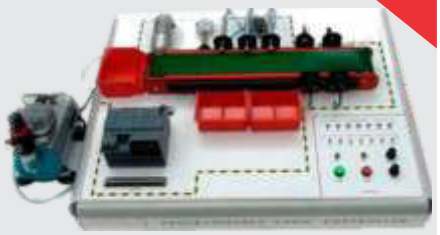
To Study Starting and connecting Arduino board with Computer, To Study Displaying different LED patterns with Arduino, To Study LCD interfacing with Arduino, To Study DC Motor Interfacing with Arduino.

52072D

**IOT DEVELOPMENT BOARD**

To Develop Program For Interfacing 7 Segment Display, To Develop Program For Measuring Distance By Interfacing Ultrasonic Sensor HC- SR04 With ESP32, To Develop Program to Control DC Motor with ESP32, To Develop Program For Generating Tone Using Buzzer.

52073



**PLC - TRAINER**

Recognize the Bit Shift Left and Bit Shift Right instructions and how they are programmed, Recognize the operation of the Sequencer Output instruction and how it is programmed, Write a program to Sort components by Height.

52082

**LEVEL MEASUREMENT TRAINER**

Onboard Instrumentation Amplifier provided, Block Description Screen printed on glassy epoxy PCB, 1feet Scale is provided for level measurement, Plastic container with outlet Tap is provided for Water Storage, Facility to Interface with PC.

52083

**SPEED MEASUREMENT TRAINER**

Onboard Instrumentation Amplifier provided, Block Description Screen printed on glassy epoxy PCB, 6V DC Motor with necessary attachment for measurement is provided, Test points are provided to analyze signals at various points, All ICS are mounted on IC Sockets, Bare board Tested Glass Epoxy SMOBC PCB is used.

## AVAILABLE BRANDS

TESCA™ · BOSCH · DEWALT · Yeim · TAPARIA · BLACK+DECKER · FLUKE · HIOKI · OWON · Tektronix · RISHABH · RIGOL · Schneider Electric · ABB · C&S · SIEMENS · BEMAX · EMLID · sylvac · peel 3d · DOT PRODUCT · GEOSLAM · GEOTECH · Raspberry Shake · VRMesh · AVEVA · GEXCEL · DOPO · IdeaForge · Godrej · Nilkamal · HOF · IMP · HYDROMINE · GLASSCO · BOROSIL · Polylab · DELL · hp · Lenovo · D-Link · EPSON · Canon · FORTINET · Atmel · ST · Texas Instruments · XILINX · NXP · VISHAY · ELCOM · comac · AHUJA · ATPRO · Honeywell · Crompton · FARO · makita · testo · MANTIS VISION · ABRIGO · GARMIN · PolyWorks · Panasonic TOUGHPAD · GMT Geo Misura Technik · 3D SYSTEMS · EOS

52085

**SENSOR TRAINER BOARD (ITI)**

Instrumentation amplifier, All interconnections are made using 2mm socket, Test points are provided to analyze signals at various points, All ICS are mounted on IC Sockets, Bare board Tested Glass Epoxy SMOBC PCB is used, In-Built Power Supply of ±5V, ±12V.

52085.1

**DIGITAL SENSOR TRAINING KIT**

To study the basic of digital input & Output, To study the industrial application of digital Sensors, To study and calibrate the digital sensor output, To display & understand the variation in response time of various digital sensor, To study electrical connections of various types of digital sensors.

52085.2


**SENSOR TRAINER BOARD WITH DIGITAL SENSORS**

To study the basic of digital input & Output, To study the basic function of digital Sensors, To display & understand the variation in response time of various digital sensor, To study electrical connections of various types of digital sensors.

52086

**FLOW RATE MEASUREMENT TRAINER**

Study of flow rate, Study of Rotameter, Study and use of flow rate measurement of water using a Rotameter.

52087

**PROGRAMMABLE LOGIC CONTROLLER TRAINER**

To Study Day light tower, To Study Vending machine control, To Study Logic gate( AND, OR,NOT,NOR,NAND,EX-OR,EX-NOR), To Study Manipulator control, To Study Traffic light control.

52088

**CONTROL SYSTEM SIMULATOR**

To observe the First Order control system for different values of the Damping Ratio at different values of resistance, To observe the Third Order control system for different values of the Damping Ratio at different values of resistance, To observe the Type0 control system Steady, State Error (Ess) for Unit Step or Square wave input.

52089

**MEASUREMENT OF STRAIN USING STRAIN GUAGE**

To study strain measurement using strain gauges and cantilever assembly, To determine the linear range of operation of strain measurement, To determine sensitivity of the trainer.

52090

**MEASUREMENT OF TORQUE USING STRAIN GUAGE**

To study Torque measurement using strain gauges and cantilever assembly, To determine the linear range of operation of Torque measurement, To determine sensitivity of the trainer.

52091

**WATER LEVEL MEASUREMENT TRAINER (USING INDUCTIVE & CAPACITIVE TRANSDUCER)**

To study Water level Indicator using Inductive Transducer, 5V D.C. at 100mA, I.C. regulated Power Supply, Inductive Water Level Sensor capable of measuring level from 0 to 9 (nine interval).


**MEASUREMENT OF ANGULAR DISPLACEMENT USING POTENTIOMETRIC (RESISTIVE) AND CAPACITIVE TRANSDUCER & STUDY THEIR CHARACTERISTICS**

To measure angular displacement using Capacitive Transducer, To study the characteristics of Potentiometric (Resistive) Transducer, To study the characteristics of Capacitive Transducer.


**DISPLACEMENT MEASUREMENT TRAINER USING LDR, PHOTO TRANSISTOR AND PHOTO DIODE SETUP**

To study LDR characteristics as displacement vs resistance at constant voltage, To study Phototransistor characteristics as voltage vs displacement, To study LDR characteristics as voltage vs resistance at constant displacement.


**DISPLACEMENT MEASUREMENT USING INDUCTIVE & CAPACITIVE PICK-UP SYSTEM**

To Study Displacement measurement using inductive pick-up system, To Study Displacement measurement using capacitive pick-up system.


**MEASUREMENT OF SPEED USING PHOTOELECTRIC TRANSDUCER**

To Study Measurement of Speed using photoelectric transducer, 4 digit 7 segment display for displaying speed in RPM, 12 Volt DC Motor with blade that has 12 hollow points at the edges whose rotating speed is to be calculated, Opto coupler MOC7811 as a photoelectric transducer.


**BASIC PNEUMATIC TRAINER KIT (TRANSPARENT) WITH INCLINED PROFILE**

Air preparation unit Junction box with slide valve, Double acting cylinder Tie rod model, Single acting cylinder Tie rod model, Roller Lever valve, Inline flow control valve.


**BASIC PNEUMATIC TRAINER KIT WITH INCLINED PROFILE**

Operation of single acting and double acting cylinder, Speed control techniques of pneumatic actuator, AND, OR logic operation Position control using Roller lever valve, Operation of manual operated valves.


**ELECTRO PNEUMATIC WORKSTATION**

PLC operated Electro Pneumatic platform, MCB for ON/OFF control and over load protection, 4 mm patch cord connections, Powerful instruction sets, Extremely easy and student friendly software.


**BASIC PNEUMATIC TRAINER KIT WITH FIXED COMPONENT**

5/2 way double external pilot operated valve, 5/2 way Single External pilot operated valve with spring return, 5/2 Hand lever valve with Sp. return, 5/2 Hand lever valve with detent.


**BASIC PNEUMATIC COMPACT TRAINER**

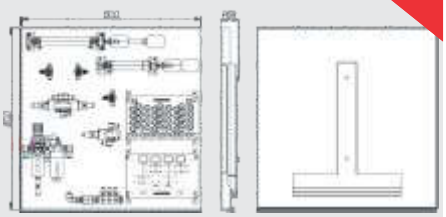
5/2 way Single External pilot operated valve with spring return, Miniature double acting cylinder(Ø25 x 100), 3/2 NC Valve with switch(Flush head - Green)-1/8", Inline slide valve, Junction box.

52106

**ELECTRO PNEUMATIC TRAINER KIT WITH FIXED COMPONENT**

Air preparation unit, Junction box with slide valve, Double acting cylinder – Tie rod model, Double acting cylinder – Crimping model, Single acting cylinder – Crimping model, Inline flow control valve, 5/2 way Double solenoid operated valve.

52106A



**ELECTRO PNEUMATIC COMPACT TRAINER KIT**

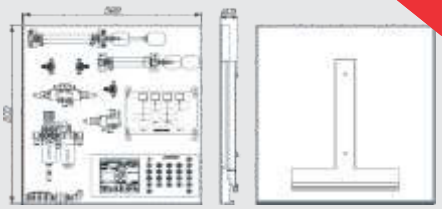
Magnetic Sensor with clamp for Miniature DAC Cylinder, Electrical connection set-banana plugs and cables, 5/2 Way Double solenoid pilot operated valve, Junction box with slide valve, Miniature Single acting cylinder - Magnetic(Ø25x50).

52107

**ELECTRO PNEUMATIC TRAINER KIT PLC WITH FIXED COMPONENT**

Electro pneumatic kit with PLC consists of all the capabilities mentioned under the electro pneumatic training kit, It surpasses their capabilities by its flexibility in designing circuits & possibilities of achieving numerous logical circuits using the software interface.

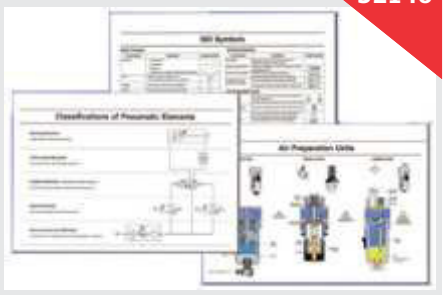
52107A



**ELECTRO PNEUMATIC COMPACT TRAINER WITH PLC**

Input Voltage : 85 264 V AC, 47 63 Hz, Output Voltage : 24V DC, 4A, Material : ABS, Protection : AC - 2A glass type fast blown fuse.

52146



**PNEUMATICS - WALL POSTERS**

Classification of Pneumatic Elements, Working Elements, Final Control Elements, Signal Elements, Directional Control Valves.

52147

**PNEUMATICS - CUT SECTIONS**

Single acting cylinder, Double acting cylinder, Filter regulator, Hand lever valve, Flow control valve, AND valve, 3/2 NC flush head valve with actuator - Green, Quick exhaust valve, Non return valve.

52148

**PNEUMATICS - MAGNETIC SYMBOLS**

Air Preparation Units, Signal Elements, Directional Control Valves, Working Elements, Final Control Elements.

52149

**PNEUMATICS - AUTOMATION SOFTWARE**

Functional features of products & components can be understood, The virtual cut sectional animations of individual components and as a circuit lets the students to know the internal details of the product and to understand the functions better.

52200

**MODULAR PRODUCTION / MANUFACTURING SYSTEM**

Dispensing Station Stack magazine and vacuum switch module for distribution of work piece for inspection, Inspection Station Pneumatic linear drive fitted with linear transducer measures the height of work piece and segregates the approved / rejected ones.


**AIR COMPRESSOR**

Power : 1HP, input Voltage : 230VAC, Tank Capacity : 25 Litre.


**PROCESS INSTRUMENTATION TRAINER**

Study of Flow transmitter and measurement, Study of Level transmitter and measurement, Study of Temperature transmitter and measurement, Study of Control valve & its characteristics, Study of frequency transmitter & its operation.


**FLOW CONTROL TRAINER (WITH TURBINE FLOW METER )**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**FLOW CONTROL TRAINER (WITH DPT TYPE FLOW METER)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**FLOW CONTROL TRAINER (WITH MAGNETIC FLOW METER)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**FLOW CONTROL TRAINER (WITH ULTRASONIC FLOW METER)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**LEVEL CONTROL TRAINER (WITH CAPACITANCE TYPE LEVEL TRANSMITTER)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**LEVEL CONTROL TRAINER (WITH DPT AS LEVEL TRANSMITTER)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**LEVEL CONTROL TRAINER (WITH ULTRASONIC LEVEL TRANSMITTER)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**PRESSURE CONTROL TRAINER (WATER)**

Study of operation and calibration of transmitters, I/P converter and Control Valve, Study of open loop/close loop tunning & auto tunning of controller, Study of step response & Transient response of controller ( process curve), Study of tuning and operation of PID controller.


**PRESSURE CONTROL TRAINER (AIR)**

Study of single loop Proportional (P), Integral (I) and Derivative control (D), Study of programming and operation of PID controller, Study of stability of single loop Flow Control System, Study of operation and calibration of transmitters, I/P converter and Control Valve.


**TEMPERATURE CONTROL TRAINER (AIR)**

Study of single loop proportional, integral and derivative control, Study of stability of single loop Temperature control, Configure micro controller based PID to give manual output, change controller modes (Manual or Auto), give ON OFF, proportional, integral, derivative PI and PID Control, change local set point, configure and run a set point.


**TEMPERATURE CONTROL TRAINER (WATER)**

Study of single loop proportional, integral and derivative control, Study of stability of single loop Temperature control, Configure micro controller based PID to give manual output, change controller modes (Manual or Auto), give ON OFF, proportional, integral, derivative PI and PID Control, change local set point, configure and run a set point.


**VERIFICATION OF P, P+I, P+D, P+I+D CONTROL**

Study of single loop proportional, integral and derivative control, Study of operation and calibration of transmitters, Study of stability of Temperature control loop, Demonstrate the use of RTD (or a transmitter) for the measurement of temperature of flowing air and a heater.


**PC-PID BASED MULTI PROCESS CONTROL TRAINER**

Feedback control Flow, Level, Temperature and Pressure, Split Range control Level/Pressure, Feed forward control flow/level, A control system for liquid flow across the two tanks, Study of SCADA Application Software/ Computerized Control of Multi-Process Control System.


**PNEUMATICS - MAGNETIC SYMBOLS**

Feedback control Flow, Level, Temperature and Pressure, Split Range control Level/Pressure, Feed forward control flow/level, A control system for liquid flow across the two tanks, Study of SCADA Application Software/ Computerized Control of Multi-Process Control System.


**PNEUMATICS - AUTOMATION SOFTWARE**

Feedback control Flow, Level, Temperature and Pressure, Split Range control Level/Pressure, Feed forward control flow/level, A control system for liquid flow across the two tanks, Study of SCADA Application Software/ Computerized Control of Multi-Process Control System.


**MODULAR PRODUCTION / MANUFACTURING SYSTEM**

Feedback control Flow, Level, Temperature and Pressure, Split Range control Level/Pressure, Feed forward control flow/level, A control system for liquid flow across the two tanks, Study of SCADA Application Software/ Computerized Control of Multi-Process Control System.

52238

**PC-PLC HMI BASED MULTI PROCESS CONTROL TRAINER**

Study of PLC & HMI, Study of feedback, cascade, Ratio and on-off, split Range, control schemes, Feedback control Flow, Level, Pressure, Temperature, Cascade Control Flow-Level, Flow-Pressure.

52239

**HEAT EXCHANGER TEMPERATURE CONTROL TRAINER**

Study of Feed Back Temperature Control Loop, Study of Shell & Tube type/Plate type Heat Exchanger, Study of SCADA Application Software/ Computerized Control of Heat Exchanger Temperature Control System.

52240

**CASCADE CONTROL (FLOW - LEVEL) TRAINER**

Study of multivariable loop, Cascade Control, Study of single loop proportional (P), integral (I), and derivative (D) control, lStudy of operation and calibration of transmitters, I/P converter and pneumatic control valve, Study of programming and operation of PID controller, Study of stability of dual loop cascade control system (Flow – Level Control).

52241

**FEEDBACK FLOW AND LEVEL CONTROL TRAINER**

Study of Feedback Control, Study of STEP response & Transient response of controller ( process curve), Study of open loop/close loop tunning & auto tunning of controller, Study of single loop proportional (P), integral (I), and derivative (D) control.

52243

**BASIC DISTRIBUTED CONTROL SYSTEM TRAINER**

Study of Distributed Control Systems, Study of Communication Protocols such as USB/RS 485/ Ethernet/ Modbus/ TCP-IP/HART, Study of Individual Process Plants hooked up with the DCS, Study of SCADA Application Software/ Computerized Control of Process Plants.

52244

**HYBRID DISTRIBUTED CONTROL SYSTEM TRAINER**

Study of Distributed Control Systems, Study of Communication Protocols such as USB/RS 485/ Ethernet/ Modbus/ TCP-IP/HART, Study of Individual Process Plants hooked up with the DCS, Study of SCADA Application Software/ Computerized Control of Process Plants.

52245

**ADVANCED DISTRIBUTED CONTROL SYSTEM TRAINER (TRUE DCS)**

Study of Distributed Control Systems, Study of Communication Protocols such as USB/RS 485/ Ethernet/ Modbus/ TCP-IP/HART, Study of Individual Process Plants hooked up with the DCS, Study of SCADA Application Software/ Computerized Control of Process Plants.

52260

**PRESSURE TRANSDUCER/ TRANSMITTER MODULE**

Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, MS Powder coated frame, Enhanced Electrical Safety Considerations, Training Manuals for Operation Ease.

52261

**ELECTRO-PNEUMATIC (E/P) OR I/P CONVERTER TRAINER**

Study Of Electro – Pneumatic (I/P) Converter, Compact Ergonomic Design User Friendly, Self Explanatory System, Robust Construction, MS Powder Coated Frame, Training Manual for Operation ease.


**PNEUMATIC-ELECTRO (P/E) OR P/I CONVERTER TRAINER**

Study of P to I Converter Setup, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Ms Powder coated frame, Training Manual for Operation Ease.


**BASIC PNEUMATIC TRAINER**

Study of Pneumatic Cylinders: Single Acting, Double Acting, Study of Different Pneumatic circuits such as AND – OR-Logical circuits etc, Study of pneumatic control system, Study of construction & operation of pneumatic equipments such as 5/2 Way valve, 3/2 Way valve, pneumatic motor.


**ADVANCE PNEUMATIC TRAINER**

Study of Pneumatic Cylinders: Single Acting, Double Acting, Study of Different Pneumatic circuits such as AND – OR-Logical circuits etc, Study of pneumatic control system, Study of construction & operation of pneumatic equipments such as 5/2 Way valve, 3/2 Way valve, pneumatic motor.


**ELECTRO-PNEUMATIC TRAINER**

Study of pneumatic actuator & reciprocating cylinder trainer kit with different logical Circuits such as OR, AND etc. operation, Study of pneumatic cylinders, single acting, double acting, Study of construction & operation of pneumatic equipments such as 5/2-way Solenoid valve, 3/2-way valve, limits switches, pneumatic motor etc, Study of pneumatic control systems.


**CUSTOMIZED BASIC ELECTRO-PNEUMATIC TRAINER**

Study of pneumatic actuator & reciprocating cylinder trainer kit with different Logical Circuits such as OR, AND etc. operations, Study of pneumatic cylinders single acting, double acting, Study of construction & operation of pneumatic equipments such as 5/2 Solenoid valve, 3/2-way valve, limits switches, pneumatic motor.


**ADVANCED CUSTOMIZED ELECTRO-PNEUMATIC TRAINER**

Study of Advanced Electro – Pneumatic Trainer, Study of Self Reciprocation of Single Acting Cylinder by Using Electric Limit Switch & 3/2 Solenoid Valve, Study of Self Reciprocation of Double Acting Cylinder by Using Proximity Switch & 5/2 Double Sided S.V.


**CUSTOMIZED BASIC ELECTRO-PNEUMATIC TRAINER**

Study of AND Valve (Dual Pressure Valve), Study of Shuttle Valve (OR Valve), Study of operation of Hand Lever Valve (3/2 & 5/2 DCV), Study of operation of 5/2 Single & Double Pilot Operated Valve, Study of operation of 3/2 Single Pilot Operated Valve, Study of Pressure Sequence Valve.


**FLAPPER NOZZLE ASSEMBLY**

To plot the characteristics of Displacement (micron) Vs Pressure (Psi), Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, MS powder coated frame, Training Manuals for Operation Ease.


**CUT SECTION OF VALVES**

Study of different types of valves, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Training Manual for Operation Ease.

52273

**DISPLACEMENT, VELOCITY, ACCELERATION MEASUREMENT SETUP**

Study of Vibration Measurement Using Accelerometer, Study of measurement of displacement, Velocity & Acceleration, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Leak proof Safety Measures, robust construction, Enhanced Electrical Safety Considerations.

52274

**OPTICAL ANGLE ENCODER SETUP FOR ANGULAR POSITION/DISPLACEMENT MEASUREMENT**

Study of Optical Rotary Encoder, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Enhanced Electrical Safety Considerations.

52275

**OPTICAL ROTARY ENCODER SETUP FOR SPEED MEASUREMENT. I.E. CONTACT TYPE SPEED MEASUREMENT SETUP**

Study of Optical Rotary Encoder, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Enhanced Electrical Safety Considerations.

52277

**CALIBRATION OF THERMOCOUPLE, RTD, THERMISTOR SETUP**

Study of Calibration of RTD, Thermistors and Thermocouple, Temperature range: 0-100°C, Calibration facility for thermocouple & RTD, 7-segment LED display for temperature Indicator controller.

52278

**CALIBRATION OF THERMOCOUPLE, RTD, THERMISTOR SETUP**

Study of Calibration of RTD, Thermistors and Thermocouple, Temperature range: 0-200°C, Calibration facility for thermocouple & RTD, 7-segment LED display for temperature Indicator controller.

52279

**CALIBRATION OF THERMOCOUPLE, RTD, THERMISOR SETUP**

Study of Calibration of RTD, Thermistors and Thermocouple, Temperature range: 0-300°C, Calibration facility for thermocouple & RTD, 7-segment LED display for temperature Indicator controller.

52280

**CALIBRATION OF THERMOCOUPLE, RTD, THERMISTOR SETUP**

Study of Calibration of RTD, Thermistors and Thermocouple, Temperature range: 0-400°C, Calibration facility for thermocouple & RTD, 7-segment LED display for temperature Indicator controller.

52281

**TEMPERATURE MEASUREMENT TRAINER**

Study of Measurement Temperature using Thermometer, Study of Measurement Temperature using Bimetal Thermometer, Study of Measurement Temperature using RTD PT-100, Study of Measurement Temperature using Thermistor, Study of Measurement Temperature using K-Type Thermocouple.

52282

**SETUP FOR AUTOMATIC DOOR CLOSING AND OPENING USING PROXIMITY DETECTOR**

Study of Automatic Door Closing & Opening System, Inductive/Capacitive Proximity Switches for end positions, Relay & motor operated door system with time out operation, Door opening/closing on presence/absence of object.


**SETUP FOR STUDY OF DIFFERENT SWITCHES & RELAYS**

Study of different Switches & Relays, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Enhanced Electrical Safety Considerations.


**HYDRAULIC TRAINER (BASIC)**

Study of fundamental principles of Hydraulics & its applications, Study of Meter-in Circuit & Meter-out circuit, Study of Bleed-off Circuit, Study of Transverse & Feed Circuit, Study of Speed Control, Pressure Control & Flow Control.


**HYDRAULIC TRAINER (ADVANCED)**

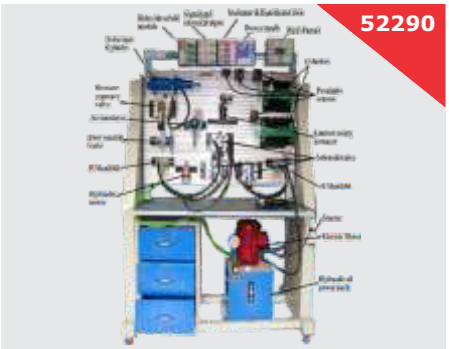
Study of fundamental principles of Hydraulics & its applications, Study of Meter-in Circuit & Meter-out circuit, Study of Bleed-off Circuit, Study of Transverse & Feed Circuit, Study of sequencing operation using Pressure Sequence Valve, Study of Speed Control, Pressure Control & Flow Control.


**TRANSPARENT HYDRAULIC TRAINER**

Study of fundamental principles of Hydraulics & its applications, Study of source of hydraulic power, its transmission methods and conditioning of oil used in hydraulic system, Study of single acting & double acting cylinders, Study of Transverse & Feed Circuit, Study of sequencing operation using Pressure Sequence Valve.


**PLC BASED ELECTRO-HYDRAULIC TRAINER**

Study of fundamental principles of Hydraulics & its applications, Study of sequencing operation of two cylinders using PLC and electro-hydraulic components, Study of Pressure control, Speed Control & Flow Control, Study of direction control, Study of hydraulic valves.




**ADVANCED CUSTOMIZED ELECTRO HYDRAULIC TRAINER**

Function & identification of Electro-Hydraulic components & their symbols, Direct and indirect manual controls, stroke dependant controls and pressure dependant controls with pressure sequence valves, Design & function of electro-hydraulic System.


**ADVANCED CUSTOMIZED HYDRAULIC TRAINER ( FOR ITI)**

Function & identification of Electro-Hydraulic components & their symbols, Direct and indirect manual controls, stroke dependant controls and pressure dependant controls with pressure sequence valves, Design & function of electro-hydraulic System.


**ECONOMY MODEL OF HYDRAULIC TRAINER KIT FOR ITI**

Function & identification of Electro-Hydraulic components & their symbols, Direct and indirect manual controls, stroke dependant controls and pressure dependant controls with pressure sequence valves, Design & function of electro-hydraulic System.


**ADVANCED CUSTOMIZED ELECTRO-HYDRAULIC TRAINER**

Study of pressure control, Study of direction control, Study of fundamental principles of Hydraulics & its applications, Study of Meter-in circuit, Meter-out circuit and Bleed-off circuit, Study of flow control.


**HUMIDITY MEASUREMENT KIT**

Study of Humidity Measurement, Digital Hand Held Battery Operated Device, 20 to 90% Humidity Measurement, Memory For Highest & Lowest Humidity.


**I/P & P/I CONVERTER KIT (COMBINED SETUP)**

Study of I/P & P/I Converter Setup, Digital Current Indicator with 3 ½ Digital Display, Current source with 3 ½ Digital Display, I/P Converter Input : 4-20 mA Output is 3-15 PSI, P/I Converter Input is 3-15 PSI Output is 4-20mA.


**LEVEL MEASUREMENT USING CAPACITIVE TRANSDUCER - SETUP WITH SUMP TANK, PUMP & CUBICLE FRAME**

Study of Level Measurement Using Capacitive Level Transducer, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Leak proof Safety Measures, Enhanced Electrical Safety Considerations.


**LEVEL MEASUREMENT USING ULTRASONIC TRANSDUCER**

Study of Level Measurement Using Ultrasonic Level Transducer, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Leak proof Safety Measures, Enhanced Electrical Safety Considerations, Training Manuals for Operation Ease.


**SPLIT RANGE CONTROL SYSTEM TRAINER**

Study of Calibration of RTD, Thermistors and Thermocouple, Temperature range: 0-400ºC, Calibration facility for thermocouple & RTD, 7-segment LED display for temperature Indicator controller.


**X-Y POSITION CONTROL SYSTEM (PLC BASED) USING STEPPER MOTORS & ITS CONTROLLER CARDS**

To draw straight line, inclined line, Square, Rectangle, Triangle, Hexagon, Pentagon with the help of PLC ladder program & XY position control module, Controlled by PLC, Capable to draw shape such as straight line, inclined line, rectangle, square, pentagon.


**RATIO & CASCADE CONTROL SYSTEM TRAINER**

Study of Feedback Flow, Feedback Level Loop, Study of single loop Proportional (P), Integral (I), and Derivative (D) control, Study of operation and calibration of transmitters, I/P converter and pneumatic control valve, Study of programming and operation of PID controller.

52317

**AIR PURGE BUBBLER SYSTEM FOR LEVEL MEASUREMENT**

Study of level measurement using the concept of back pressure regulation, Demonstrate the implicative use of pressure gauge as a level measurement (indirect measurement technique), Training Manuals mimic Charts for Operation Ease.

52318

**PICK & PLACE ROBOTIC APPLICATION MODULE (PLC BASED) USING STEPPER MOTORS & ITS CONTROLLER CARDS**

PLC Micrologix 1400 with PWM output, Controlled by PLC, Displacement in 3 axes : X-Y-Z axis, Capable to pick and place an object from one position to another, Variable Jaw area to Pick objects of different shapes.

52319

**PICK & PLACE ROBOTIC APPLICATION MODULE (PLC BASED) USING SERVO MOTOR & SERVO AMPLIFIER**

PLC Micrologix 1400 with PWM output, Controlled by PLC, Displacement in 3 axes : X-Y-Z axis, Capable to pick and place an object from one position to another, Variable Jaw area to Pick objects of different shapes.

52320

**ROBOT MODEL (4-AXIS)**

Study of level measurement using the concept of back pressure regulation, Demonstrate the implicative use of pressure gauge as a level measurement (indirect measurement technique), Variable Jaw area to Pick objects of different shapes, Object Lift movement height Selectable.

52322

**NON CONTACT TYPE SPEED MEASUREMENT SET UP**

Speed measurement by using Tachometer, User Friendly, Self Explanatory Systems, Robust Construction, Enhanced Electrical Safety Considerations, Training Manuals for Operation Ease, Inbuilt Safety Measures to avoid improper usage.

52323

**ROTARY TABLE POSITIONING SYSTEM - MANUAL**

To rotate the table in various angular positions with the help of stepper motor, Stepper motor electrical with actuator driven mechanism, with circular transparent table, Circular platform Diameter- 200mm, Thick-5mm.

52324

**ROTARY TABLE POSITIONING SYSTEM - PLC BASED**

To rotate the table in various angular positions with the help of stepper motor, Stepper motor electrical with actuator driven mechanism, with circular transparent table, Circular platform Diameter- 200mm, Thick-5mm, Bidirectional stepper motor Torque 10Kg / cm².

52325


**DEAD WEIGHT PRESSURE GAUGE TESTER**

Study of dead weight pressure gauge tester, Screw pump to generate pressure in the circuit easily and accurately, Hydraulic fluid is generally a mineral oil, but glycerin is used for testing oxygen gauges.

52330

**PLC BASED COIN COUNTER APPLICATION MODULE**

Study PLC based coin counter application, Proximity/optical sensor to sense the coin, 3 ½ digit display to show the count display, electric actuator.


**AC MOTOR SPEED CONTROL TRAINER I.E. AC DRIVE (VFD) TRAINER**

Study of operation and construction of A.C. motor, Study of characteristics of A.C. motor, Study of tachometer, Study of AC drives, Characteristics plot of Speed VS Current, and Frequency VS Speed, Study of closed loop control system (speed control).


**DC MOTOR SPEED CONTROL TRAINER. I.E. DC DRIVE TRAINER**

Study of operation, construction of DC motor, Study of characteristics of DC motor, Study of tachometer, Study of DC drive, Characteristics plot of Voltage VS Speed, Speed VS Current, Study of closed loop control system (speed control).


**CENTRIFUGAL PUMP TEST RIG**

Study of characteristics of centrifugal pump, Study of testing efficiency of Centrifugal Pump, Self-contained unit, Modern industrial components are used for operating, Comprehensive training manual supplied.


**RECIPROCATING PUMP TEST RIG**

Study of characteristics of reciprocating pump, Study of testing efficiency of various positive displacement pumps, The self-contained unit, Modern industrial components are used for operating, Comprehensive training manual supplied.


**GEAR PUMP TEST RIG**

Study of working of Two Stage Air compressor, Study of calculation of efficiency of compressor, Leak proof Safety Measures, & Robust Construction, Enhanced Electrical Safety Considerations, Training Manuals & mimic Charts for Operation Ease, M.S. powder coated panel with standard Instrument Mountings.


**VANE PUMP TEST RIG**

Study of characteristics of Vane pump, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Leak proof Safety Measures, sturdy piping & Robust Construction, Training Manuals mimic Charts for Operation Ease, System Frame with Caster Wheel Arrangement for ease in movement.


**MCLEOD GAUGE**

Measurement of Vacuum using McLeod Gauge, User Friendly, Self Explanatory Systems, Robust Construction, Enhanced Electrical Safety Considerations.


**TEMPERATURE MEASUREMENT TRAINER**

Study of Measurement Temperature using Thermometer, Study of Measurement Temperature using Bimetal Thermometer, Study of Measurement Temperature using RTD PT-100, Study of Measurement Temperature using Thermistor, Study of Measurement Temperature using K-Type Thermocouple.


**SETUP FOR AUTOMATIC DOOR CLOSING AND OPENING USING PROXIMITY DETECTOR**

Study of Automatic Door Closing & Opening System, Inductive/Capacitive Proximity Switches for end positions, Relay & motor operated door system with time out operation, Door opening/closing on presence/absence of object.


**FLOW MEASUREMENT SETUP USING ROTAMETER**

Study of Rotameter, Flow control valve (ball valve), Sump tank and pump for water circulation, Measurement tank for Rotameter calibration, Caster wheel mounted movable frame, Inbuilt Safety Measures to avoid improper usage,


**FLOW MEASUREMENT SETUP USING VENTURI TUBE**

Study of Flow Sensors such as Rotameter, Venturi with the help of Manometer, Flow control valve (ball valve), Sump tank and pump for water circulation, Caster wheel mounted movable frame.


**PLC BASED OIL AND WATER SEPARATOR**

Study of characteristics of Vane pump, Two line display on PLC unit for programming, Transparent acrylic tanks, Ms Powder coated frame containing water tanks.


**ROTARY ENCODER SETUP FOR SPEED AND ANGLE (POSITION) MEASUREMENT**

Study of Optical Rotary Encoder, Compact Ergonomic Design, Provision to give angular displacement to the encoder shaft, User Friendly, Self Explanatory Systems, Enhanced Electrical Safety Considerations, Robust Construction.


**SERVOMOTOR POSITION AND SPEED CONTROL TRAINER**

To study Position Control of Servomotor, To study Graphic Operation Controller, Inbuilt Safety Measures to avoid improper usage, To study Speed Control of Servomotor using photoelectric pick up.


**SPEED MEASUREMENT USING DIGITAL STROBOSCOPE & PROXIMITY SENSOR**

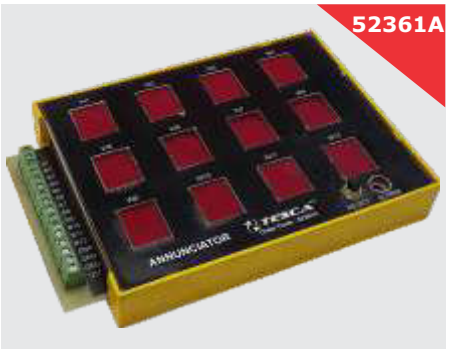
Study of Digital Stroboscope, Study of Proximity sensor for speed measurement, Compact Ergonomic Design, Enhanced Electrical Safety Considerations, Inbuilt Safety Measures to avoid improper usage, Test points provided on front panel to measure pulses.


**PC BASED FEEDBACK FLOW, LEVEL ,PRESSURE, TEMPERATURE, CONTROL**

Study of SCADA Application Software/ Computerized Control of Feedback Control System, Study of Feedback control, Flow, Level, Temperature and Pressure.


**ALARM ANNUNCIATOR TRAINER**

Study of Alarm Announciator Trainer, Compact Ergonomic Design, Inbuilt hooter, Fast response time, User Friendly, Self Explanatory Systems.




**ANNUNCIATOR**

Multiple sequence option with site selection facility, On board Test, Silence, Accept, Reset button, 12 Window with Super bright 4 LED`s in Parallel, Terminal Block connector for input command.

52365

**AIR COMPRESSOR TEST RIG (TWO STAGE RECIPROCATING TYPE)**

Study of working of Two Stage Air compressor, Study of calculation of efficiency of compressor, Leak proof Safety Measures, & Robust Construction, Enhanced Electrical Safety Considerations, Training Manuals & mimic Charts for Operation Ease, M.S. powder coated panel with standard Instrument Mountings.

52366

**PRESSURE MEASUREMENT USING BOURDON GAUGE AND FOOT PUMP**

Study of Bourdon Gauge Pressure Sensor, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Training Manuals for Operation Ease.

52367

**INTERACTING & NON INTERACTING TANK SYSTEM**

Study Of dynamic response of interacting & non interacting system, Study Of step response of first order systems arranged in non interacting & interacting mode, Study of step response of single capacity system.

52369

**FLUID MECHANICS LABORATORY SETUP - TEST RIG FOR MINOR LOSSES IN PIPES**

Study of Minor Losses in pipe, Robust Construction, Enhanced Electrical Safety Considerations, Training Manuals mimic Charts for Operation Ease, Caster wheel mounted movable frame.

52370

**FLUID MECHANICS LABORATORY SETUP - TEST RIG FOR MAJOR LOSSES IN PIPE**

Study of Major Losses in pipe, Robust Construction, Enhanced Electrical Safety Considerations, Training Manuals mimic Charts for Operation Ease, Caster wheel mounted movable frame.

52371

**FLUID MECHANICS LABORATORY SETUP - TEST RIG FOR BERNOULLI'S THEOREM**

Study of Bernoulli's Theorem, Compact Ergonomic Design, Caster wheel mounted movable frame, Training Manuals mimic Charts for Operation Ease, Modern industrial components are used for operating.

52375

**DATA ACQUISITION SYSTEM**

Study of Data Acquisition System, Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Robust Construction, Enhanced Electrical Safety Considerations.

52376

**UNIVERSAL TABLE (PLC BASED) USING STEPPER MOTORS & ITS CONTROLLER CARDS**

To move MS table in Horizontal, Vertical direction and also Tilt with the help of PLC ladder program & Stepper motor driven mechanism, To Study Equipment Required, To Study PLC Micrologix 1200 with PWM output.

52377

**UNIVERSAL TABLE (PLC BASED) USING SERVO MOTORS & SERVO AMPLIFIER**

To move MS table in Horizontal, Vertical direction and also Tilt with the help of PLC ladder program & Stepper motor driven mechanism, To Study Equipment Required, To Study PLC Micrologix 1200 with PWM output.


**UNIVERSAL PROCESS CONTROL TRAINER**

Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Leak proof Safety Measures, sturdy piping, Enhanced Electrical Safety Considerations, Training Manuals and mimic Charts for Operation Ease, System Frame with Caster Wheel Arrangement for ease in movement.


**PROCESS SIMULATOR TRAINER**

Study of characteristics of Temperature Sensors, Study of Various types of Pressure Sensors & Pressure Transmitter, Data analysis using SCADA Application Software, Study of Process Simulator Setup.


**IMPLEMENTATION OF LOGIC GATES USING RELAYS**

Study of Digital Logic, Study of AND Gate, Study of OR Gate, Study of NOT Gate, Study of NAND Gate, Study of NOR Gate, Study of EX-OR Gate.


**BRAKE LINER /FRICTION / WEAR MEASURING SETUP**

Study of Friction / Wear Measurement Setup, Study of Data Acquisition System, Study of Brake Liner & Brake Applying Mechanism, Study of Pressure Transmitter, Temperature Transmitter, LVDT, RPM Sensor.


**TEST RIG FOR SPRING BACK ACTION**

Compact Ergonomic Design, Inbuilt Safety Measures to avoid improper usage, User Friendly, Self Explanatory Systems, Robust Construction, M.S. powder coated plant with standard Instrument Mountings.


**PLC BASED ELECTRO HYDRAULIC SORTING MECHANISM**

System Frame with Caster Wheel Arrangement for ease in movement, M.S. fabricated powder coated with necessary fittings, couplings and hydraulic mountings, Inbuilt Safety Measures to avoid improper usage, Integration of Electronic, Instrumentation and Hydraulics in single unit.


**PLC BASED ELECTRO PNEUMATIC SORTING MECHANISM**

All Pneumatic components identical to those used in industry, User Friendly, Self Explanatory Systems, Leak proof Safety Measures, sturdy piping & Robust Construction, Training Manual, mimic Charts for Operation Ease, System Frame with Caster Wheel Arrangement for ease in movement.


**STUDY OF VARIOUS TYPES OF ACTUATORS**

System Frame with Caster Wheel Arrangement for ease in movement, M.S. fabricated powder coated with necessary fittings, couplings and mountings, Inbuilt Safety Measures to avoid improper usage.


**MECHATRONICS TRAINER KIT - IOT BASED INDUSTRIAL PROCESS DEMONSTRATION PLANT**

Leak proof Safety Measures, sturdy piping & Robust Construction, M.S. fabricated powder coated with necessary fittings & Pneumatic Connections, Integration of Electronic, Instrumentation and Pneumatic in single unit.


### CALIBRATION TRAINER

To study the Calibration of Differential Pressure Transmitter, To study the Calibration of Manometer, To study the Calibration of Pressure Transmitter, To study the Operation & inherent characteristics of Pneumatic Control Valve, To study the Operation of Electro Pneumatic Positioner, To study the Operation of Universal Calibrator.


### AUTOMATION EQUIPMENTS FOR MOBILE SKILL DEVELOPMENT VEHICLE

Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Training Manuals for operation ease, Robust Construction, Enhanced Electrical Safety Considerations., Self-explanatory instruction manuals, copy of S/W are provided, Inbuilt Safety Measures to avoid improper usage.


### MULTIVARIABLE CONTROL TRAINER

Study of level control Open loop, On-Off, P, PI, PD, PID Tuning by open & closed loop Stability analysis, Study of second order interacting, Study of second order Non interacting, Study of cascade control, Study of quadruple tank control.


### AIR VELOCITY MEASUREMENT TRAINER USING HOT WIRE ANEMOMETER

Understand the concept of Anemometer, User Friendly, Self Explanatory Systems, Enhanced Electrical Safety Considerations, Training Manual for Operation Ease, M.S. powder coated frame with standard Instrument Mountings.


### TORQUE METER

Understand the concept of torque measurement, User Friendly, Self Explanatory Systems, Enhanced Electrical Safety Considerations, Training Manual for Operation Ease, M.S. powder coated cubical plant with standard Instrument Mountings.


### OPTICAL PYROMETER WITH TEMPERATURE SOURCE TEST RIG

Compact Ergonomic Design, User Friendly, Self Explanatory Systems, Enhanced Electrical Safety Considerations, Inbuilt safety Measures to avoid improper usage.



### DISPLACEMENT MEASUREMENT OF MOTORIZED BED USING LVDT

Study of Displacement Measurement using LVDT setup, Compact Ergonomic Design, User Friendly, Self Explanatory System, Robust Construction, Enhanced electrical Safety considerations, Training Manual for Operation Ease.


### FUZZY LOGIC TRAINER

Facility to monitor behavior of the controller output (Un) & process variable (MV) either on PC screen or on CRO. Graph printing facility for laboratory journal entries, Can learn about different processes using simulated building blocks as well as real life processes using replaceable experiment panels/processes.

# Electrical Machine Lab

For practical learning of | Working | Construction | Characteristics | Methods of Operation and Application of Electrical Machines | Motors | Alternators | Generators | we have a broadly variated range of Electrical Machine Lab equipments comprising | Electrical Machine Trainer | Three Phase Induction Motor Trainer | DC Machine Lab | Ward Leonard Method of DC Machine Trainer | Three Phase Synchronous Motor Lab | Induction Motor Compound Generator Lab | Slip Ring Induction Motor Lab | Single and Three Phase Resistive | Inductive | Capacitive Load | Earth Fault Relay Testing System | Synchronization Panel Trainer | Brush Less DC Motor Trainer | Fire Alarm Trainer | Solar Technology Trainer and many more.




**DC SUPPLY**

Exclusive and rugged designed panel, Stand alone operation, Designed by considering all the safety precautions, High quality meters.


**AC/DC LOAD**

Mains Supply : AC / DC, 230V ±10%, Load Range : 0 - 1.2 kW, in steps of 100W, Load Type : Resistive (Lamp Load), Ammeter (MI) : 10A.


**ELECTRICAL SAFETY TRAINER**

Designed, considering all safety standards, Exclusive design and attractive presentation of each block, This trainer represents many essential safety precautions, Unique demonstration & importance of Earthing, Real time appearance of MCB to help the students to understand its mechanical arrangement.


**THREE PHASE LAB**

Three Phase Low Voltage Power Supply (01), Input : Three Phase Mains (230 V Phase, voltage, 415 Line voltage 50 Hz) ± 10%, Outputs : 18V Phase voltage, 28V line voltage 50 Hz ± 10%, MCB (Power Switch) : Four Phase.


**SINGLE PHASE TRANSFORMER LAB**

Study of Open Circuit Test in a Single Phase Transformer, Study of Short Circuit Test in a Single Phase Transformer, Study of Load Test and correspondingly determine the Efficiency and Voltage Regulation in a Single Phase Transformer.


**TRANSFORMER TRAINER (SINGLE PHASE & THREE PHASE)**

Digital Watt meter single phase Potential coil 250 Volt Current coil 2Amp. Total Watt 500W, Temperature Meter, Single Phase Auto Transformer: Primary Voltage : 230, Current Transformer Ratio 1:10, MCB for short circuit and over current 2Amp.


**TRANSFORMER TRAINER**

Finding Transformer equivalent circuit, Study of transformer regulation, Measurement of winding temperature, Effect of type of load on transformer output waveform, Three phase transformer connections.


**TRANSFORMER TRAINER**

To Study Voltage regulation & rectifier, To Study Temperature Rising Experiments of the Single Phase Transformer, To Study the working of single phase transformer in combination, To Study and measure 30 power of LAMP LOAD in STAR Connection, To Study the Open Circuit Test of Three Phase Transformer.


**TWO WATTMETER METHOD TRAINER**

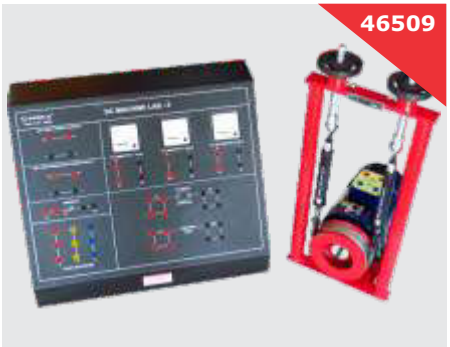
Measurement of Power Factor in a Three Phase Circuit, Measurement of Active, Reactive and Apparent Power in a Three Phase Circuit, Measurement of Three Phase Parameters.


**THREE PHASE INDUCTION MOTOR TRAINER**

Machine with Mechanical Loading Arrangement, Provided with Digital Tachometer, Machine with Class "B" Insulation, Heavy Duty Base/Channel, Brake-Drum/Pulley with heat suppression facility.


**DC MACHINE LAB 1**

Study of No Load Characteristics (OCC) of DC Shunt Generator, Study of self excited DC Shunt Motor, Speed Control of DC Shunt Motor by Field and Armature current variation, Study of Load Characteristics of DC Shunt Generator.




**DC MACHINE LAB 2**

TDC Shunt Motor, Mechanical Loading arrangement, Exclusive and rugged designed panel, Stand alone operation, Designed by considering all the safety precautions, High quality meters.


**SCOTT CONNECTION TRAINER**

Stand alone operation, Exclusive and attractive designed panel, Designed by considering all the safety precautions, Main and Teaser Transformers are shown separately, On board high quality meters.


**SUMPNER'S TEST OF TWO SINGLE PHASE TRAINER**

Study of Polarity Test with Two Single Phase Transformers, Study of Sumpner's Test Open Circuit Test Short Circuit Test, Determination of the Efficiency and Voltage Regulation of Two Single Phase Transformers.


**PARALLEL OPERATION OF TWO SINGLE PHASE TRAINER**

Exclusive and attractive designed panel Stand alone operation, Designed by considering all the safety precautions, Diagrammatic representation for the ease of connections.

TESCA TECHNOLOGIES PVT. LTD.
INDIA
JAIPUR


**DC SERIES MOTOR**

Stand alone operation, Exclusive and attractive designed panel, High quality meters, Designed by considering all the safety precautions, Safety terminals and patch chord package.


**SINGLE PHASE INDUCTION MOTOR LAB**

Study of Single Phase Induction Motor, Study of Running and Reversing of Single Phase Induction Motor, Study of the No-Load Test in a Single Phase Induction Motor, Study of the Blocked Rotor Test in a Single Phase Induction Motor.


**SINGLE PHASE ENERGY METER TRAINER**

Study the application of Single Phase Energy Meter for measurement of Power Consumed, Study of Single Phase Energy Meter using different test points and to understand its working, Complete training system for in depth study of Single Phase Energy Meter.



**VALUES**

- ☑ Innovation
- ☑ Trust
- ☑ Discovery
- ☑ Environment Friendly
- ☑ People First
- ☑ Gratitude

46518

### STUDY OF UJT AND UJT RELAXATION OSCILLATOR

Study of Zener Diode as Voltage Regulator, Study of Static Emitter Characteristics of UJT- Unijunction Transistor on oscilloscope, Study of effect of V on peak point and valley point voltage and valley point current. BB, Operation of UJT Relaxation Oscillator and its use as SCR trigger circuit.

46519

### STUDY OF SCR AND A.C. PHASE CONTROL

An isolation transformer 230VA.C. 250mA. This protects external instruments from damage if they are not isolated, Bridge rectifier for full-wave phase control with zener regulator, Two potentiometers for resistance controlled ramps, Two potentiometers for resistance controlled pedestals.

46520

### DV/DT LIMITATION OF SCR'S

Test dv/dt estimation of the SCR, Compare Dv/Dt capability by Gate-Cathode terminations, Compare Dv/Dt capability by Gate-Cathode biasing (Voltage biasing), Compare Dv/Dt capability by Gate-Cathode biasing (Current biasing), To improve Dv/Dt capability by transistor snubber circuit.

46521

### STUDY OF TRIAC AND A.C.PHASE CONTROL

Study of TRIAC characteristics and its operation in all the four modes i.e. I , I-, III and III, Gate control of TRIAC with NPN transistor, Gate control of TRIAC with PNP transistor, Phase control with TRIAC and DIAC as pulse generator for gate trigger.

46522

### SCR CONVERTERS AND REACTIVE LOADS

Study of SCRs triggering in half controlled bridge under reactive loads-limitations of simple UJT triggering circuits, Study of SCR triggering in half controlled bridge under reactive loads using auxiliary SCR triggering circuit with extended pulse technique, Study of half controlled bridge and action of free wheeling diode.

46523

### SCR REGULATED D.C. POWER SUPPLY

Study of output voltage variation, regulation and ripple in open loop (without feed back) by varying the load using inductance input filter, Same as above experiment by using capacitor input filter.


**TRIAC A.C. LINE SWITCHING**

Cstudy of TRIAC as line triggered A.C. power switch, Study of TRIAC as D.C. triggered A.C. power switch, Study of TRIAC as self latching line switch, Study of TRIAC as UJT triggered A.C. power switch, Study of TRIAC as UJT triggered A.C. power switch with external transistor control from transducer.


**THYRISTOR TIME DELAY RELAY**

Study of delayed Turn-ON of D.C. load, Study of auto Turn-OFF of D.C. load, Study of delayed Turn-ON of TRIAC as line switch, Study of auto Turn-OFF of TRIAC as line switch.


**THYRISTOR ALARMS**

Study of Make-to-operate alarms Study of Break- to-operate alarms, Demonstration of temper-proof burgler alarm, Demonstration of alarm with delayed self latching, Demonstration of alarm operated with water level, Demonstration of alarm sensitive to light beam using L.D.R.


**SCR RING COUNTER**

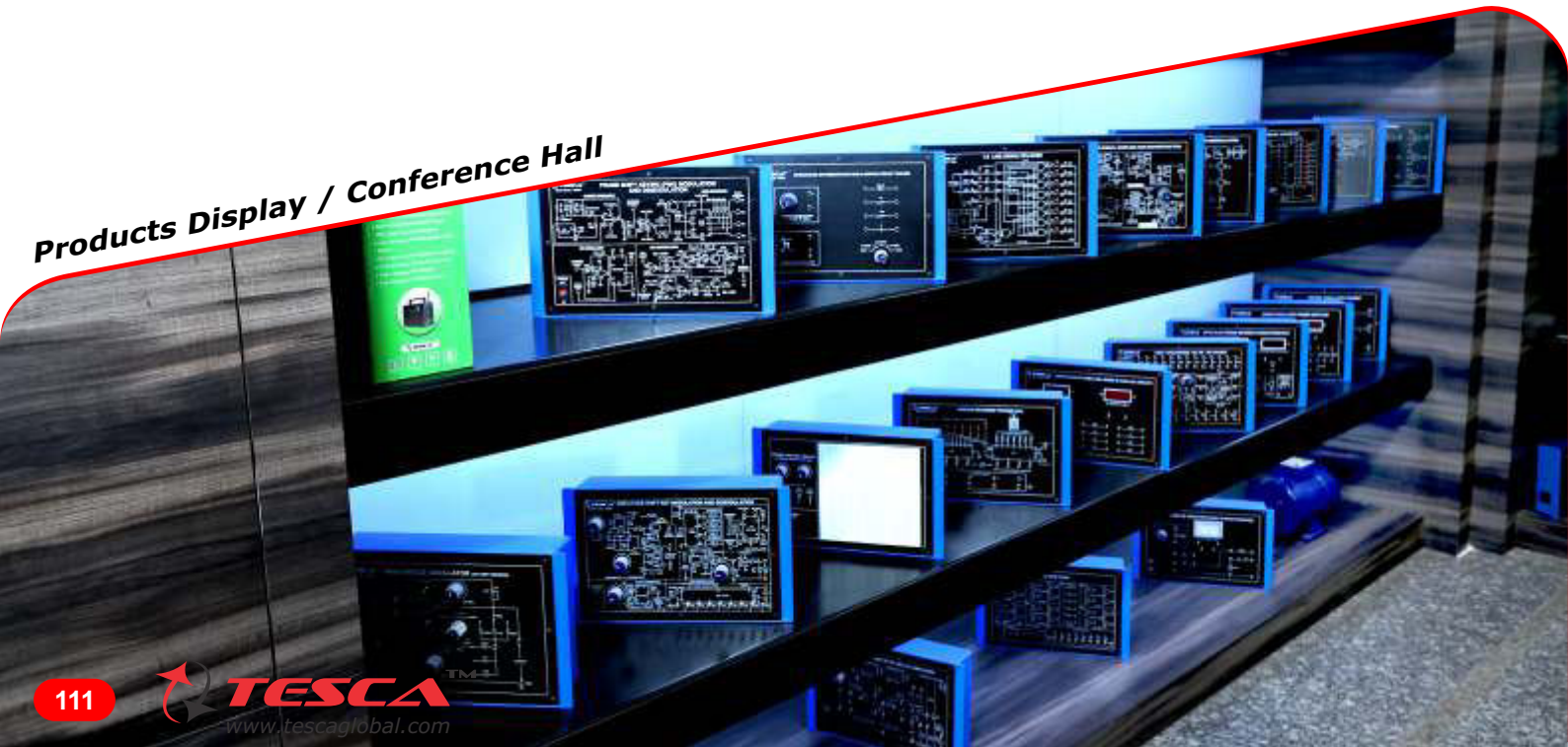
To study operation of Ring Counter with internal load, To study operation of Ring Counter with external load, D.C. Zener Regulated Power Supply for control pulse generator, UJT 2N 2646 in relaxation oscillator configuration which provides triggering pulses to SCRs, Potentiometer for variable time delay.


**SCR TRIGGERING CIRCUIT USING IC TCA-785**

SCR triggering with controlled gate pulses, Change of firing angle in response to the change in reference voltage, Functioning of Signal Conditioner and Pulse Generator IC TCA-785.


**UNIVERSAL MOTOR SPEED CONTROL**

Half wave controller without feed back, Half wave controller with feed back, Half wave controller high torque at low speed version - skip cycling operation, Full wave controller using triac and demonstrating hysteresis effects improved by gate slaving techniques.




**TO TRIGGER A SCR BY USING A LDR**

To trigger a SCR by using a LDR, LDR mounted on Panel, Two potentiometers for intensity and sensitivity control, Adequate no. of other electronic components, Mains ON/OFF switch, Fuse and Jewel light.


**SINGLE PHASE FULLY-CONTROLLED BRIDGE CONVERTER**

To study and obtain the single phase fully controlled bridge converter, 230VA.C. Isolated Transformer, Power 50 watt, 9V D.C. at 100mA Zener Regulated Power Supply, Two UJT, Four SCR's, Two Pulse transformer 1:1:1.


**S.C.R. DC CIRCUIT BREAKER**

To study SCR turn OFF action under varying loads, To study D.C. over voltage trip action, To study over current trip action, Two UJTs connected in relaxation oscillator mode, Two potentiometers to adjust the over voltage and over current limit.


**S.C.R. LAMP FLASHER**

To perform the Symmetrical D.C. flasher, To perform the High power A.C. flasher, 12V D.C. at 100mA, IC Regulated Power Supply, Two SCRs, TRIAC 4 Amp./400PIV, 230V/40 Watt lamp for load, UJT 2N 2646 in relaxation oscillator mode.


**TRIGGERING CIRCUITS FOR SCR**

To study Resistor (R) Triggering circuit, To study Resistor - capacitor (R-C) Triggering circuit, To study Uni-junction Transistor (UJT) Triggering circuit (UJT relaxation Oscillator).


**SINGLE PHASE HALF WAVE CONTROLLED CONVERTER**

Study and obtain the waveforms for single-phase half wave controlled converter, Adequate no. of other Electronic Components, Mains ON/OFF switch, Fuse and Jewel light, The unit is operative on 230V ±10% at 50Hz A.C. Mains.


**SINGLE PHASE HALF CONTROLLED SYMMETRICAL & ASYMMETRICAL BRIDGE CONVERTER**

An isolation transformer 230VA.C. at 200mA. This protects external instruments for damage if they are not isolated, 6VAC at 100mAAC Power Supply, ±12V DC at 100mA fixed regulated Power Supply.


**AC REGULATORS USING TRIAC, ANTI PARALLEL THYRISTOR AND TRIAC & DIAC**

To Study A.C. Regulator using a Triac, To Study A.C. Regulator using Thyristor connected in antiparallel, To Study A.C. Regulator using a triac & a diac (with R.C. triggering circuit).


**DC MACHINE LAB 2**

TDC Shunt Motor, Mechanical Loading arrangement, Exclusive and rugged designed panel, Stand alone operation, Designed by considering all the safety precautions, High quality meters.


**FIRING CIRCUIT USING RAMP COMPARATOR SCHEME**

To study the firing circuit for single-phase converter using Ramp Cooperator Scheme, Two Op-Amp's. IC, Quad, Ex-OR gate IC, Triple, 3 input AND gate IC, Hex inverter gate IC.


**FIRING CIRCUIT USING OP-AMPS AND GATES**

To study firing circuit for single-phase converter using Op-Amps and Gates, Eight Op-Amp's IC, Quad 2 input AND gate IC, Two NPN Transistors, Two Pulse Transformers 1:1.


**FIRING CIRCUIT USING COSINE-WAVE SCHEME**

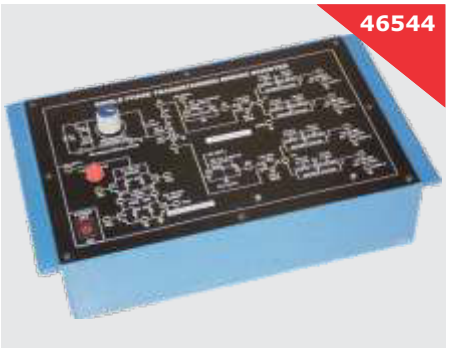
To Study firing circuit for single-phase converter using Cosine-Wave Comparator Scheme, Six Op-Amps IC, Triple, 3 input AND gate IC, Four NPN Transistor, Two Potentiometer.


**SINGLE PHASE SERIES INVERTER**

To study the Single Phase Series Inverter, Bridge rectifier for making DC voltage, Hex Inverter IC, Quad, 2-input AND gate IC, Two Silicon Controlled Rectifiers (SCR's).


**SCR PARALLEL INVERTER**

To study the SCR Parallel Inverter, UJT to generate ramp, IC-1 to drive Tr. 4 and Tr. 5, Tr. 4 and Tr. 5 for generation of pulses, Pulse transformer 1:1:1, Tr. 1, 2 and 3 for relay operation.




**UNIVERSAL MOTOR SPEED CONTROL WITH POWER SUPPLY & MOTOR**

Half wave controller without feed back, Half wave controller with feed back, Half wave controller high torque at low speed version - skip cycling operation, Full wave controller using triac and demonstrating hysteresis effects improved by gate slaving techniques.


**FORCED COMMUTATED CIRCUITS**

To study Class - A or self commutation by resonating the load, To study Class - B or self commutation by an LC circuit, To study Class - C or commutation through charged capacitor switched by another load carrying SCR, To study Class - D or commutation through charged capacitor switched by an auxillary SCR.


**VOLTAGE COMMUTATED THYRISTORISED CHOPPER**

To study the step down voltage commutated thyristorised chopper, Bridge Rectifier for making D.C. voltage, UJT as relaxation oscillator, Op-Amp. IC, Timer IC, Hex Inverter Gate IC.


**CURRENT COMMUTATED THYRISTORISED CHOPPER**

To study the step down current commutated thyristorised chopper, ±12V D.C. at 100mA IC regulated power supply internally connected, 5V D.C. at 100mA IC regulated power supply internally connected, Bridge Rectifier for making D.C. voltage.


**EFFECT OF FREE WHEELING DIODE IN SINGLE PHASE FULLY-CONTROLLED BRIDGE CONVERTER**

To study and obtain the single phase fully controlled bridge converter using R-load, To study and obtain the single phase fully controlled bridge converter using R-L load & effect of free wheeling diode.


**CHARACTERISTICS OF POWER MOSFET**

To study and Plot VI Characteristic of a Power MosFet, To study Switching Characteristic of a Power MosFet, IC regulated power supply 0-10V at 30mA, IC regulated power supply 0-60V at 200mA, Digital DC voltmeter ranges 0-20V.


**UJT FIRING CIRCUIT OF SCR**

To study UJT Firing Circuit of SCR, An isolation transformer 230VA.C. 200mA, This protects external instruments for damage if they are not isolated, Bridge rectifier for making D.C. voltage, Uni Junction Transistor.


**LAMP DIMMER USING DIAC AND TRIAC**

To study Lamp Dimmer Using Diac and Triac, Potentiometer to control intensity of Lamp, Adequate no. of other Electronic Components, Mains ON/OFF switch, Fuse and Jewel light, The unit is operative on 230V ±10% at 50Hz A.C. Mains.


**ILLUMINATION CONTROL USING SCR**

To study the Illumination control using SCR, An Isolation Transformer having output 230V AC at 100mA, Uni Junction Transistor, Silicon Control Rectifier (SCR).


**FAN REGULATOR USING DIAC AND TRIAC**

To study Fan Regulator Using Diac and Triac, Isolation Transformer 230VA.C., Power 70 watt, Diac, Triac, Potentiometer to control the speed of Motor / Fan.


**SCR CONTROLLED EMERGENCY LIGHT**

To study SCR Controlled Emergency Light, Astep down transformer 6V at 2Amp, Silicon Control Rectifier (SCR), Lamp load, Four diodes, 6V 4AH Battery, Adequate no. of other Electronic Components.


**ELECTRONIC TIMER USING IC-555**

To study Electronic Timer Using IC-555, 12V D.C. at 100mA, IC regulated Power Supply, IC-555 as timer, Push button as start switch, 12 Volt relay, Potentiometer to control time delay.


**THREE PHASE HALF WAVE RECTIFIER**

To observe the phase relation between the voltage waveforms in a three phase supply, To observe the load waveforms & their phase in a three phase half wave rectifier with resistive load, Three phase transformer, Digital Panel meter 3½ digits range 200V to measure the d.c. output voltage.


### THREE PHASE FULL WAVE RECTIFIER

To study three phase full wave rectifier, Three phase transformer, Digital Panel meter 3½ digits range 200V to measure the DC output voltage, Digital Panel meter 3½ digits range 200mA to measure the d.c. load current.


### THREE PHASE HALF CONTROLLED THYRISTORIZED BRIDGE CONVERTER WITH TRIGGERING CIRCUIT

To study the nature and generation of Control Signal for 3 phase Half wave Controlled Rectifier, To study the operation of a 3f Half Wave controlled bridge rectifier with R load.


### THREE PHASE FULLY CONTROLLED THYRISTORIZED BRIDGE CONVERTER WITH TRIGGERING CIRCUIT

To study the nature and generation of Control Signal for 3 phase Full-wave Controlled Rectifier, To study the operation of a 3 phase Full-wave Controlled Bridge Rectifier with R load.


### ZERO VOLTAGE SWITCHING

To study operation of zero voltage switching of thyristor, A transformer to give low AC voltage to Thyristor and DC voltage to transistor, Two diode used as fullwave rectifier, One diode to avoid –ve voltage to collector of NPN transistor.


### CHARACTERISTICS OF POWER TRANSISTOR

To study & plot the Input Characteristics of Power Transistor in Common Emitter Configuration, To study & plot the Output Characteristics of Power Transistor in Common Emitter Configuration, To study the Switching Characteristics of Power Transistor.


### D.C. STEP DOWN MOSFET CHOPPER

To study D.C. Step down Mosfet Chopper, ± 12 Volt D.C. at 100mA, regulated Power Supply, 20 Volt DC at 1A, regulated Power Supply, IC for triangular pulse generation, IC to drive MOSFET.


### D.C. TO A.C. INVERTER

To study the multivibrator circuit to convert DC to AC, IC-1 & IC-2 to generate AC signals to drive, 12-0-12VAC at 4 Amp. Transformer, Four NPN low Power Transistors.


### STEP DOWN & STEP UP TRANSISTOR CHOPPER

To study Step Up & Step Down Transistor Chopper, IC for Triangular wave pulse generation, Choke 40mH, Lamp 230V 15watt, DC Motor 12 V, Adequate no. of other Electronic Components.


### CHARACTERISTICS OF IGBT

To study and Plot V/I Characteristic of a Power IGBT, To study Switching characteristic of a power IGBT, IC regulated power supply 0-10V DC at 30mA, IC regulated power supply 0-60V at 200mA.


**STEPPER MOTOR CONTROLLER USING IC SAA-1027**

To study various functions of Stepper Motor, DC Stepper Motor 4 winding torque 1.0 Kg-cm, step angle 1.8º, power 12V 0.2 Amp/ phase, Fast & slow selection switch, Forward & reverse selection switch.


**STUDY OF BUCK BOOST PRINCIPLE**

To demonstrate the Buck Boost principle, To demonstrate the lower voltage setting, To demonstrate the upper voltage setting, To demonstrate automatic voltage stabilization of A.C. Voltage.


**STUDY OF CURRENT TRANSFORMER (C.T.)**

To study Current Transformer.( C.T. ), Current Transformer INPUT current is 2 Amp & OUTPUT current 200 mA i.e. Ratio 10 : 1, Digital AC Ammeter 31/2 digits seven segment display having range 0-2A, Digital AC Ammeter 31/2 digits seven segment display having range 0-200mA.


**STUDY OF POTENTIAL TRANSFORMER (P.T.)**

To study Potential Transformer (P.T.), Potential Transformer is designed for 300 VAC INPUT & OUTPUT 30 VAC i.e. ratio 10 : 1, Mains ON/OFF Switch and Fuse 100 mA.


**STUDY OF INSTRUMENT TRANSFORMERS (C.T. & P.T.)**

To study Current Transformer (C.T.), To study Potential Transformer (P.T.), To connect instrument transformers (C.T. & P.T.) in electrical circuits for measurement of current, voltage and power.


**R.M.S. & AVERAGE VALUES OF RECTIFIED VOLTAGE**

To connect a Bridge Rectifier for full wave rectification, To measure amplitude of the input and output voltage of Bridge Rectifier with help of CRO, To verify the relation between r.m.s. and average values of rectified O/P voltage.


**DETERMINATION OF FUSING CHARACTERISTICS AND FUSING FACTOR OF GIVEN FUSE**

To draw a graph between fusing time and fusing current of a given fuse, To determine the fusing factor, To verify that fuses have inverse time characteristics.


**SINGLE PHASAE HALF WAVE AND BRIDGE CONTROLLED RECTIFIER**

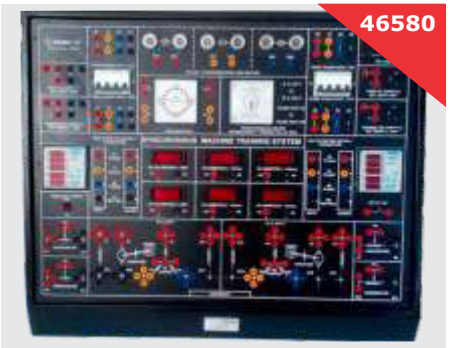
To study the singal phase half wave controlled rectifier & observe the effect of firing angle of wave form, To study the bridge controlled rectifier & observe the effect of firing angle of wave form.


**HOME ELECTRICAL WIRING TRAINING SYSTEM**

Easy diagrammatic representation of circuits, Energy Meter, Voltage and Current display on Graphical LCD (128x64), Test points are provided to measure the voltages at different points, Designed after considering all safety standards.


**SCR APPLICATION TRAINER**

To Study SCR Turn Off Action Under Varying Loads, To Study DC Over Voltage Current Trip Action, Study of Make-to-operate Alarms, Study of Break- To-operate Alarms, Demonstration of Temper-proof Burgler Alarm.




**SYNCHRONOUS MACHINE TRAINING SYSTEM**

Two Identical Motor Generator Set, Electrical Loading Arrangement, 240 X 128 Graphical LCD Display, RISC Microcontroller based design for measurement.


**DC COMPOUND MOTOR LAB**

Machine with mechanical loading arrangement, Provided with Digital Tachometer, Machine with Class "B" Insulation, Heavy Duty Base/Channel, Terminals provided to use the optional externally.


**POWER MEASUREMENT BY 3 VOLTMETER, 3 AMMETER METHOD**

Digital panel meters, Designed by considering all the safety precautions, Stand alone operation, Exclusive and rugged designed panel, Diagrammatic representation for ease of connections.


**THREE PHASE THYRISTORISED AC REGULAR WITH TRIGGERING CIRCUIT**

Three Phase thyristorized AC Regulator, Three pole power contractor with /AC coil complete with Push-to-ON switch, Four pole Miniature Circuit Breaker (MCB).


**THREE PHASE TRANSFORMER TRAINER**

Stand alone operation, Graphical LCD display for high resolution, Exclusive and rugged designed set-up, Electrical loading arrangement, Three Phase Supply indication lamps.


**ELECTRICAL TRANSMISSION LINE TRAINER**

Voltage, Current, Power, Power Factor Measurement, Simultaneous display of sending & receiving end, Inbuilt Variable AC Supply, Big Graphical LCD, Exclusive and attractive designed panel.


**TRANSMISSION LINE TRAINER**

Trainer having control panel should provided in 40X40mm Aluminum profile rack with sturdy table top flat panel, Should have 8 no's of ABS plastic panel mounted on the aluminum rack with mimic diagram All input & output are terminated in 4mm shrouded connector, Should provide 4mm banana cable for experiments.


**THREE PHASE TRANSMISSION LINE SYMMETRICAL & UNSYMMETRICAL FAULT TRAINER**

To Study Line to Ground (L-G) Fault analysis of a Single Phase Transmission Line, To Study Single Line to Ground Fault (L-G) analysis of a Three Phase Transmission Line, To Study Line to Line Fault (L-L) analysis of Three Phase Transmission Line.


**HOME AUTOMATION ELECTRICAL WIRING TRAINER**

Shock proof safety Banana Terminals & patch cords for inter connections & operations, MS fabricated powder painted control panel, Poly carbonate/Venyl front facial with precision machined back support.


**ELECTRICAL HOME INSTALLATION TRAINER**

To study and measure Line & Phase Voltages, To study and measure Current in Three Phase Circuits, To study working of Control Transformer, To study working of Electric Door Opener System.


**ELECTRICAL WIRING LEARNING SYSTEM**

Pre-attached power cord (4 pole, 5 wire), Lockout/Tagout mechanism, Nema 1 Control Cabinet, hinged, LxWxD - 42"x 32"x 8", 3-Phase Fuse Block with 3 fuses, Timer Relay, 4PST instantaneous, DPST timed (convertible N.O. or N.C.).


**HOME AUTOMATION TRAINING KIT - BLUETOOTH**

Power indication, Device On/Off indication, Total shock proof (we need not to touch the switch board as it operates with remote control).


**HOME AUTOMATION TRAINING KIT - WI-FI**

Total shock proof (we need not to touch the switch board as it operates with remote control), Based on Bluetooth Technologies User Can Control devices using Smart mobile phone using android Apps (without Remote).


**HOME AUTOMATION TRAINING KIT - IR**

Power indication, Device On/Off indication, Total shock proof (we need not to touch the switch board as it operates with remote control).


**WARD LEONARD METHOD OF DC MACHINE TRAINER**

To study the speed control of Separately Excited DC Shunt Motor in either direction by Ward Leonard Method, Stand alone operation, Mechanical Coupling Arrangement.


**DC SUPPLY**

Over Current protection, Field failure protection, Suitable to run in series and shunt mode of machine, Low cost thyristor based design, Separate section for Fixed and Variable Supply.


**RLC RESONANCE TRAINER**

LCD Voltmeter and Frequency Counter, Inbuilt Signal Generator, Low cost trainer demonstrating both Series and Parallel Resonance, Experiments can be performed with or without Oscilloscope.


### THREE PHASE SYNCHRONOUS MOTOR LAB

To study the V curve of Three Phase Synchronous Motor, To study the Inverse V curve of the Three Phase Synchronous Motor, Flexible Shaft Coupling Arrangement, Wattmeter being used for better precision.


### MEASUREMENT OF XD AND XQ OF THREE PHASE SYNCHRONOUS MACHINE

Electrical Loading Arrangement, Flexible Shaft Coupling Arrangement, Provided with Digital Tachometer, Machine with Class "B" Insulation, Heavy Duty Base/Channel, Equipped with supply indication lamps.


### THREE PHASE SYNCHRONOUS GENERATOR LAB

Equipped with supply indication lamps, Designed by considering all the safety standards, Diagrammatic representation for the ease of connections, Exclusive and Compact Design.


### INDUCTION MOTOR COMPOUND GENERATOR LAB

Equipped with supply indication lamps, Designed by considering all the safety standards, Diagrammatic representation for the ease of connections, Exclusive and Compact Design.


### THREE TO SIX PHASE CONVERSION TRAINER

Study of Polarity Test under Single Phase Transformer, Study of Three to Six Phase Conversion using 3 Single Phase Transformers, Study and verification of Three Phase Star Connection Parameters.


### SHUNT MOTOR SERIES GENERATOR LAB

Specially designed BS-10 safety terminals, Electrical loading arrangement, Designed by considering all safety precautions, Diagrammatic representation, Learning material CD.


### FIELD TEST OF DC SERIES MACHINE

Stand alone operation, High Quality meters, Mechanical coupling arrangement, Standard BS-10 safety terminals, Electrical loading arrangement.


### DC SERIES MOTOR SHUNT GENERATOR LAB

Study and Measurement of External characteristic of DC Shunt Generator, Study and Measurement of Internal characteristic of DC Shunt Generator, Study and Measurement of Open Circuit Characteristic of DC Shunt Generator.


### UNDERSTANDING CALIBRATION OF ENERGY METER

Single phase kWh Energy meter, Inbuilt Voltmeter, Ammeter, Watt meter as Standard meter for calibration of Energy meter, Big font LCD (16 x 2) for use as Standard meter/Energy meter calibration, Separate Seven Segment Display as Energy meter.


### INDUCTION MOTOR SERIES GENERATOR LAB

Study & verify No-Load Characteristics of DC Series Generator, Study & verify Load Characteristics of DC Series Generator, Designed by considering all the safety standards, Diagrammatic representation for the ease of connections.


### ELECTRICAL HOME INSTALLATION TRAINER

Study and verify the Load Characteristics of Long Shunt Cumulatively Compound Generator, Study and verify the Load Characteristics of Short Shunt Cumulatively Compound Generator, Study and verify the Load Characteristics of Long Shunt Differentially Compound Generator.


### SLIP RING INDUCTION MOTOR LAB

Study of Running Three Phase Slip ring Induction Motor, Study of Reversing Three Phase Slip ring Induction Motor, Study of No Load Test in a Three Phase Slip ring Induction Motor, Study of Block Rotor Test in a Three Phase Slip ring Induction Motor.


### SWINBURN'S TEST OF DC MACHINE

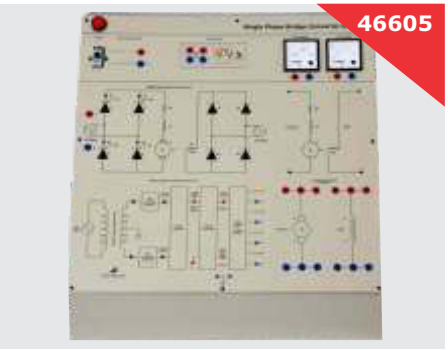
Study and Determine the losses of DC Machine and correspondingly calculate the efficiency of DC Machine by Swinburn's Test Method, Machine with Mechanical Loading Arrangement, Provided with Digital Tachometer, Machine with Class "B" Insulation.


### HOPKINSON'S TEST OF DC MACHINE

Study and obtain the losses separately and correspondingly. Determine the efficiency of a DC Shunt Machine by Hopkinson's test, Designed by considering all the safety standards, Diagrammatic representation for the ease of connections.


### CUT SECTION OF MACHINES

Self-Contained, Easy to operate, Quality designed motor with running condition, Easily distinguish the internal part of machines, Provided with terminal box for ease of connection.




### SINGLE PHASE BRIDGE CONVERTER DRIVE

Study of Ramp Comparator Firing Circuit for Drive, Study of Single Phase Bridge Converter Drive, Power Scope for isolation measurement, Provided with DC Shunt Motor, High quality meters.


### THREE PHASE AC VOLTAGE CONTROLLER

Study of Three Phase Firing Circuit, Study of Three Phase AC Voltage Controller at Lamp Load, Study of Three Phase AC Voltage Controller at Motor Load.


### POWER MEASUREMENT USING CT & PT

To measure high value of AC Current by a low range, AC Ammeter and Current Transformer, To measure high value of AC Voltage by a low range, AC Voltmeter and Potential Transformer, To measure Power using CT & PT.





**METER DEMONSTRATOR**

Study the operation of moving coil type instruments, Study the operation of moving iron type instruments, Study the operation of Dynamometer type instruments, Demonstration of Analog measuring insturments, CBT software covering all the experiments, Follows all safety standards.


**RADIAL AND RING MAIN DISTRIBUTION SYSTEM**

Digital 3 nos. DC Voltmeter & 3 nos. DC Ammeter for accurate measurement, Separate connection for Radial & Ring Main System, Inbuilt DC Variable Supply, Isolation Transformer is provided for safe operation, Exclusive and attractive designed panel.


**POWER DISTRIBUTION TRAINER**

To study working of dol starter and measure line and phase voltages, To study connection and working of emergency switch, To study and measure current in three phase circuits. To study working of bus bar.


**SINGLE AND THREE PHASE RESISTIVE LOAD**

Suitable for Single and Three Phase Operation, Star/Delta Switch for easy conversion, Suitable for both static & rotating machines, Five selectable load values on each bank.


**SINGLE PHASE RESISTIVE LOAD**

Suitable for single phase operation, Suitable for both static & rotating machines of single phase, Five selective load value are provided, Switch are used to switch value & protection MCB are provided.


**SINGLE AND THREE PHASE INDUCTIVE LOAD**

Suitable for loading Single Phase and Three Phase supply, Suitable for both static & rotating machines, Star/ Delta switch provides easy switching, MCBs are used to switch values and provide protection at the same time.


**SINGLE PHASE INDUCTIVE LOAD**

Suitable for single phase operation, Suitable for both static & rotating machines of single phase, Five selective load value are provided, Switch are used to switch value & protection MCB are provided.

46612

**SINGLE PHASE & THREE PHASE CAPACITIVE LOAD**

Suitable for Single and Three Phase Operation, Star/Delta switch for easy conversion, Ten selectable load values on each bank, Suitable for balanced and unbalanced load Conditions, MCBs are used to switch loads and provide protection at the same time.

46612A

**SINGLE PHASE CAPACITIVE LOAD**

Suitable for single phase operation, Suitable for both static & rotating machines of single phase, Five selective load value are provided, Switch are used to switch value & protection MCB are provided, Designed by considering all the safety standards.

46613

**3-PHASE PARAMETER MEASUREMENT**

Microcontroller based design for accurate measurement, 240 x 128 Graphical LCD Display to view all the parameter, Simultaneous display of Three Phase electrical parameters, Used with Single Phase / Three Phase supply.

46614

**TRANSFORMER OIL TESTING SYSTEM**

Break down voltage protection, Over current protection, Mains & H.T. "ON" & "OFF" Switches, Incorporates automatic tripping mechanism, Mains and H.T. "ON" indications, Test cup with adjustable gap electrode arrangement.

46615

**TRANSFORMER OIL TESTING SYSTEM**

Fully motorized high voltage control, Break down voltage protection, Over current protection, Mains & H.T. "ON" & "OFF" Switches, Incorporates automatic tripping mechanism, Mains and H.T. "ON" indications.

46616

**MCB AND HRC FUSE TESTING SYSTEM**

Alphanumeric 16X2 Big Font LCD for better visibility, Isolated Power Supply using Transformer, Inbuilt variable current injection facility, Transparent MCB's to understand internal architecture and its working, Inbuilt Timer, Current & Temperature on LCD.

46617

**OVER CURRENT RELAY TESTING SYSTEM**

Alphanumeric 16X2 Big Font LCD for better visibility, Electromechanical relay to understand internal mechanism and its working, Simultaneous display of voltage, current on LCD, Inbuilt automatic timer that starts and stop with relay, Inbuilt Power Source for relay.


**UNDER VOLTAGE & OVER VOLTAGE RELAY TESTING SYSTEM**

Alphanumeric 16 x 2 Big Font LCD for better visibility, Electromechanical relay to understand internal mechanism and its working, Inbuilt Single Phase Variac with isolation, Tripping function settings.


**EARTH FAULT RELAY TESTING SYSTEM**

To study and verify the operating characteristics of Earth Fault Relay with different plug setting, To study connection of Earth Fault Relay in transmission line.


**DIFFERENTIAL RELAY TESTING SYSTEM**

Alphanumeric 16X2 Big Font LCD for better visibility, Electromechanical relay to understand internal mechanism and its working, Inbuilt Single Phase Variac with isolation, Two variable current injection units, Tripping function settings.


**THREE PHASE LOW VOLTAGE POWER SUPPLY**

Provided with two nos. synchronized three phase output, Easy to Operate, Designed by considering all the safety standards, Equipped with supply indicators, Learning material CD.


**SYNCHRONIZATION PANEL TRAINER**

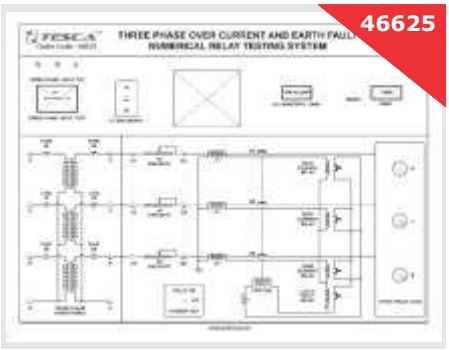
Two digital synchronization size 96x96 is provided, 3 Nos multifunction digital meter (VIF) size 96x96mm to display current voltage frequency, Two synchronization switch MCB 3 pole 16Amp. Is provided, Two set of 3 phase synchronization lamp is provided.


**SEQUENCE CONTROL TRAINER**

Understating of control components and individual components operation, Sequence circuit connection experiment, Sequence control by proximity sensor, Sequence circuit by PLC Control.


**FIRE ALARM TRAINER**

Demonstration of various types of Fire sensors, Real time activation of fire alarm system, Understanding the sensing techniques of fire sensors, Study of Fire alarm system and its accessories, To learn how to operate the fire control system.

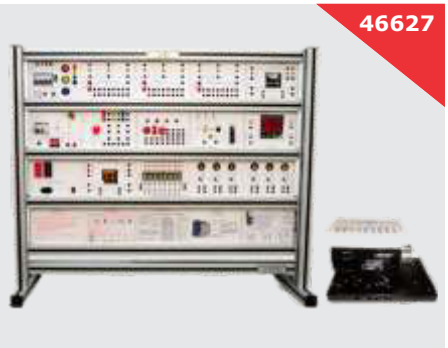



**THREE PHASE OVER CURRENT & EARTH FAULT NUMERIC RELAY TESTING SYSTEM**

Study and verify Operating Characteristics of Three Phase Over Current and Earth Fault Numeric Relay with different Time Multiplier Settings (TMS) and Current Setting, Study and use of Time Setting Multiplier (TMS) in Numeric Relay.


**BRUSH LESS DC MOTOR TRAINER**

To study of speed vs Load characteristics with loading arrangement, To study Speed vs load vs current vs voltage measurements with loading arrangements.




**INDUSTRIAL INSTALLATION TRAINER**

Study of components in electrical systems and contact their Operations, Study of Hold ON Contact Logic, Study of interlocking contact logics with trip indication, Study of DOL starter logic, Study of Star-Delta Logic, Study of phase reversal logic.


**INDUSTRIAL INSTALLATION TRAINER**

To study the working of meters, To study the working of DOL Starter, To study the working of Contactor, To study the working of Over Load Relay, To study the working of CAM Switch, To study the working of Proximity Switch.


**SMART POWER SYSTEM TRAINER MODEL**

Study of voltage variation & control, Study of voltage regulation for constant cos F, Study of 3 bus load flow study, Study of No load test ferranti effects on transmission line.


**HOME/COMMERCIAL WIRING INSTALLATION TRAINER**

Electrical Safety Rules for working in laboratories, Variety of wiring experiments based on above operational panels, Study of protective devices panel, Study and use of Measurement devices.


**ANTI-THEFT TRAINER**

To work with PIR (Passive infrared) motion sensor, To work with Ultrasonic motion sensor, To work with diffuse photo sensor, To work with through beam photo sensor, To work with magnetic reed switch.


**FIRE ALARM TRAINER**

To Work with smoke detector/sensor, To Work with heat detector/sensor, To Work with Gas (LPG) leak detector/sensor, To Work with manual Call point (MCP), To Work with siren with flasher.


**SOLAR TECHNOLOGY TRAINER**

Study of I-V characteristic of Solar cell, Study of I-V characteristic of Solar PV module, Study of series parallel combination of solar cells, Study of series parallel combination of solar PV modules.


**OVER UNDER VOLTAGE PROTECTION RELAY KIT**

To study the working of DOL starter, To study the working of variac, To study the working of under voltage protection relay in definite time mode, To study the working of under voltage protection relay in inverse definite minimum time (IDMT) mode.


**IDMT OVER CURRENT RELAY KIT**

To measure high value of AC Current by a low range, AC Ammeter and Current Transformer, To measure high value of AC Voltage by a low range, AC Voltmeter and Potential Transformer, To measure Power using CT & PT.


**COMBINED EARTH FAULT AND OVER CURRENT NUMERICAL RELAY KIT**

To perform experiment on IDMT over current protection, To perform experiment on earth fault protection, 1 phase AC Input supply panel, Variable voltage & current injector panel.


**DISTANCE PROTECTION RELAY KIT**

Study of No Load Test, Study of Ferranti Effect, Study Determination of transmission line ABCD parameter, To perform experiment for distance protection of transmission line LG, LL, LLG, LLL, LLLG.


**POWER FACTOR CONTROL RELAY KIT**

To study the working of contactor, To study and measure voltage, current & power factor of lamp load, To study and measure voltage, current & power factor of inductive load, To study the working of power factor correction relay with inductive and resistive load.


**FEEDER PROTECTION RELAY KIT**

Study the working of IDMT over current protection, Study the working of under/over voltage protection, Study the working of under/over frequency protection, Study the working of earth fault protection.


**SINGLE AND THREE PHASE LOAD (R. C. L.)**

Suitable for Single and Three Phase Operation, Star/Delta Switch for easy conversion, Suitable for both static & rotating machines, Five selectable load values on each bank, Suitable for balanced and unbalanced load Conditions.


**ELECTRONIC CONTROL TRAINER**

Facilitates easy and safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords and shrouded socket arrangements for high voltage circuits, Each panel is made of non-breakable tough acrylic plate and colorful screw-less overlays showing circuits diagrams & its connection tag numbers for easy understanding and connection.


**SWITCH GEAR ASSEMBLY AREA**

To Study Basic logic circuit AND, OR, NOT, NO, NC connection using push buttons and relays, To Study Forward - Reverse of motor circuit design wiring, testing & analyzing, Implementing switch gears for different wiring and operation for industrial purpose.


**FLYBACK CONVERTER**

To study PWM generation, To study Flyback Converter with different filter components and loads, Optically isolated PWM generation with Gate driver, Easy to operate & understand, Inbuilt isolation section for measurement of the signal.


**BRUSH LESS DC MOTOR TRAINER**

To study of speed vs Load characteristics with loading arrangement, To study Speed vs load vs current vs voltage measurements with loading arrangements.


**SINGLE PHASE SEMI CONVERTER DRIVE**

To Study Single Phase Semi-converter using ramp comparator firing circuit, 6V AC at 100mA AC Power Supply, ±12V DC at 100mA fixed regulated Power Supply, Two SCR and Six Diode.


**INDUSTRIAL INSTALLATION TRAINER**

To Study Single Phase full wave converter Drive using ramp comparator firing circuit, Two 3½ digital panel meter (DPM) for measurement of voltage, Adequate no. of other Electronic Components, Mains ON/OFF switch (MCB), Fuse and Jewel light.


**SINGLE PHASE PWM INVERTER**

Study of the single phase PWM firing circuit, Study the operation of single phase PWM bridge inverter using MOSFET, Study the operation of single phase PWM bridge inverter using IGBT.


**THREE PHASE HALF WAVE CONVERTER DRIVE**

To study of Three Phase Half wave converter drive, Three separate identical cards consisting of Zero Crossing Detector, Integrator, Comparator and Pulse Generator one for each phase, for controlling the triggering angles of the positive group of three thyristors, Angles of the negative group of three diodes.


**THREE PHASE HALF WAVE AC VOLTAGE CONTROLLER**

To study of Three phase half wave AC voltage controller, Three 230:50V at 0.5Amp transformer for rectifications & 6V AC supply for Triggering, ± 12V at 100mA, IC regulated Power Supply for Triggering Circuits, Three nos. Driver Circuits with Pulse Transformers.


**THREE PHASE FULL WAVE AC VOLTAGE CONTROLLER**

To study of Three phase Full wave AC voltage controller, Three Phase line commuted Full wave bridge converter, Four pole Miniature Circuit Breaker (MCB) 0.5Amp.


**SINGLE PHASE CYCLOCONVERTER**

Works directly on 230V AC mains, Gate drive current of 200mA to trigger wide range of devices, Firing variation from 1800 to 00 on a graduated scale, Frequency division – 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.


**THREE PHASE FIRING CIRCUIT FOR 3 PHASE AC VOLTAGE CONTROLLER**

To study of Three phase firing circuit, To Study of Three Phase AC Voltage Controller with Resistance Load, Three Phase line commuted Full wave bridge converter, Three pole Miniature Circuit Breaker (MCB).


**MOSFET, IGBT, TRANSISTOR AND SCR BASED STEP DOWN CHOPPER**

Study PWM circuit, Study MOSFET based Step Down Chopper with R load, Study MOSFET based Step Down Chopper with RL load, Study MOSFET based Step down Chopper with Motor load.


**ELECTRICAL MACHINE TRAINER**

To Study speed torque curve of DC shunt motor with 3 phase AC integrated motor, To Study v-i efficiency curve of DC shunt generator with 3 phase AC integrated motor, To Study DOL starter. To Study Star delta starter, To Study Rotor resistance starter.


**DC MOTOR COUPLED 3PH. AC MOTOR TRAINER**

To Study speed torque curve of DC shunt motor with 3 phase AC integrated motor, To Study v-i efficiency curve of DC shunt generator with 3 phase AC integrated motor, To Study DOL starter. To Study Star delta starter, To Study Rotor resistance starter.


**DC MOTOR COUPLED 3PH. SALIENT MOTOR TRAINER**

To Study speed torque curve of DC shunt motor with 3 phase salient motor, To Study speed torque curve of DC series motor with 3 phase salient motor, To Study Speed torque curve of separately excited DC motor with 3 phase salient motor.


**DC MOTOR COUPLED 1PH. AC MOTOR TRAINER**

To Study speed torque curve of DC shunt motor with 1 phase AC integrated motor, To Study speed torque curve of DC series motor with 1 phase AC integrated motor, To Study Speed torque curve of separately excited DC motor with 1 phase AC integrated motor, To Study Speed torque of DC compound motor with 1 phase AC integrated motor.


**DC MOTOR COUPLED 1PH. SYNCHRONOUS MOTOR TRAINER**

To Study speed torque curve of DC shunt motor with 1 phase synchronous motor, To Study speed torque curve of DC series motor with 1 phase synchronous motor , To Study Speed torque curve of separately excited DC motor with 1phase synchronous motor.


**DC MOTOR COUPLED UNIVERSAL MOTOR TRAINER**

To Study Speed torque curve of DC shunt motor with universal motor, To Study Speed torque curve of DC series motor with universal motor, To Study Speed torque curve of separately excited DC motor with universal motor, To Study Speed torque of DC compound motor with universal motor.


**DC MOTOR COUPLED TO DC MOTOR TRAINER**

To Study Speed torque curve and efficiency of DC shunt motor with DC motor, To Study Speed torque curve and efficiency of DC series motor with DC motor, To Study Speed torque curve and efficiency of separately excited DC motor with DC motor, To Study Speed torque curve and efficiency of DC compound motor with DC motor.


**SYNCHRONATION PARALLELING OF 2 THREE PHASE ALTERNATOR TRAINER**

To Study speed torque curve of DC shunt motor with 3 phase AC integrated motor, To Study speed torque curve of DC series motor with 3 phase AC integrated motor, To Study Speed torque curve of separately excited DC motor with 3 phase AC integrated motor.


**SINGLE PHASE AC INDUCTION MOTOR TRAINER**

Study of speed-torque characteristics of single phase induction motor (split phase type), Study of efficiency and input power factor of 1phase induction motor (split phase type) for various loading conditions, Study of speed-torque characteristics of single phase induction motor (capacitor start type).


### 3 PHASE AC SLIP RING INDUCTION MOTOR TRAINER

To Study Speed torque characteristics of 3 ph. wound rotor induction motor with variable rotor Resistance, To Study Efficiency of input power factor measurement of 3 ph. wound rotor induction motor, To Study Speed torque characteristics of 3 ph. short-circuited rotor induction motor.


### 3 PHASE SQUIRREL CAGE INDUCTION MOTOR TRAINER

To Study Speed torque characteristics of 3 phase squirrel cage induction motor, To Study Efficiency, % slip and input power factor measurement of 3 phase squirrel cage induction motor, To Study Speed control of squirrel cage induction motor by pole changing method.


### REPULSION MOTOR TRAINER

Study of speed torque characteristics of Repulsion motor, To Study efficiency and input power factor measurement of single phase Repulsion motor, To Study Speed control and reversal of direction of rotation of repulsion motor.


### LIGHTING INSTALLATION

To Study Single-point controlled lighting plant with socket, To Study Switch-controlled two-lamps lighting installation, To Study Two-point controlled lighting installation.


### ADVANCE LIGHTING INSTALLATION

To Study Low consumption lamps lighting installation, To Study Emergency light installation, To Study Lighting installation controlled by dimmer, To Study Lighting installation controlled by pushbutton light regulator.


### SIGNALING WITH ARDUINO

To develop Arduino program for blinking of LED, To develop Arduino program for controlling LED Arrays, To Develop Arduino Program for Interfacing TM1637 4 Digit 7 Segment Display with Arduino UNO.


### VIDEO INTERCOM INSTALLATION

To Study Video Intercom Experiment, Facilitates easy and safe wiring by students due to use of 4mm sturdy Shrouded banana path cords & shrouded socket arrangements, All Panels are mounted on finely painted sturdy base frame with easy Panels interchangeability.


### HIGH VOLTAGE POWER ELECTRONICS LAB

Study of Single Phase Supply and Single Phase Low voltage Power Supply, Study of Three Phase Supply and Three Phase Low voltage Power Supply, Study of Single Phase Half Wave Uncontrolled Rectifier with Lamp Load, Study of Single Phase Half Wave Uncontrolled Rectifier with Motor Load.


### POWER ELECTRONICS TRAINING SYSTEM

To Study Single-Phase Half-Wave uncontrolled rectifier, To Study Symmetrical Single-Phase Full-Wave Semi-Controlled rectifier, To Study Single-Phase Full-Controlled AC voltage controller.

# MECHANICAL LAB

We are dealing with complete Mechanical Engineering Lab solutions. In this segment we are having training set-ups comprising various training units in Aerodynamic Trainers | Automotive Trainers | Automobile Engineering & I.C. Engine Lab | Boiler & Steam Generators | CNC Trainers | Fluid Mechanics Lab | Heat Transfer Lab | Refrigeration & Air Conditioning Lab | Structural Mechanics Lab | Theory of Machine Lab | Thermodynamics Lab | Engineering Apparatus, Models & Charts | Engines & Transmission Trainers | Environmental Trainers | Ignition & Fuel Injection Trainers | Steering Trainer and many more.




**IMPACT OF A JET APPARATUS**

Measurement of jet impact forces on various target deflectors, Demonstration of the principle of linear momentum, Study of jet impact forces at various jet velocities, Comparison of measured jet impact forces with the theory.


**FLOW-OVER WEIRS & NOTCHES APPARATUS**

Demonstration of the flow over the rectangular notch, Study of discharge Vs head over the notch characteristics, Determination of the coefficient of discharge of weirs, Demonstration of the flow over the V-notch.


**BERNOULLI'S THEOREM DEMONSTRATION APPARATUS**

Demonstration of continuity equation, Investigation of static pressure, flow velocity and total pressure variation along the venturi, Familiarization with static and total pressure measurements, Demonstration of Bernoulli's theorem.


**ORIFICE DISCHARGE APPARATUS**

Study of flow through orifice, Investigation of water jet through orifice, Locating vena contract in water jets, Determination of coefficient of velocity for orifice, Determination of contraction coefficient for orifice, Determination of coefficient of discharge for orifice.


**PRESSURE LOSSES IN BENDS APPARATUS**

Study of Measuring the electrical activity generated by the heart wave Detection, Study of Heart rate Pulse Measurement, Study of PPG Signal & signal processing, Placement of Electrodes, Amplification, Filters, Gain, Self test.


**OSBORNE REYNOLD'S APPARATUS**

Dye flow visualization of laminar, transitional and turbulent flows, Study of change of flow pattern from laminar to turbulent type as a function of Reynolds number, Calculation of critical velocities and critical Reynolds numbers.


**PRESSURE LOSS IN PIPES APPARATUS**

Study of loss of head due to friction in a circular pipe at various mean flow velocities, Study of friction factors in laminar and turbulent flow regimes, Demonstration of the law of resistance in laminar to turbulent flow regimes.


**HYDROSTATIC FORCE & CENTRE OF PRESSURE**

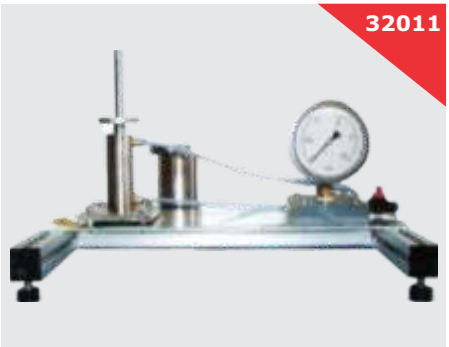
Measurement of hydrostatic force on a fully and partially submerged vertical plane surface, Determination of center of pressure on a fully and partially submerged vertical plane surface, Comparison of experimental results with principles of hydrostatics.


**METACENTRIC HEIGHT APPARATUS**

Plumb: Made of Stainless Steel, fitted at center of protector for vertical downward line, Horizontal scale graduation: 1mm, Protector: To determine the angle of tilt of ship from its axis, protractor is attached on the ship.


**FLOW CHANNEL APPARATUS**

Study of basic open channel flows with variable depth of flow, Calculation of Froude number and similarity of flows, Study of uniform flow, gradually varied flow and rapidly varied flow and Froude number correlations.




**PRESSURE GAUGE CALIBRATOR**

Demonstration of the principle of working of Bourdon tube pressure gauge, Understanding of pressure and its measurement, Calibration of Bourdon tube pressure gauge.


**STABILITY OF FLOATING BODY APPARATUS**

Familiarization with the laws of floatation and principle of working of floating bodies, Determination of center of gravity of a pontoon, Determination of center of buoyancy of a pontoon.


### SERIES/PARALLEL PUMP TEST APPARATUS

Study of operation and working of centrifugal pumps connected in series and parallel, 2. Study of matching of pumps, starting and stopping of pumps in series and parallel connection, 3. Determination of power requirement for series and parallel operation, 4. Determination of hydraulic power output in series and parallel operation.


### CENTRIFUGAL PUMP TEST APPARATUS

Computer Control Software, PID Computer Control + Data Acquisition + Data Management, Compatible with actual Windows operating systems, Graphic and intuitive simulation of the process on screen, Compatible with the industry standards.


### FREE & FORCED VORTICES APPARATUS

Demonstration of free and forced vortices, Determination of surface profile of a free vortex, Determination of total head variation in free vortex, Dye flow visualization of streamlines in free vortex.


### HYDRAULIC RAM PUMP DEMO APPARATUS

Demonstration of the water hammer effect, Familiarization with the operation of hydraulic ram pumps, Study of pressure versus flow characteristics of hydraulic ram pump, Determination of efficiency of hydraulic ram pump.


### AUDIOMETER

Determination constant head characteristics curve, Determination of constant speed characteristics curves, Study of construction of Pelton turbine, Determination of constant efficiency curves.


### ORIFICE & FREE JET FLOW APPARATUS

Determination of coefficient of velocity for an Orifice, Study of coefficient of discharge at various values of head over the Orifice to study the influence of flow Reynolds number, Comparison of the measured trajectory of the jet with the trajectory calculated from simple theory.


### FLOW METER DEMO APPARATUS

Familiarization with static pressure measurements, Familiarization with flow measurement techniques, Determination of coefficient of discharge of orifice plate, Determination of coefficient of discharge of venturimeter.


### CAVITATION DEMO APPARATUS

Computer based learning software is included to enable students to understand and conduct experiments, tabulate results and plot graphs.


### FLOW VISUALIZATION CHANNEL

Study of open channel flows, Study of flow over weirs – over shot and under shot weirs, broad and narrow crested weirs, Familiarization with water flow visualization technique, Demonstration of laminar and turbulent flow.


**FRANCIS TURBINE DEMO APPARATUS**

Study of construction of Francis Turbine, Determination constant head characteristics curve, Determination of constant speed characteristics curves, Determination of constant efficiency curves.


**PUMP IMPELLER DISPLAY PANEL**

Pump Impeller Display Panel consisting of impellers of five different pumps, Panel dimensions: 550 x 350 mm, Designed for desktop mounting, Weight: 18 kg (approx.).


**PIPE FRICTION APPARATUS**

Familiarization with pressure measurements and the working of U-tube manometer, Study of loss of head due to friction in a circular pipe at various mean flow velocities, Study of friction factors in laminar and turbulent flow regimes.


**RADIAL FLOW TURBINE**

Characteristic behaviour of a reaction turbine, Power output dependent on volumetric flow rate,pressure and speed, Recording of torque characteristic, Determination of the turbine efficiency.


**DRAIN PERMEAMETER MODEL**

Indigenous Digital Student Physiograph, It is Compact light weight and easy to operate by a beginner. , On screen 6 channels select. By external switching can be set up to Input 9 Signal, Unit having PC Interfacing's USB output.


**PRESSURE DISTRIBUTION IN VENTURI & NOZZLE APPARATUS**

Patient Monitor ECG/Sp02/BP Patient Monitor, high quality "Multi Parameter Monitor" 12 inch Five Standard parameters like ECG, RESP, NIBP, SPO2, TEMP, PR/HR.


**IMPULSE TURBINE**

Determination of typical turbine curves, Turbine : Power Output approx. 5.6W (at V ≈ 30.7Ltr/min, H = 2m, n = 500rpm), Impeller : External Diameter 132mm, Width of vane 33.5mm, 14 vanes, Nozzles : Diameter of stream 10mm.


**INFILTRATION APPARATUS**

Understand the effects of soil texture and structure on infiltration, Understand the effects of existing soil moisture conditions on infiltration.


**PARTICLE DRAG COEFFICIENT APPARATUS**

Study of BP Measurement using different technique, Study of Sphygmomanometer, Aneroid (Dial), Digital Bp Apparatus, Compare the pressure sensitivity, Readings, Stability, Accuracy, Effect of applied pressure on Blood Flow.


**KAPLAN TURBINE TRAINER**

Study of construction of Kaplan turbine, Determination constant head characteristics curve, Determination of constant speed characteristics curves.


**MOBILE BED & FLOW VISUALIZATION UNIT**

Flow around model engineering structures, Mobile bed experiments, Meandering water courses characteristics, Visualization of the behavior of boundary layers.


**AIR FLOW STUDIES APPARATUS**

Measurement of pressure using a manometer, Measurement of total pressure using Pitot probe, Measurement of flow velocity using Pitot- static probe, Measurement of flow rate using nozzles, Measurement of flow rate using orifice plate.


**IMPULSE TURBINE APPARATUS**

Determining the characteristics of the turbine including the relationships of volume flow rate, head, torque produced, power output and efficiency to rotational speed, Comparison of nozzle and throttling control of an Impulse Turbine.


**VORTEX FLOW METER**

Study and experiments with a vortex flow meter, Study and experiments with a variable area flow meter, Measurement of volumetric volume flow rate, Measurement of gravimetric volume flow rate.


**DEPRESSION MEASUREMENT VACUUM PRESSURE GAUGE**

To measure the depression caused by fluid aspiration by a hydraulic pump, We can observe the different negative readings due to the different methods of fluid aspiration for its subsequent impulsion.


**SOIL SURFACE DEMO APPARATUS**

Disassembly, packing, and reassembly of common centrifugal pumps, Pump maintenance procedures, including impeller clearance adjustment.


**BASIC HYDROLOGY APPARATUS**

Effect of interflow on outflow hydrograph, Simulation of multiple and moving storms, Cone of depression for single well and interaction of cones of depression for two adjacent wells, Dewatering of excavation sites by use of wells, Flow from a well in a confined aquifer.


**VENTURI MEASUREMENT APPARATUS**

Venturi tube: inlet and outlet diameter 26 mm NB, made of transparent plastic / perspex / plexi – glass base Centrifugal Pump: ½ H.P., Sump Tank (50Ltrs), Measuring tank and electronic level measurement system with digital stopwatch.


**WATER RESERVOIR & SURGE TOWER APPARATUS**

Mass continuity in unsteady systems, Flood routing and reservoir inflow and outflow hydrographs, Surge in a pipe and mass oscillation in a surge tower.


**PRESSURE MEASUREMENT APPARATUS**

Study of Pressure measuring System, Study of Barometer, Pressure measurement using different Manometers, Pressure measurement using Bourdon type Pressure Gauges.


**PERMEABILITY TANK APPARATUS**

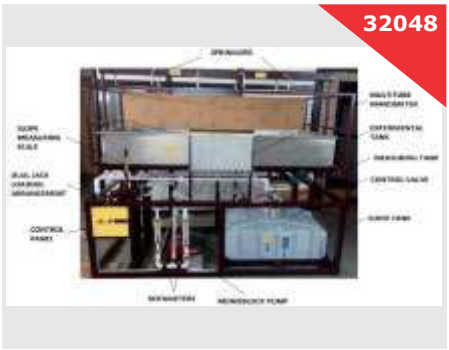
Confirmation of Darcy's Law and measurement of the Coefficient of Permeability, Draw down in two-dimensional horizontal flow, Two-dimensional drainage test, Flow through a permeable earth dam, with and without toe-filter, Seepage flow under an impermeable embankment or dam ,Seepage flow under sheet piling and foundation slabs.


**RADIAL FLOW TURBINE**

Demonstration of cooling tower cycle, Study of the performance of cooling tower systems under laboratory conditions, Study of Mass & Energy transfer, Plotting of different states of air on the psychrometric charts.


**ORIFICE, VENTURI & ROTAMETER APPARATUS**

Calibration of Flowmeters, Flow measurement using venturi meter, orifice meter, variable area flowmeter like Rotameter, Demonstration of use of different flow meter & its comparisons, Determination of flow coefficient, Comparison of pressure drops across venturi meter & Orifice meter.




**RAINFALL SIMULATOR APPARATUS**

The relative protection afforded by different plant densities, Studies of relative Soil Erosion, Studies of soil infiltration characteristics, Erosion and runoff from up and downslope row crops.


**CENTRIFUGAL BLOWER APPARATUS**

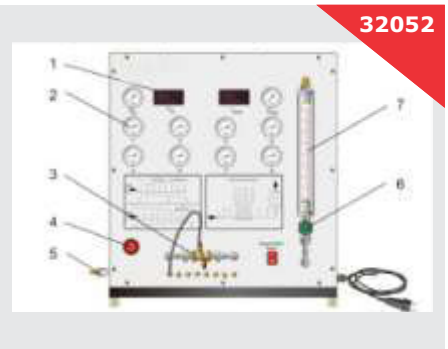
Speed sensor, range: 0 - 3000 r.p.m, Three differential pressure sensors to measure: The differential pressure in the aspiration duct, The differential pressure in the discharge duct, "J" type temperature sensor, Pressure sensor, range: 0 – 1.1 atm.


**BASIC PIPES NETWORK TUTOR**

Recording a calibration curve for individual pipe sections: pressure loss overflow rate, Parallel configurations of pipes (open/ closed), Series configurations of pipes, Combined series and parallel configuration.


**FLOW METERS TRAINER**

Directly comparing flow measurement using 'Quick-change' flow meter adaptors and pressure connections, Minimum four-tube manometer to show flow meter and overall pressure changes, Nozzle flow meter ,Downstream flow control valve.




### NOZZLE PERFORMANCE STUDY APPARATUS

Nozzle pressure distribution in the actual flow of compressible fluids, Three nozzles with pressure measurement points: 1 convergent nozzle, 1 short and 1 long de Laval nozzle, Compressed air regulator for adjusting the pressure downstream of the nozzle.


### PITOT STATIC TUBE APPARATUS

To find the point velocity at the center of a tube for different flow rates of water and calibrate the Pitot tube, To plot velocity profile across the cross-section of the pipe.


### APPARATUS FOR POROUS BED IN VENTURI

Demonstration of Bernoulli's theorem and its limitations in divergent - convergent position, Demonstration of Bernoulli's theorem and its limitations in convergent-divergent position, Direct measurement of the static height and of the total distribution of heights .


### VENTURI, BERNOULLI & CAVITATION APPARATUS

How to fill the manometric tubes, To Study Flow calculation, To Study Determination of the exact section in Venturi's tube, Bernoulli's theorem study, To Study Cavitation study, To Study Pressure reduction in a tank.


### DEAD WEIGHT PRESSURE GAUGE CALIBRATOR

Study concepts of pressure , Force, Area and pressure scales, Calibration and the use of a Dead-weight Pressure Calibrator, Precision machined piston and cylinder with leveling screws.


### FLUID STATISTICS & MANOMETRY

Demonstrating the behavior of liquids at rest (Hydrostatics), Showing that the free surface of a liquid is horizontal and independent of a cross-section, Measuring small changes in a liquid level using a micro-manometer, Measuring changes in a liquid level using a Vernier hook and point gauge.


### LIQUID SEDIMENTATION STUDIES APPARATUS

Determination and comparison of the settling velocities of solids in suspensions dependent on the solid density and concentration and the liquid density and viscosity, Influence of flocculent on the settling velocity.


### OPEN & CLOSED FLOW CHANNEL APPARATUS

Closed conduit flow, Application of the Bernoulli and Continuity equations to converging and diverging flow, Effect of gradual and sudden changes in cross-section (energy losses), Using a contraction as a flow measuring device.


### ADVANCED HYDROLOGY TRAINER (2M X 1M)

Study of the storm hydrograph of an impermeable catchment, Study of the effect of a moving storm on a flood hydrograph, Study of the effect of reservoir storage on a flood hydrograph, Study of the effect of drain pipes on a flood hydrograph.


### FIXED & FLUIDIZED BED APPARATUS

Pressure drop in fixed or fluidized bed with water or air, Ergun equation, Carman-Kozeny and Burke-plummer equations, Particulate and aggregative fluidization Bed porosity, Experimental data collection of real bed fluidization.


### FLOCCULATION TEST DEMO APPARATUS

To determine the optimum coagulant dosage, To determine the optimum pH, To determine the effect of mixing time and intensity on aggregation.


### SEDIMENTATION STUDIES APPARATUS

Confirmation of Darcy's Law and measurement of the Coefficient of Permeability, Draw down in two-dimensional horizontal flow, Two-dimensional drainage test, Flow through a permeable earth dam, with and without toe-filter, Seepage flow under an impermeable embankment or dam ,Seepage flow under sheet piling and foundation slabs.


### PERMEABILITY & FLUIDIZATION STUDIES APPARATUS

Six stirrers with stainless steel paddles, linked to a variable speed motor with electronic feedback speed control, Sample tube I/D: 38mm, Sample tube length: 507mm, Flowmeter range: 50-800ml/min.


### FILTERABILITY INDEX UNIT DEMO

Compact bench top unit with non-corrosive components, Transparent components & Tubing for better visualization, Includes precision Flow meter & differential manometer for accurate measurement.


### DEEP BED FILTER COLUMN

Demonstration of reversed flow fluidization and backwashing, The column may be readily adapted for absorption and ion Exchange studies, Measuring how fast total head loss increases with filtration run.


### SEDIMENTATION TANK MODEL DEMONSTRATOR

Effect of flow rate and baffle position on dispersion, Comparison of real flow regimes with idealized flow models, Electric Supply 230 V AC, Single Phase, Earthed, Measuring sediment removal efficiencies and relating these to the hydraulic characteristics.


### DRAINAGE AND SEEPAGE TANK DEMONSTRATOR

Verification of Darcy's Law, Comparison of experimental results with analytical solutions, Seepage underneath a sheet pile wall, Distribution of uplift pressure on hydraulic structures.


### MOBILE BED & FLOW VISUALIZATION BENCH

Flow around model engineering structures, Boundary layer suction demonstration, Characteristics of meandering watercourses, Experimental investigation of erosion and deposition, Two-dimensional flow visualization by the Ahlborn technique.

32070

### RAINFALL HYDROGRAPHS DEMONSTRATOR

Storm hydrographs from single or multiple storms, Storm hydrograph from a previously saturated catchment, Storm runoff from an impermeable catchment, Effect of a moving storm on the flood hydrograph.

32071

### GROUND WATER FLOW UNIT

Hydraulic gradients in groundwater flow, including the effect of permeability., Abstraction from a single well in a confined aquifer, Cone of depression for two wells.

32072


### HYDRAULIC FLOW DEMO UNIT WITH HYDRAULIC BENCH

Closed conduit flow, Application of the Bernoulli and Continuity equations to converging and diverging flow, Effect of gradual and sudden changes in cross-section (energy losses), Using a contraction as a flow measuring device.

32073

### PISTON DEMO PUMP

The characteristic curve of a reciprocating pump, Influence of pulsation attenuation, Pressure characteristic of delivery pressure and cylinder pressure, Preparation of p-V diagram.

32074


### MICRO RIVER SIMULATOR TRAINER

Basic principles of river behavior such as stage discharge relationship, runoff hydrographs and river routing, Subtle River Morphology, Sediment transport and pollutant transport, Study of Flood and flood plains.

32075


### SEDIMENT TRANSPORT DEMONSTRATION CHANNEL

A sequence of bedforms associated with increasing flow intensity and sediment transport rate, The following bedforms are exhibited (as discharge and/or slope are increased).

32076

### COMPRESSIBLE FLOW OF FLUIDS APPARATUS

Pressure losses in pipes and pipe elbows, Flow in convergent/divergent nozzles, Supersonic flow in the de Laval nozzle, Determine the speed of sound in the air, Compare calculation methods for incompressible and compressible flow.

32077

### FLOW VISUALIZATION BENCH 2.5M

Visualization of Flow patterns in a water channel, Drive Motor: Variable Speed DC Motor to drive the vanes, Light Source, Definition Image Capturing Camera.

32078

### VERTICAL FLOW FROM TANK APPARATUS

Study of the outlet jet (diameter, velocity), Determination of pressure losses and contraction coefficient for different outlet contours, Determination of flow rate at different discharge heads.

32079

**RADIAL FAN TEST APPARATUS**

Operating behavior and characteristic variables of a radial fan, Recording the fan characteristic (differential pressure as a function of the flow rate), Effect of the rotor speed on the pressure, Effect of the rotor speed on the flow rate.


32080

**AXIAL FAN TEST APPARATUS**

Operating behavior and characteristic variables of an axial fan, Recording the fan characteristic (differential pressure as a function of the flow rate), Effect of the rotor speed on the pressure, Determination of hydraulic power output and efficiencies.

32081

**PISTON PUMP TEST APPARATUS**

Principle of operation of a piston pump, Recording of pump characteristics, Pressure curves of delivery pressure and cylinder pressure, Influence of pulsation damping.

32082

**GEAR PUMP TEST APPARATUS**

Principle of operation of a gear pump, Recording of pump characteristics, Relationship between head and speed, Effect of pressure limitation, Determination of efficiencies.

32083

**REACTION TURBINE (150W)**

Power output dependent on volumetric flow rate, pressure, and speed, Recording of torque characteristic, Determination of the turbine efficiency, Investigation of partial load operation due to throttling.

32084

**AXIAL FLOW TURBO MACHINES**

Recording characteristic curves, Determining dimension-less characteristics, Velocity triangles and pressure curves, Investigation of energy conversion within the turbo machine.

32085

**PLUNGER PUMP DEMO APPARATUS**

To Study Plunger displacement, To Study Cylinder pressure, To Study Pump outlet pressure, To Study Line P-V diagram displays, To Study Sprung loading valve or needle valve.

32086

**DEMONSTRATION FRANCIS TURBINE**

Francis runner surrounded by 6 guide vanes inside PVC volute with clear acrylic front panel for visualization, Francis runner 60 mm diameter with 12 blades, Inlet pressure gauge with range 0 to 2 bar, Brake force determined using Prony type brake dynamometer.

32087

**RECIPROCATING PUMP APPARATUS**

Recording of pump curves, Determination of the power requirement of the pump, Determination of the hydraulic power output of the pump, Determination of the pump efficiency.


**PRESSURE DISTRIBUTION NOZZLES APPARATUS**

Connection between inlet pressure and mass flow rate or exit pressure and mass flow rate, How pressure drop in the nozzle affects the temperature, Determining the critical pressure ratio (Laval pressure ratio), Demonstration of the "choking effect".


**AIR FLOW BENCH - MODULAR**

To Study Bernoulli's Equation, To Study Drag Force, To Study Flow Visualization, To Study Boundary Layer, To Study Round Turbulent Jet, To Study Flow Around a Bend, To Study Jet Attachment, To Study Tapped Aerofoil.


**MULTI HEAD DIAPHRAGM PUMP**

Examination of a multi-head diaphragm pump, Diaphragm pump with 3 heads, Common stroke rate adjustable for all 3 heads, Stroke individually adjustable for each head, 3 overflow valves to set the counter pressure.


**ROTARY VANE VACUUM PUMP**

Familiarization with the basic principle of a rotary vane pump, Simulation of leaks, Generation of negative pressure over time, Determination of the flow rate as a function of the counter pressure.


**PUMPS COMPARISON APPARATUS**

Experiments relating to key issues in pump engineering, Comparison of various pump types such as centrifugal pump, piston pump, side- channel pump, Operation of centrifugal pumps in parallel or series, Free position for additional pump.


**FRANCIS TURBINE OPERATING PRINCIPLES APPARATUS**

Design and function of a Francis turbine, Determination of torque, power, and efficiency, Graphical representation of characteristic curves for torque, power, and efficiency.


**FLUID MECHANICS EXPERIMENT PLANT**

Experiments With Pumps Valves and Fittings, And Pipe Sections, Operating Behavior Of Centrifugal Pumps In Individual Or Parallel Operation, A Measurement Of The Npsh Value Of Pumps, Pressure Losses In Pipe Sections With Different Surface Roughness, Pressure Losses In Pipe Fittings.


**CENTRIFUGAL COMPRESSOR DEMO UNIT**

Operating behavior and characteristic variables of centrifugal compressor, Recording of the compressor curve for both stages, Effect of the rotor speed on the pressure, Effect of the rotor speed on the flow rate, Distribution of stage pressure ratios.


**HYDRAULIC BENCH**

Stilling baffles are provided to reduce turbulence, Sight tube with scale provided to indicate instantaneous water level, Bull's eye level is provided to ensure proper position of the Bench and accurate reading of levels, Remote Actuator provided to operate the Dump Valve at the base of Measuring Tank.


**BASE HYDRAULIC BENCH MODULE (DIGITAL)**

Operating behavior and characteristic variables of a radial fan, Recording the fan characteristic (differential pressure as a function of the flow rate), Effect of the rotor speed on the pressure, Effect of the rotor speed on the flow rate.


**TURBINE SET: PELTON, FRANCIS, KAPLAN**

Determination of mechanical output, Determination of efficiency, Recording of characteristic curves, Investigation of the influence of the nozzle cross-section on the power output, Determination of power output curves at different speeds.


**DEEP FILTRATION APPARATUS**

Learning the fundamental principle of depth filtration by sand filters, Observation of the pressure conditions in a filter bed, Determination of pressure losses, Plotting of Micheau diagrams, Principle of backwash.


**FLUIDS SPECIFIC GRAVITY & DENSITY APPARATUS**

Triple scale reading uses all three reading scales for the measurement for experiment exercise, Accurate measurements and the proposed hydrometer is colored in 3 different colors for easier measurement.


**METHODS OF FLOW MEASUREMENT APPARATUS**

Flow measurement with Orifice plate flow meter and measuring nozzle, Venturi nozzle, Rotameter, Pressure measurement with Pitot tube, Comparison of different instruments for flow measurement, Determining the corresponding flow coefficients.


**PRINCIPLES OF AIR FLOW STUDIES APPARATUS**

Recording a fan characteristic, In conjunction with the power meter HM 240.02, Determining the fan efficiency, In conjunction with corresponding accessories, Velocity distribution in the pipe.


**OPEN CHANNEL SEDIMENT TRANSPORT DEMONSTRATOR**

Recording a fan characteristic, In conjunction with the power meter, Determining the fan efficiency, In conjunction with corresponding accessories, Velocity distribution in the pipe, Velocity distribution behind a cylinder subject to transverse incident flow.


**AIR OPERATED IMPULSE TURBINE**

Design and function of an impulse turbine, Determination of torque, power and efficiency, Graphical representation of characteristic curves for torque, power and efficiency, Investigation of the effect of nozzle pressure and number of nozzles Requirements.


**CAVITATION IN PUMPS**

Visualization of cavitation in centrifugal pumps, Open impeller to observe the blades during operation, Continuously adjustable pump speed via frequency converter, Temperature control via heater and external cooling via the water supply.


**FLOW THROUGH PARTICLE LAYERS**

Investigation of the properties of fixed and fluidized beds subjected to liquid flow, Glass test tank with sintered filter medium on its base, Test tank removable for filling, Downward flow to investigate fixed beds, Upward flow to investigate fluidized beds.


**NUTSCHE PRESSURE FILTER**

Nutsche vacuum filter for discontinuous cake filtration, Open 2-part vessel with flange and recessed sieve base, Bottom section to draw in and collect filtrate, Top section with an inserted filter bag to form a filter cake, Polyester filter bag.


**DRUM CELL FILTER**

Learning the basic principle and method of operation of a drum cell filter, Fundamentals of cake filtration: Darcy's equation, Variation in time of filtrate quantity, filter cake mass, and thickness, Filter cake mass and thickness dependent on filtrate quantity, negative pressure, and drum speed.


**SUSPENSION PRODUCTION UNIT**

Supply unit to produce and deliver suspensions for experimental filtration units, Stirred tank with lid and stirring machine to prepare a suspension, Eccentric screw pump, with pressure cut-out switch, dry- running protection and adjustable speed, to deliver the suspension.


**FLOW OF BULK SOLIDS FROM SILOS**

Investigation of the outflow of bulk solids from silos with wedge-shaped discharge hoppers, Demonstration of arching, mass flow, and funnel flow with different bulk solids, Two silos with different hopper wall materials, Front walls of the silo made of transparent material.


**FLOW PROPERTIES OF BULK SOLIDS**

Design of bulk solids silos using a ring shear tester, 1 ring-shaped shear cell to determine yield loci, 1 ring-shaped shear cell with a sample of wall material to determine wall yield loci, Shearing of the bulk solid sample by motor rotation of the shear cell.


**MIXING PROCESS BY STIRRING**

Observation of the suspension state of suspended solids when using different stirrers and at different speeds, Observation of the droplet size of emulsions when using different stirrers and at different speeds, Influence of mixing processes on heat transfer.


**PNEUMATIC TRANSPORT APPARATUS**

Learning the fundamental principle and method of operation of a pneumatic conveyor system, Observation of different transport states dependent on solid content and air velocity, Determination of the suspension velocity of the solid, Determination of the solid content of the flow.


**FLUIDIZED BED FORMATION**

Fundamentals of the fluidization of bulk solids, Observation and comparison of the fluidization process in water and air, Pressure loss depends on the flow velocity, Pressure loss depends on the type and particle size of the bulk solid.


**CHARACTERISTIC VARIABLES OF HYDRAULIC TURBO-MACHINES**

Study of Centrifugal pump, Measuring inlet and outlet pressures of the pump, Determining the delivery height, Determining the hydraulic output, Determining the mechanical output.


**PRECIPITATION AND FLOCCULATION APPARATUS**

Familiarization with precipitation and flocculation, Effect of the pH value on precipitation, Creation of a stable operating state, Determination of the required metering quantities (precipitant, coagulant, flocculant), Functional principle of a lamella separator.


**ACTIVATED SLUDGE PROCESS APPARATUS**

Learning the fundamental principle of the activated sludge process, Functional principle of nitrification and pre-de-nitrification, Creation of a stable operating state, Identification of the following influencing factors, Return sludge ratio, Return ratio of the internal re-circulation.


**FLUIDS SPECIFIC GRAVITY & DENSITY APPARATUS**

The basic principle for the separation of solids from suspensions in a sedimentation tank, Determine the hydraulic loading rate, Influence of the following parameters on the separation process like Concentration of solids, Flow rate, Flow velocity in the inlet.


**CAKE & DEPTH FILTRATION APPARATUS**

Fundamentals of filtration - Darcy's equation, Depth filtration with different bulk solids and suspensions, Cake filtration with different suspensions, Identification of characteristic filtration values.


**VISUALIZATION OF STREAMLINES**

Visualization of streamlines in, Flow around drag bodies, Flow-through changes in cross-section, Influence of sources and sinks.


**WATER HAMMER IN PIPES APPARATUS**

To Study Water hammer as a function of flow rate, To Study Water hammer as a function of valve closing time, To Study Display pressure curve, Determine reflection time, Calculation of the velocity of sound in water.


**PLATE & FRAME FILTER PRESS APPARATUS**

Learning the fundamental principle and method of operation of a plate and frame filter press, To Study Production of a suspension, To Study Removal of the filter cake, To Study Insertion of the filter cloth, To Study Fundamentals of cake filtration.


**AERATION APPARATUS**

Visualization of cavitation in centrifugal pumps, Open impeller to observe the blades during operation, Continuously adjustable pump speed via frequency converter, Temperature control via heater and external cooling via the water supply.



**BEARING SAMPLES PANEL**
Familiarization with real bearings and their function, Identification of different bearings and seal/shield types, Bearing Fault Identification, Bearing Maintenance and Installation, Powder-coated, silk screened, 16-gauge, steel mounting panel with provision for mounting 12 bearings.


**COUPLING SHAFT ALIGNMENT TRAINER**
Heavy-duty, aluminum construction throughout, The overall weight of 20Kgs excluding packaging, Allows for alignment using all common alignment methods, Multiple "motor" positions allow for use of all common couplings including "spacer-type" couplings.


**CAM ANALYSIS MACHINE**
Follower bounce can be observed by using a stroboscope, To study the effect of follower weights (W) on the speed of bounce, To study the effect of initial spring compression on the speed of bounce, A test can be repeated by changing parameters like various compression springs, follower weights, and Cam speeds.


**PUMP MAINTENANCE TRAINER**
The actual working centrifugal pump used, To teach maintenance as well as installation, 7-Gauge, formed-steel, powder-coated base plate with provision for bench mounting, Clear acrylic, standard bore, replacement back-head/stuffing box.


**RECIPROCATING COMPRESSOR DEMO TRAINER**
A detailed scaled-down model of a common XLE compressor, Inlet unloaders and channel valves, full-size replicas, Oil Wiper and stuffing box assemblies, fully detailed and removable, Working parts made of corrosion-resistant metal.


**PUMP PACKAGING MECHANICAL SEALING DEMO**
Formed, 7-gauge, steel baseplate with provision for bench-top mounting, Clear acrylic "backhead" and stuffing box, allowing for complete visibility of the seal area, and allowing for installation of many commercially available mechanical seals.


**BEARING MAINTENANCE TRAINER**
Steel base plate, 30" long, allowing for convenient mounting across the width of a standard shop bench, 4 Steel shaft mounting brackets which, when used in combination, allow for mounting of shafts in different orientations, 4 High-grade alloy steel CNC-machined stub shafts allowing for installation of all bearings.


**BEARING FRICTION APPARATUS**

Determination of friction torque on sliding bearings various material pairings by means of interchangeable bearing shells, Determination of the friction torque on a rolling bearing, Comparison between sliding and rolling bearing.


**DEFORMATION OF BARS UNDER BENDING TORSION**

Determination of the modulus of elasticity, Statically determinate systems, Statically indeterminate systems, Deformation of a beam dependent on Material, Formulation of proportional relationships for the deformation Torsion experiments, Determination of the shear modulus of various materials.


**DEFORMATION OF STRAIGHT BEAM**

Deflection of a dual-span beam on three supports, Measurement of the support reactions, Measurement of the deformations, Influence of the material (modulus of elasticity) and the beam cross-section (geometry) on the elastic line, Maxwell-Betti coefficients and law.


**CRANK & CONNECTING ROD APPARATUS**

To Study Crank drive with fixed cylinder, To Study Crank drive with swiveling cylinder, Experimental units on crank drives, with either fixed or swiveling cylinder Ball bearing mounted crank disc, anodized aluminum, 3 different crank radio Connecting rod black anodized aluminum.

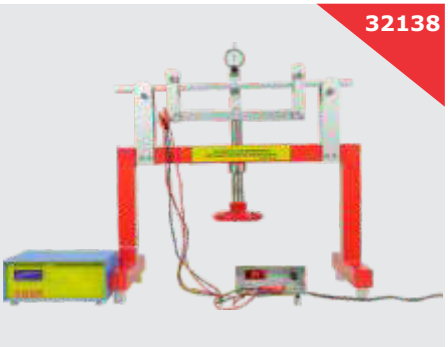

**CAM ANALYSIS APPARATUS**

Cam -Eccentric, tangent and circular ARC type, Follower mushroom, flat faced and roller type, Cams and followers are hardened to reduce wear of the surfaces, Variable speed motor coupled to camshaft of suitable range and Variac.


**FORCES IN CRANE JIB**

Graphical breakdown of forces by force parallelogram, Determination of the bar forces on various jib forms, Comparison of measurement result, calculation, Graphical method.






**STRAIN GAUGE TRAINING SYSTEM**

Experimental unit investigating the fundamentals of strain gauge measurement, Tension, bending and torsion tests each with strain gauge measuring points in full bridge circuit, Strain gauge application areas protected by Plexiglas cover, Steel test bodies.


**EQUILIBRIUM MOMENTS ON TWO ARM LEVER**

Fundamentals of the equilibrium of moments applied forces, generated moments and equilibrium, Action of forces dependent on the lever arm.


**FORCES IN A SINGLE BAR STRUCTURE**

Resolution of forces in a single plane, statically determinate system, 3 node discs, 2 of which serving as supports, 3 bars, each fitted with a leaf spring element and dial gauge, 2 fixed bar lengths, 1 variable bar length.


**SLOTTED ANGLE APPARATUS**

Conversion of smooth rotary motion into a purely harmonic reciprocating motion, Influence of crank length and input angle on the output stroke.


**FOUR BAR CHAIN**

Investigation of the mechanical relationships on four-bar chain mechanisms, Checking the Grash of set by varying the crank radius, the radius of oscillation, and connecting rod length, Demonstration of the operation of axle pivot steering.


**WHITWORTH QUICK RETURN APPARATUS**

Output stroke of Whitworth's quick return as a function of the input angle of the drive crank, Benchtop experiment on the uneven reciprocating motion of Whitworth's quick return, Crank radius 46mm, slider radius 55mm, connecting rod length 145mm.


**CRITICAL SPEED INVESTIGATION APPARATUS**

Investigation of bending vibrations and resonance of a rotating shaft, Determination of critical speeds with different arrangements of the bearing and masses on the rotor shaft, Investigation of the rotor shaft's self-centering effect.


**DEFORMATION OF A CURVED AXIS BEAM**

Bending behavior of a curved-axis beam, Circular beam, Semi-circular beam, Quadrant beam, Application of the principle of virtual forces (the force method) to calculate the deformation, 2nd moment of area.


**BUCKLING BEHAVIOUR OF BARS**

Verification of the Euler Theory, buckling on elastic bars, Determination of the modulus of elasticity for an unknown material (GRP), Measurement of force and deflection, Calculation of the expected buckling force by the Euler formula, Graphical evaluation of deflection and force With supplementary set.


**DYNAMIC BEHAVIOR MULTISTAGE SPUR GEARS**

Determining the angular acceleration on gears, Determining the mass moment of inertia of the gear, Determining the friction, Determining the gear efficiency.


**FORCES IN VARIOUS SINGLE PLANE TRUSSES**

Investigation of bar forces in a statically determinate truss, Construction of various trusses possible, 2 supports with node discs, Load application device with force gauge mountable on different node discs.


**PUMP VALVES FITTING TEST SET UP**

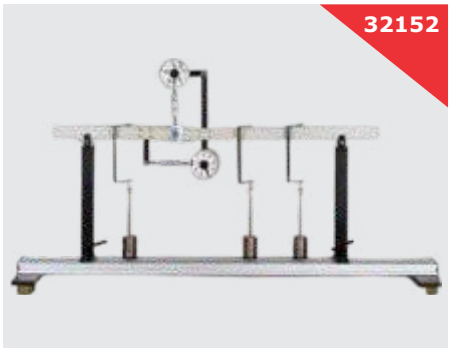
Determining the Kvs value of the control valve, Pressure losses at the dirt trap depending on the filter and its load. Planning, execution and assessment of maintenance and repair operations, Reading and understanding engineering drawings and operating instructions.


**MOUNTING FRAME**

Frame for mounting of experiments in statics, the strength of materials and dynamics, Sturdy sectional aluminum double frame, Easy, exact mounting of all components by precision clamp fixings, Stable on laboratory desktops or workbenches.


**DEFLECTION OF BEAM APPARATUS**

Study the variation of length in deflection, Cantilever beam with a load on one of its ends, The effect the beam´s length has on a cantilever with a load on one of its ends, The effect the beam´s section has on a centrally loaded beam supported on its two ends.




**BEAM SHEAR FORCE & BENDING MOMENT APPARATUS**

Calculation of the reactions arising from the static conditions of equilibrium, Application of the method of sections to calculate the internal forces and moments, Calculation of the shear force diagram, Calculation of the bending moment diagram.


**SUSPENDED BEAM APPARATUS**

Demonstration of the characteristics of a simple suspension bridge, Determination of the experimental tension in the supporting cables, Observation of the stability of the structure, Examination of the relationship between applied loads and the suspension cable tension.


**PRESSURE DISTRIBUTION IN JOURNAL BEARING APPARATUS**

Pressure distribution in the journal bearing depending on the speed, Pressure distribution in the journal bearing depending on load or bearing gap width, Stability limit as a function of the gap width.


**DEFORMATION OF TRUSSES**

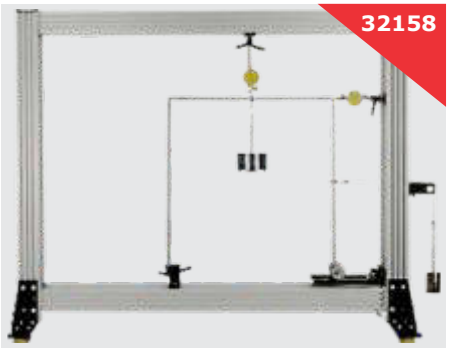
Elastic deformation of the truss under point load, Calculation of support reaction and bar forces, The principle of work and strain energy, Application of Castigliano's first theorem to calculate the deformation at a defined point, Verification of the calculated deformation possible by the principle of virtual work.


**DEMONSTRATION OF EULER BUCKLING**

Demonstration of elastic buckling, Representation of all cases of Euler buckling, 4 steel test bars, Loading of test bars with weights, Test bars cannot be overloaded, White backing wall with grid patterning.


### DETERMINATION OF ELASTIC LINE

Comparison of different methods to determine the elastic line, Statically determinate or indeterminate beam, 2 supports with clamp fixing, optionally as articulated support with measurement of angle of inclination or clamp fixing, Articulated support with force measurement dial gauge.




### DEFORMATION OF FRAMES

Relationship between load application and deformation on the frame, Differences between statically determinate and statically indeterminate frames, Familiarisation with the first-order elasticity theory for statically determinate and indeterminate systems, Application of the principle of superposition.


### STABILITY OF BAR BUCKLING UNDER LOAD

Investigation of the buckling load under different conditions (elastic joint, elastic fixed end), Two-part buckling bar with central joint, Loading infinitely variable with lever and set of weights, Determination of loading via scale on load application lever, Various degrees of clamping via leaf spring with variable length on bottom support.


### TORSION OF BARS APPARATUS

Torsion of a bar, Shear modulus of elasticity and 2nd polar moment of area, Angle of twist dependent on clamping length, Angle of twist dependent on torque, Influence of rigidity on torsion.


### CENTRIFUGAL FORCE APPARATUS

To Study Dependency of centrifugal force, To Study On the rotational speed, To Study On the size of the rotating mass, To Study On the radius of rotation.


### MOTORIZED GEAR MODELS

To Study Spur gear train with intermediate gear, To Study Two-stage spur gear train, To Study Planet gear train, Bench top experiment on the relationship between the number of gear teeth and the transmission ratio of gear trains.


### CENTRIFUGAL GOVERNOR APPARATUS

To Study kinetics and kinematics of the following centrifugal systems, To Study Porter governor, To Study Proell governor, To Study Hartnell governor, Adjustment of centrifugal governors, Recording the governor characteristic curves and setting curves.


### BENDING OF BEAM - UNIAXIAL

Unsymmetrical bending (complex) on a beam with an L-profile, Calculation of the neutral fibres, Combined bending and torsion loading by way of eccentric force application, Determination of the shear centre on a beam with a U-profile.


### THREE HINGED ARCH

Familiarization with three-hinged arches (unsymmetrical and symmetrical), Application of the method of sections and the conditions of equilibrium to calculate the bearing forces for Point load, distributed load, moving load, Investigation of the influence of the load on the horizontal thrust in the supports.


**FORCES IN OVER DETERMINATE TRUSSES**

Measurement of the bar forces in a statically determinate and statically over-determinate, single plane truss, Distribution of forces in the single plane truss dependent on the use of a surplus bar, Dependency of the bar forces on the external force, Magnitude, direction, point of application.


**FORCES IN SINGLE PLANE TRUSSES**

Measurement of the bar forces in various single plane trusses, Dependency on the external force, Magnitude, Direction, Point of application, Comparison of measurement results with mathematical methods.


**PARABOLIC ARCH**

Mechanical principles of the parabolic arch, Differences between statically determinate and statically indeterminate arches, Measurement of the deformations of the arch under load, Measurement of the support reactions on the statically indeterminate arch under load.


**STRESSES ON GERBER BEAM**

Study the variation of length in deflection, Cantilever beam with a load on one of its ends, The effect the beam´s length has on a cantilever with a load on one of its ends, The effect the beam´s section has on a centrally loaded beam supported on its two ends.


**FREE VIBRATIONS OF BAR APPARATUS**

Free vibration of a vertical bending bar, Free vibration of a horizontal bending bar, Determination of natural frequencies according to Rayleigh, Influence of free clamping length and weight on natural frequency.


**Free & forced vibration apparatus**

Basics of mechanical vibration, natural damped and forced vibrations, Bar-type oscillator, Three helical springs, Unbalance exciter with DC motor, 0,77kg, Displacement exciter with DC motor, Electronic control unit with digital display, exciter frequency adjustable.


**TORSION VIBRATION APPARATUS**

Determination of the torsional stiffness of a torsion bar, Determination of the mass moment of inertia, Decay behavior of torsional vibration, Determination of the damping of torsional vibration.


**TWO PINNED ARCH UNIT**

Demonstration of the characteristics of a two pinned arch, To examine the relationship between applied loads and horizontal thrust, Determination of the horizontal thrust in a support point of an arch beam subjected to a vertical load, Study of the horizontal force change with the magnitude of the applied load.


**PORTAL FRAME UNIT**

To determine the experimental value of the deflection at the load point for a rectangular portal frame subjected to a vertical load, To determine the experimental value of the deflection at the load point for a rectangular portal frame subjected to a horizontal load, To compare the theoretical and experimental results.

32175

**DEFLECTION OF CURVED BAR APPARATUS**

Study of deflection of curved bars, Determination of the horizontal and vertical displacements at the free end of various curved bars when subject to single concentrated loads, Study of the different types of bars geometry and for different positions.

32176

**FREE VIBRATION APPARATUS**

Investigation of the relationship between the mass of the body, the stiffness of the spring and the period/frequency of oscillation for a simple spring mass system with one degree of freedom, Investigation of the relationship between the applied force, the viscosity of the oil and the velocity for various settings of the adjustable oil damper.

32177

**THIN CYLINDER APPARATUS**

Determination of theoretical strain, Closed ends condition, Determination of theoretical strain, Open ends condition, Study with Mohr Strain Circle and determination of circumferential, biaxial, radial and longitudinal stresses, Closed ends condition, Study with Mohr Strain Circle and determination of circumferential, biaxial, radial and longitudinal stresses.

32178

**THICK CYLINDER APPARATUS**

Determination of theoretical strain, Closed ends condition, Determination of theoretical strain, Open ends condition, Study with Mohr Strain Circle and determination of circumferential, biaxial, radial and longitudinal stresses, Closed ends condition, Study with Mohr Strain Circle and determination of circumferential, biaxial, radial and longitudinal stresses.

32179

**TORSION OSCILLATION APPARATUS**

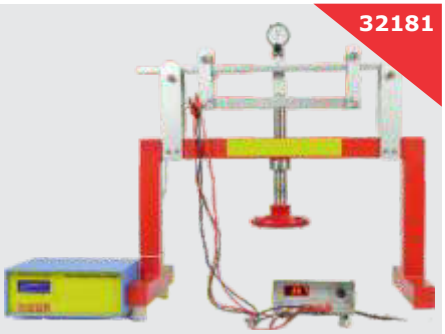
Single rotor connected to the free end of a torsionally flexible member, Single rotor connected to the free end of a series of torsionally flexible members, Two rotors connected to the free ends of a torsionally flexible member, Two rotors connected to the free ends of a series of torsionally flexible members.

32180

**SINGLE BALANCING APPARATUS**

Demonstrations and experiments in the balancing of coplanar rotating systems, Balance in a single plane of revolution, Observe the effects on oscillations of various conditions of balance.

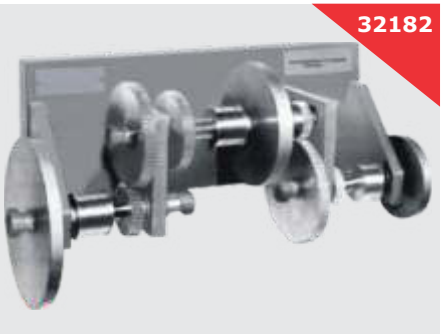
32181



**GAUGE FACTOR OF STRAIN GAUGES**

To Study kinetics and kinematics of the following centrifugal systems, To Study Porter governor, To Study Proell governor, To Study Hartnell governor, Adjustment of centrifugal governors, Recording the governor characteristic curves and setting curves.

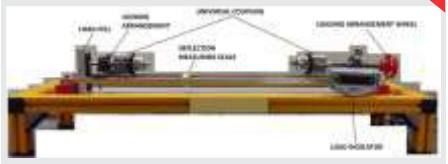
32182



**ACCELERATION OF GEARED SYSTEM APPARATUS**

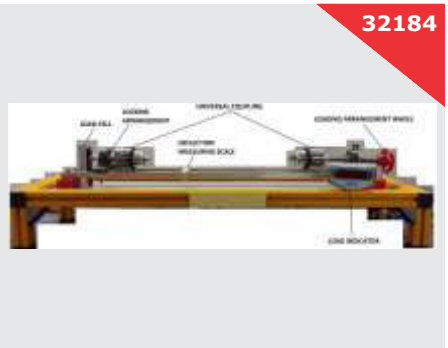
To determine the moment of inertia of a single shaft and of this shaft connected to other two shafts, To study the relationship between gears when applying different torques to the system, To determine the acceleration of the system.

32183



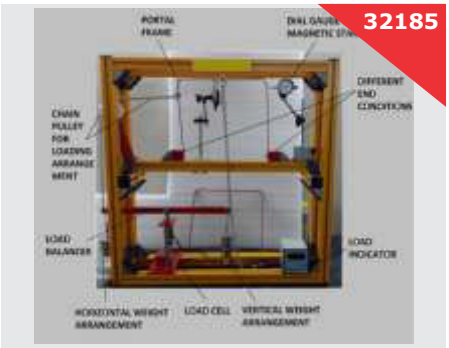
**STRUT BUCKLING APPARATUS WITH DAQ**

Study of deformation in beams, Demonstration of the Euler theory for beams, Determination of the relationship between buckling load and slenderness modulus for axial loads, Determination of the critical buckling load of a flat test piece, pinned at both ends.




### STRUT BUCKLING APPARATUS W/O DAQ

Study of deformation in beams, Demonstration of the Euler theory for beams, Determination of the relationship between buckling load and slenderness modulus for axial loads, Determination of the critical buckling load of a flat test piece, pinned at both ends.




### PLASTIC BENDING OF PORTALS APPARATUS

Verifies that hinges occur at positions of greatest bending moment, Studies the change in the collapse mechanism as the ratio of horizontal to vertical load is varied, Determines the increase in collapse load as the degree of redundancy increases.


### TORSION & DEFLECTION TEST APPARATUS

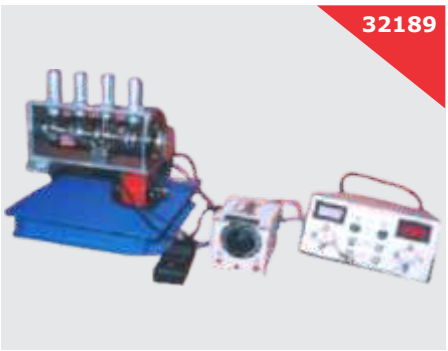
Deflection of specimen as a function of loading force, material, Young's Modulus of Elasticity (E), cross section, support span, Comparison of bending stiffness of varying specimen sections for the same cross sectional area, Comparison of cantilever beams.


### FATIGUE TESTING APPARATUS

Gripping dia of specimen 12mm, Testing dia of specimen 8mm, Rotating speed 4200 rpm, Accuracy of applied bending ±1% moment, Digital counter 8 Digital, Power required 0.5 HP.


### UNSYMMETRICAL CANTILEVER APPARATUS

Investigations into bending of unsymmetrical cantilevers, Vertical and horizontal displacement measurement for varying angles of applied load, Demonstration that maximum and minimum vertical deflection occurs when horizontal deflection is zero, Use of Mohr's circle.




### BALANCE OF RECIPROCATING MASSES

Primary and secondary forces and moments in popular engine configurations - one, two and four cylinder, Primary and secondary forces and moments for different crank settings, The effect of adding additional mass to one or more pistons for any chosen crank setting.


### CONTINUOUS BEAM APPARATUS

Reactions of a simply supported beam, Reactions of a two-span continuous beam, Reactions and fixing moments of a fixed beam and a propped cantilever, Reaction and fixing moment of a propped cantilever with a sinking support.


### ADVANCED BEAM TESTING APPARATUS

To Study All variables in deflection of beams, To Study Slope and curvature of beams, To Study Support reactions of single span and continuous beams, To Study Effect of sinking supports, To Study Area moment theorems.


### BENDING MOMENT APPARATUS

To determine the experimental value of the deflection at the load point for a rectangular portal frame subjected to a vertical load, To determine the experimental value of the deflection at the load point for a rectangular portal frame subjected to a horizontal load, To compare the theoretical and experimental results.

32194

**GEAR MAINTENANCE TRAINER**

Steel baseplate with provision for table-top mounting, Welded aluminum gear box, allowing for installation of all supplied gear sets, Seven custom bearing housings allowing for installation and shimming (internal and external) of tapered roller bearing sets.

32195

**SHEAR FORCE APPARATUS**

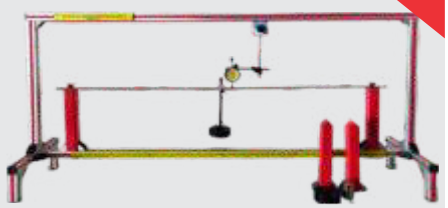
To comprehend the action of shear in a beam, To measure the shearing force at a section of a loaded beam, and to compare with a theoretical estimate, To study the definition of an influence line for shear force.

32196

**REACTION OF BEAM APPARATUS**

Determination of the reaction forces in the supports of a simple supported beam under various loadings; also measurement of loads and moments on a lever; validation of the principal of equilibrium, The apparatus consists of a beam of @1m long, linear spring balances, three load hangers, and a bench top mounting unit.

32197



**DEFLECTION OF BEAM & CANTILEVERS APPARATUS**

Study of Beam deflections, Study of General bending formulae, Study of Beam end rotations, Study of Elastic moduli (Young's modulus) for various materials Typical conditions are Cantilever, Propped cantilever.

32198

**UNSYMMETRICAL BENDING & SHEAR CENTER APPARATUS**

Study of the horizontal and vertical deflection of asymmetrical cantilevers when the plane of loading does not coincide with a principle axis of the section, Study of the horizontal deflection of asymmetrical cantilevers under various loadings.

32199

**ROTATING FATIGUE TESTING APPARATUS**

To make an introductory study of fatigue using a Wohler rotating fatigue apparatus, including the time to failure caused by various stress levels and materials, Introducing students to S-N curves, Material specification on fatigue limits.

32200

**TENSION COEFFICIENT APPARATUS**

To determine experimentally forces induced in individual frame members, To calculate the theoretical forces induced, using the method of tension coefficients, To compare the experimental and theoretical results, To repeat for other frame configurations.

32201

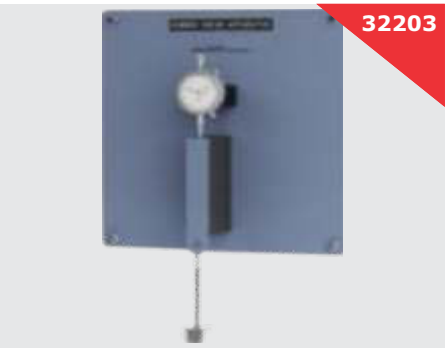
**REDUNDANT TRUSS APPARATUS WITH DAQ**

Study of strains, stresses, forces and deflections in, A statically determinate structure, A statically indeterminate structure, Allows safe and practical experiments into determinate and indeterminate structures.

32202

**REDUNDANT TRUSS APPARATUS WITHOUT DAQ**

Study of strains, stresses, forces and deflections in, A statically determinate structure, A statically indeterminate structure, Allows safe and practical experiments into determinate and indeterminate structures.




**RUBBER IN SHEAR APPARATUS**

To determine the variation of deflection with applied load, To investigate the relationship between shear stress and shear strain, To find the modulus of rigidity of the rubber block.


**CLUTCH PLATE FRICTION APPARATUS**

To determine the coefficient of friction of the plate material, To show that the minimum torque to maintain rotation is proportional to the axial load and diameter of the friction disc.


**SLIDER CRANK MECHANISM**

Demonstration of the action of a simple crank and slotted link mechanism, Graphic determination of the relationship between the linear displacement of the sliding block and the angular displacement of the input crank.


**WHEEL & AXLE APPARATUS**

Experimental determination of velocity ratio and comparison with calculated value, Determination of variation with load of effort, Determination of variation with load of efficiency.


**BEAM TEST APPARATUS**

Experimental determination of the reaction forces in the supports of a simply supported beam under various loadings, Measurement of loads and moments on a lever, Comparison with calculated results and validation of the principle of equilibrium.

MECHANICAL

**IndiaSoft Exhibition India**



**THREE DIMENSIONAL EQUILIBRIUM**

Study of equilibrium of five concurrent and non concurrent forces in a three dimensional system, Made for maximum flexibility and ease of use for extensive range of experiments, Simply supported and tests with up to four supports with any loading.


### ECCENTRICALLY LOADED TIE APPARATUS

Loading of a bending bar with different constant moments, Measurement of the deflection that occurs, Table unit for the demonstration of the relationship between load and deformation on a bending bar.


### UNIVERSAL BUCKLING APPARATUS

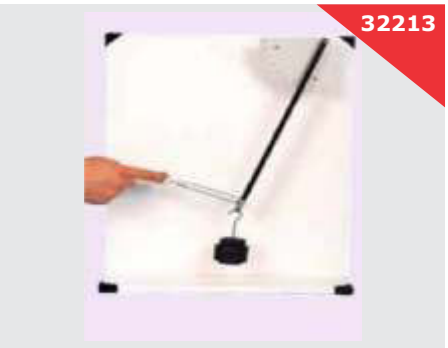
Study of Euler buckling theory, Experimental determination of the relation between the buckling load for different thickness and shapes of the test bars, Experimental determination of the relation between the buckling load and the methods of support of the test bars, Determination of the critical load differences for different lengths and different bar sections.


### TWIST & BENDING MACHINE

Study of the beams flexion for different sections and lengths, Determination of the Elasticity Modulus for stainless steel, Study of the relation between the torsional moment, beam length and torsion angle of one shaft, Determination of the Rigidity Modulus for steel, bronze and aluminum.


### ROOF TRUSS APPARATUS

To compare experimental values of the forces in the struts and tie of a basic roof truss with theoretical predictions, To observe the effect of changing the tie bar length.




### VARIABLE FORCES APPARATUS

To determine the work done by a variable effort and to compare with the work done in lifting the load, To show that the work done by the effort is equal to the change in potential energy of the load, To obtain the experimental relationship between effort and distance moved by effort, and to compare with a theoretical prediction.


### LINEAR & ANGULAR SPEED APPARATUS

To find the relationship between angular rotation and the peripheral movement of the stepped shaft, Compare actual results with theory, The angular movement of the shaft and the corresponding linear movement of the weights can be compared.


### IMPACT TEST APPARATUS

Determine the notched-bar impact work, Determine the notched-bar impact strength, Analyze the fracture surface characteristics, Plot a notched-bar impact work–temperature diagram.


### SPRING TEST APPARATUS

Study of Spring rate and Hooke's law, To prove the basic rules of spring design, Study of A simple spring scale, Study of Springs in series, Study of Springs in parallel.


### BENDING STRESS IN A BEAM APPARATUS

Study of Second moment of area, Study of Converting strains to stresses, Study of Strain gauges, Study of The neutral axis, Study of The bending equation.


**BELT DRIVE STUDY APPARATUS**

Learning the fundamental principle of the activated sludge process, Functional principle of nitrification and pre-de-nitrification, Creation of a stable operating state, Identification of the following influencing factors, Return sludge ratio, Return ratio of the internal re-circulation.


**PIN JOINTED FRAMEWORKS**

Study of Bow's Notation, strains, stresses, forces and deflections in various frameworks, including a Warren girder and roof truss, Comparison of different frameworks, Comparison of different frameworks.


**TENSILE TEST MACHINE**

To determine experimentally forces induced in individual frame members, To calculate the theoretical forces induced, using the method of tension coefficients, To compare the experimental and theoretical results, To repeat for other frame configurations.


**BENCH TOP IMPACT TEST MACHINE MODEL**

Introduction to the principles of common impact testing methods, such as Izod and Charpy tests, Investigations into the resistance of materials to crack propagation.


**ROUND DIAPHRAGM APPARATUS**

Measurement of diaphragm disc surface strain using strain gauges, Measurement of diaphragm disc deflection with a dial gauge, Determination of radial strain, Determination of circumferential strain. Diaphragm surface profile, Strain gauge technology and uses.


**VIRTUAL WORK PRINCIPLE APPARATUS**

Elastic lines for statically determinate or indeterminate beams under load, Determination of the elastic line of a beam by, The principle of virtual work (calculation), Mohr's analogy (area moment method devised by Mohr; graphical representation), Application of the principle of superposition.


**TRANSMITTED LIGHT POLARISCOPE**

Photoelastic analysis of standard mechanical models, Analysis of Crane hook under tensile load, Tensile loading of beams, perforated beams, plates, overlap element, Variation of stress colourisation.


**FUNDAMENTALS OF STATICS**

Experimental setup to demonstrate simple, planar force systems, Panel with rails around the edges for easy mounting of various experimental components, Panel with imprinted 50mm line grid and facility to write on using erasable marker, Lever rods with 50mm grid.


**EQUILIBRIUM IN A SINGLE PLANE APPARATUS**

Experimental development of the core principle of "freeing" in statics, Calculation of the support forces for a given position of the clamp weight and for a known angle of inclination.


**FORCES IN A HOWE TRUSS**

Measurement of the bar forces in a single plane truss, Howe type, Dependency of bar forces on the external force magnitude, direction, point of application, Comparison of measuring results with mathematical and graphical methods, Method of joints, Ritter's method of sections, Cremona diagram.


**PLASTIC BENDING OF BEAMS APPARATUS**

Measurement of collapse load for a black mild steel beam, Study of extra load carried as beam is made redundant by end fixing Comprehensive instruction manual provided.


**BENDING & TORSION APPARATUS**

To determine elastic failure of a specimen subjected to several ratios of bending and torsion simultaneously, To compare the results with the established theories of failure.


**INVERTED PENDULUM APPARATUS**

Design of a fuzzy control for the unstable single-variable system inverted pendulum, Working with the development software, Activating of two independent actuators that are coupled via the system, Mastering of non-linearities in the system inverted pendulum.


**GYROSCOPE**

Study of the laws of gyroscopes, Demonstration of the precession and stability of a gyroscope system, Investigation of gyroscopic couple direction for each combination of the rotor and the precession directions, Study of the magnitude of gyroscope couple in function of the rotor velocity and the precession velocity.


**MOMENTS EXPERIMENTS KIT**

Study of Principle of moments, Study of Beam balances, Study of 1st, 2nd and 3rd order levers, Bell crank lever, Study of Beam reactions, Rigid beam with hook points, Bell crank lever with hook points, Spring balances, Pulley.


**ECCENTRICALLY LOADED TIE APPARATUS**

Low cost, effective teaching Self-contained Bench-mounted Combined bending and tension Three eccentricities unit, Range of Experiments to measure the vertical bending deflection of the bar and to compare with theoretical predictions, To assess the effect of eccentricity of loading.


**EQUILIBRIUM IN A SINGLE PLANE**

Experimental development of the core principle of "freeing" in statics, Calculation of the support forces for a given position of the clamp weight and for a known angle of inclination, Application of the 1st and 2nd equilibrium conditions in statics, And full compensation of the support forces by cable forces, How does the clamp weight position affect the support forces.


**DEPENDANT MOTION APPARATUS**

This apparatus set up on the lab bench using a stand base, The block and tackle can be expanded to three pairs of pulleys and can support loads of up to 20N, the pulleys are mounted virtually friction free in ball bearings and for inclined plane, two forces are measured for various angles of inclination using precision dynamometers.


**LABORATORY BALL MILL**

Cascade and cataract motion, critical speed, Degree of communication dependent on milling time, rotation speed, ball diameter, ball filling, material to be milled, Theoretical and actual power demand.


**STATIC & DYNAMIC BALANCING MACHINE**

Demonstration of simple static and dynamic balancing of two, three and four rotating masses, Dynamic balancing of rotating mass systems by calculation and vector diagrams (triangle and polygon).


**UNIVERSAL VIBRATION APPARATUS**

Backboard: Durable Plastic with 50mm centre fixings, 9mm thick, Metal Chains and sprockets, Plastic Gears, Quick release fasteners, Modules supplied in Aluminum Cases.


**VIBRATIONS FUNDAMENTALS TRAINING KIT**

Free vibrations (oscillations) in simple, compound, filar and Kater's pendulums, Centre of percussion, Free vibrations in cantilevers and a mass-spring system, Free torsional vibrations and free vibrations in a beam and spring, Free and forced vibrations in a simply supported beam and a rigid beam with spring.


**HOOK'S COUPLING APPARATUS**

Determination of the gimbal error on Hooke's couplings, Bench top experiment on gimbal error and its avoidance on articulated joints, Hooke's coupling, standard industrial parts, Scales made of transparent plastic.


**HEAT EXCHANGER – JACKET VESSEL**

To study and compare the heat exchanged in shell and tube type and concentric type heat exchanger, Determination of mean temperature difference under parallel and counter flow, Determination of overall heat transfer coefficient, To determine the heat exchanger capacity.


**HEAT EXCHANGER – PLATE TYPE**

To study and compare the heat exchanged in shell and tube type and concentric type heat exchanger, Determination of mean temperature difference under parallel and counter flow, Determination of overall heat transfer coefficient, To determine the heat exchanger capacity.


**HEAT EXCHANGER – SHELL & TUBE TYPE**

Computerised data acquisition software for heat transfer, An advanced personal computer based model, This system has facility of data acquisition, plotting on-line and historical trends.


**HEAT EXCHANGER – TUBULAR**

Computerised data acquisition software for heat transfer, An advanced personal computer based model, This system has facility of data acquisition, plotting on-line and historical trends.


**HEAT TRANSFER IN NATURAL CONVECTION**

Pipe - Brass, 38 mm dia.(OD), 500 mm long fitted with cartridges type heater, Thermocouples fitted along the length of pipe, Enclosure with Perspex window to house the pipe.


**HEAT EXCHANGER – PC BASED MULTIPLE**

To study and compare the heat exchanged in shell and tube type and concentric type heat exchanger & other heat exchangers, Determination of mean temperature difference under parallel and counter flow, Determination of overall heat transfer coefficient, To determine the heat exchanger capacity.


**THERMAL CONDUCTIVITY OF METAL BAR**

Test Bar - 25 mm. dia. of adequate length, material mild steel, Thermocouples are mounted along the length of bar, Band heater is provided at one end and heat sink at other end, Test portion is well insulated to prevent heat loss.


**HEAT TRANSFER – FORCED CONVECTION**

Test Bar - 25 mm. dia. of adequate length, material mild steel, Thermocouples are mounted along the length of bar, Band heater is provided at one end and heat sink at other end.


**HEAT EXCHANGER – PARALLEL & COUNTER- FLOW**

Determination of overall heat transfer co-efficient for a tube in tube type heat exchanger, To calculate Rate of heat transfer, To calculate L.M.D.T., To calculate Theoretical overall heat transfer co-efficient.


**CHEMICAL REACTORS – TEACHING EQUIPMENT**

Determination of reaction rate constant, Investigation of the effect of throughput on conversion, Demonstration of the temperature dependence of the reaction and the rate constant, Determination of the residence time distribution, Study of the effect of flow rate on conversion.


**TUBULAR REACTOR**

Determination of reaction rate constant, Investigation of the effect of throughput on conversion, Demonstration of the temperature dependence of the reaction and the rate constant, Determination of the residence time distribution, Study of the effect of flow rate on conversion.


**CONTINUOUS STIRRED TANK REACTOR**

Hot Water Tank with Heater Controller, Two peristaltic feed pumps with individually variable flow rates, 0-140 ml/min, Complete with two thermocouples, an input for a third (user) thermocouple and a dual range conductivity sensor.


**CHEMICAL REACTOR TRAINER**

In conjunction with the various types of reactors available as accessories in the 32265, comprehensive experiments on the reaction kinetics and on the conversion of reactants during a saponification reaction can be performed, Variation of contact time of the two chemicals.


**MECHANICAL EQUIVALENT OF HEAT APPARATUS**

Study of the basic aspects of conversion of mechanical work to heat energy, Familiarization with the working of the apparatus, Measurement of mechanical work dissipated and heat energy dissipated, Determination of mechanical equivalent of heat.


**HEAT TRANSFER – CONDUCTION**

Study of heat flow rate through solids and comparison with Fourier law of linear heat conduction, Determination of co-efficient of thermal conductivity of conductors and insulators, Measurement of temperature distributions in linear heat conduction, Measurement of contact resistance and its effect on heat transfer.


**THERMAL CONDUCTIVITY UNIT FOR LIQUIDS & GASSES**

Study of steady state one dimensional heat conduction through liquids and gases, Determination of thermal conductivity of different fluids such as air, oil, water etc.


**HEAT TRANSFER: FREE & FORCED CONVECTION**

Demonstration of the basic mechanisms of free and forced convection, Determination of free and forced convection heat transfer to air from vertical flat plate, Determination of free and forced convection heat transfer to air from circular cylinder in a tube bundle.


**HEAT TRANSFER TRAINER & MODULES**

Determination of Heat transfer rate through solids, Determination of Thermal conductivity of different materials, Determination of contact resistance in Composite slab.


**MIXED HEAT FLOW EXCHANGE**

Computer based data acquisition unit, Mixed Heat Flow Heat Exchanger type having any other specific user requirements, Single phase mains electrical supply, 220-240 V, 50 Hz, Water supply.


**FINNED TUBE HEAT EXCHANGER**

Finned-tube heat exchanger to study convective heat transfer between water and air, Function of the heat exchanger as an air heater or water cooler, Closed hot water circuit with electric heater, thermostat, water tank and pump, Adjustable water and air flow.


**STEAM TO WATER HEAT EXCHANGER UNIT**

Visual demonstration of filmwise condensation and nucleate boiling, Demonstration of the increase in heat exchanger effectiveness due to increasing the number of tube passes at constant flow rates, Investigation of the effect of increasing flow velocity and the number of tube passes on the overall heat transfer coefficient.


**THERMAL CONDUCTIVITY THROUGH COMPOSITE WALLS**

Calculation of thermal conductance & different heat distribution in composite wall, Plotting of heat distribution across the width of composite walls, Compact, comprehensive, sturdy design, Fully instrumentation for experimentation of Heat transfer.


**THERMAL CONDUCTIVITY THROUGH METAL BARS**

To study the heat distribution along the length of the bar, To determine the thermal conductivity of given specimens, To Study the variation of thermal conductivity of the material with temperature.


**FORCED AIR GAS BURNER TRAINER**

Identification and management of the components required for a real gas line, Study and analysis of the tune-up operations for the forced air gas burner, Study of the ignition procedure and the nominal load adjustment of a gas burner, Study and analysis of the gas flow rate and the operating volume.


**THERMAL CONDUCTIVITY OF METAL BAR**

Demonstration of indirect heating/ cooling by transfer of heat from one fluid stream to another when separated by a solid wall, Energy balance determination (heat balance) and calculation of efficiencies by measuring the flow rates and temperature changes in the hot and cold fluid streams.


**HOT AIR BLOWER**

Compact, mobile unit designed to generate Hot Air for different applications, PID based temperature controller to meet precise air temperature, Comprehensive Instrumentation Panel with all necessary safety instruments.


**LINEAR CONDUCTION HEAT TRANSFER APPARATUS**

Understanding the Fourier rate equation in determining the rate of heat flow through solid materials, Measuring the temperature distribution for steady state conduction of energy through a uniform plane solid and a composite plane solid.


**TRAY DRIER**

Study of Mass and energy balance, Study of Drying processes, Study of Mass and heat transfer, Study of Air speed and temperature effects on drying process.


**COOLING TOWER**

To study the water flow pattern and distribution, To measure all "end states", and flow rates of water air and make-up water, To plot the end states on a psychometric chart and to draw up energy balances using the steady flow equation, To study the performance at different range of cooling loads and inlet temperatures.


**RADIAL HEAT CONDUCTION**

Fourier's equation and determining the rate of heat flow through solid materials, Measuring the temperature distribution during radial heat conduction, Determine the thermal conductivity of the disc or cylinder material.


**PILOT PLANT FOR STUDY OF BATCH DISTILLATION**

Distillation of several mixtures (water/ethanol, water/methanol, methanol/propanol, etc) according to the variation of different operating parameters, Flooding phenomenon, Energy and mass balances.


**SPRAY DRYER**

Demonstration of the process of spray drying, Study various parameters affecting Spray drying process, Wheeled AISI 304 stainless steel structure, Atomization system with stainless steel spray nozzle.


**SINGLE EFFECT FALLING FILM EVAPORATOR**

Study of Evaporation process, Study of Heat transfer determination, Study of Energy and mass balances, Study of Heat transfer coefficient, Designed to demonstrate process of rising film evaporation, Includes Pulsing Unit with capability to vary amplitude & frequency of Pulsation.


**LIQUID LIQUID EXTRACTION UNIT**

Separation of two components liquid mixture by extraction using a solvent, Determination of the extraction efficiency, Mass balance, Calculation of the number of theoretical stages, Number of transfer units and height of a transfer unit.


**SOLID LIQUID EXTRACTION UNIT**

Study of the extraction performance according to different variables, Demonstration of the operation of a continuous, Wheeled structure of AISI 304 stainless steel, piping and valves of AISI 304 and AISI 316 stainless steel.


**CRYSTALLIZATION UNIT**

To Study Fundamental principle of cooling crystallization, Investigation of the factors influencing crystallization process, Calculate Concentration of the solution, Calculate Temperature, Calculate Time.


**REVERSE OSMOSIS UNIT**

Fundamental principle of reserve osmosis, Van't Hoff's law, Permeate quantity and salt concentration in the permeate and retentate dependent on pressure and salt concentration in feed, Determination of membrane constants and retention.


**PLATE & FRAME FILTER PRESS**

Bed and cake flow resistance, Determine the dryness of the filtration cake obtained, Implement the filtration process, Choice of filtration pressure, Choice of filtration surface area, Financial and technical validation of process.


**COOLING USING PELTIER EFFECT APPARATUS**

Function and operation of a Peltier element for cooling & as heat pump, Determination of the cooling and heating capacity, Recording typical characteristics, such as cooling capacity, via temperature differences, Energy balance, Calculating the coefficient of performance.


**THERMAL CONDUCTION OF INSULATING POWDER APPARATUS**

Determination of thermal conductivity of insulating powder, Comparison of thermal Conductivity of insulating powder at different temperatures, Insulating powder – Asbestos magnesia commercially available powder and packed between the two spheres.


### CONCENTRIC HEAT EXCHANGER

Energy balance determination, Temperature profiles in co- and counter-current flows, Log mean temperature difference, Heat transfer coefficient calculation, Effect of flow rate on heat transfer rate.


### LIQUID DIFFUSION COEFFICIENT APPARATUS

Measurement of mass transfer rates, Measurement of diffusion coefficients, The effect of concentration upon diffusion coefficient, First order unsteady state process analysis, Familiarisation with laboratory instruments to obtain data for industrial process design.


### FLUIDIZED BED HEAT TRANSFER APPARATUS

Observation of the behavior in a fluidized bed of a wide range of granular materials, from onset of fluidization to entrainment, Measurement of air flow and pressure drop through a variety of granular materials, as packed and as fluidized beds, Investigations of the effect of distributor design on bed behavior.


### BATCH CRYSTALLIZER

To study the performance of a Batch Crystallizer, To determine the crystal yield and the efficiency of crystallizer, Crystallization is the formation of solid particles within a homogeneous phase of saturated liquid.


### WETTED WALL ABSORPTION COLUMN

Calculation of liquid film mass transfer coefficients, Variation of coefficient with mass flow rate, Variation of oxygen flow rate to determine power law relationship, Calculation of liquid film mass transfer coefficients.


### CATALYTIC REACTOR

Understanding the principles of packed bed catalytic reactors, Mass balancing, Examination of steady and unsteady state catalysis, Comparison of chemical and biological (enzymic) catalysis, Flow Characterization in a packed bed, Understanding the principles of Flow Injection Analysis (FIA).


### VAPOR LIQUID EQUILIBRIUM APPARATUS

An equilibrium cell in which the vapour and liquid phases of the mixture are in equilibrium, An environment that controls the temperature of the equilibrium cell, e.g. air bath, oil or water bath etc, A procedure for agitating and mixing the cell contents, e.g. stirrer.


### STEADY & UNSTEADY STATE HEAT TRANSFER TRAINER WITH DAQ

To Study Steady heat conduction, To Study Transient heat conduction, To Study Temperature/time profiles, To Study and Calculate thermal conductivity λ of different metals.


### BOYLE'S LAW DEMONSTRATION APPARATUS

Demonstration of Boyle's law, Ideal gas equation of state, Compressor, can be used as vacuum pump, Electronic sensors to measure temperature, pressure, level of liquid, 1 temperature controller.

Industrial Visit of
JECRC University
Jaipur




**TEMPERATURE CONTROL TRAINER**

Study of open loop (Manual control), Study of on/off controller, Study of proportional controller, Study of prop. integral controller, Study of prop. derivative controller, Study of PID controller.


**BOILING PROCESS APPARATUS**

Visualization of different forms of evaporation, Heat transfer, Effect of temperature and pressure on the evaporation process, Visualization of boiling and evaporation in a transparent pressure vessel.


**RADIATION HEAT TRANSFER APPARATUS**

Study of Lambert's cosine law, Study of Inverse-square distance law (Lambert), Study of Stefan-Boltzmann constant, Study of Kirchhoff's laws, Study of Absorptivity, Study of Reflectivity, Study of Emissivity.


**EVAPORATION PROCESS**

Visualization of evaporation in a tube evaporator, Heating and cooling medium: water, Tube evaporator made of double-wall glass, Heating circuit with heater, pump and expansion vessel, Safety valve protects against over pressure in the system.


**THERMAL CONDUCTIVITY OF BUILDING MATERIALS APPARATUS**

Observation of typical forms of evaporation, Study of Sub-cooled boiling., Study of Dispersed flow, Study of Slug flow, Study of Film boiling, Study of Wet steam, Study of Single phase vapour flow, Study of Single phase liquid flow.


**GAS ADSORPTION COLUMN**

Determination of adsorption isotherm equilibrium, Adsorption isotherm profile characteristic, Determination of adsorption bed capacity, To study effect of pressure, flow rate & temperature control on adsorption characteristics, Mass transfer rates & coefficient.


### CONDENSATION PROCESS APPARATUS

Visualization of the condensation process of water in a transparent tank, Two water-cooled tubes as condensers with different surfaces to realize film condensation and dropwise condensation, Controlled heater to adjust the boiling temperature.


### GAS ABSORPTION DESORPTION COLUMN

Understanding of gas absorption and desorption working principles, Study of the basic principles of the absorption of a gas into a liquid using packed column, Study of basic principles of gas desorption of liquid into air using a packed column, Determine the heating effects on desorption rate and efficiency.


### PERFECT GAS LAWS APPARATUS

To study relationship between pressure & temperature of Perfect Gas, To verify Boyle's Law for a perfect Gas, Compact unit designed to demonstrate relationship between pressure & temperature of Perfect Gas, Microprocessor based temperature controller to maintain precise air temperature.


### VENTURI AIR SCRUBBER TRAINER

Demonstration of Venturi scrubber in dust pollution control, To study the effect of liquid-to-gas (L/G) ratio upon separation efficiency, To verify the theoretical relationship between total pressure drop, P and inlet velocity.


### CHEMICAL REACTORS SERVICE

Supply unit for 6 different chemical reactor types, Connection of the reactors via hoses with quick-release couplings, Water circuit with tank, 100W heater, temperature controller, pump and low water cut-off for heating and cooling (with water chiller).


### CONTINUOUS STIRRED TANK REACTOR

Effect of residence time on conversion, Residence time distribution, Evaluation of empirical rate expressions from experimental data, Determination of reaction rate constant, Effect of temperature on reaction rate.


### TUBULAR REACTOR

Determination of reaction rate constant, Investigation of the effect of throughput on conversion, Study of the effect of flow-rate on conversion, Determination of the residence time distribution, Demonstration of the temperature dependence of the reaction and the rate constant.


### TRANSPARENT BATCH REACTOR

Supply unit for 6 different chemical reactor types, Connection of the reactors via hoses with quick-release couplings, Water circuit with tank, 100W heater, temperature controller, pump and low water cut-off for heating and cooling (with water chiller), Temperature control of the reactants and reactors.


### PLUG FLOW REACTOR

Temperature control of the reactants and reactors, 3 Glass tanks for reactants and products, 5 Peristaltic pumps to deliver the reactants and products, 2 Combined sensors for measuring the conductivity and temperature.


**LAMINAR FLOW REACTOR**

Demonstration of the flow pattern in the reactor and comparison with the theoretical modelEffect of flow rate and feed concentration on the steady state conversion, Visual demonstration of the reactor response with tracer techniques and laminar flow.


**TEMPERATURE MEASUREMENT APPARATUS**

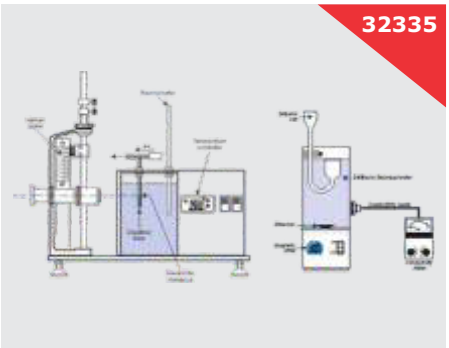
Study of different types of temperature measuring devices, Study calibration of Different Temperature sensors, Functions of individual temperature measuring devices, Response characteristics of sensors, Steady state & Non-steady state behavior of the temperature measuring devices.


**GAS ABSORPTION COLUMN**

Study of the basic principles of the absorption of a gas into a liquid using a packed column, Demonstration of methods of gas and liquid quantitative analysis, Production of mass balances for a packed absorption column, Method of transferring units, including calculation of NTU and HTU.

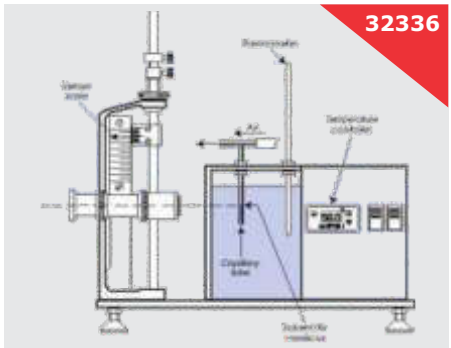

**GAS ABSORPTION UNIT**

Investigation of the absorption process when separating gas mixtures in a packed column, Determination of pressure losses in the column, Representation of the absorption process in an operating diagram investigation of the variables influencing the effectiveness of absorption.



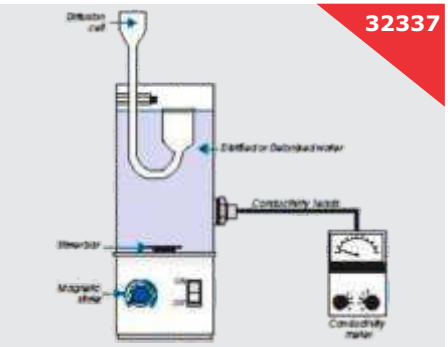

**MASS TRANSFER & DIFFUSION COEFFICIENT APPARATUS**

Direct measurement of mass transfer rates in the absence of convective effects, Use of gas laws to calculate concentration differences in terms of partial pressures, Use of Fick's Law to measure diffusion coefficients in the presence of a stationary gas.




**GASEOUS DIFFUSION COEFFICIENTS APPARATUS**

Direct measurement of mass transfer rates in the absence of convective effects, Use of gas laws to calculate concentration differences in terms of partial pressures, Use of Fick's Law to measure diffusion coefficients in the presence of a stationary gas.




**LIQUID DIFFUSION COEFFICIENT APPARATUS**

Essentially, the cell consists of a honeycomb of accurately dimensioned capillaries, positioned between two liquids of differing concentration of the solute whose diffusion coefficient is to be determined.


**THERMOMETERS & TEMPERATURE MEASUREMENT APPARATUS**

Experiments in the fundamentals of temperature measurement with 7 typical measuring devices, Various heat sources or storage units laboratory heater, immersion heater, vacuum flask, Calibration units precision resistors and digital multimeter.


**FLASH & FIRE POINT APPARATUSARATUS**

Compact, comprehensive, sturdy design, Heater control system, Demonstration of complete experimentation of flash point and fire point, Fully instrumentation for experimentation of thermocouple calibration, Direct reading of temperature at various points.


**BATCH ENZYME REACTOR**

Understanding the principles of batch enzyme kinetics, Understanding the factors affecting enzyme performance, Understanding the principles of polarimetry and Biot's law, Teaching exercises are included to familiarize the students with the following topics.


**SATURATION VAPOR PRESSURE APPARATUS**

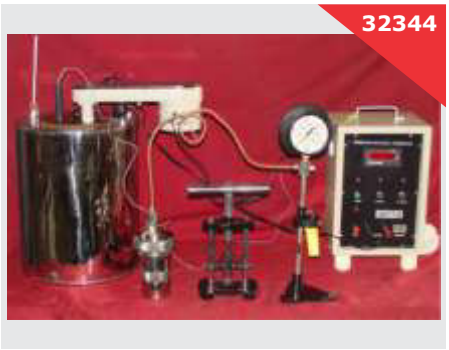
Observation of the patterns of boiling at the surface of the water, Measurement of the temperature of saturated steam over the range of pressures 0 to 7 bar gauge and comparison of the saturation curves obtained with those published in steam tables, The concept of a saturation line.


**HEAT TRANSFER – BOILING & CONDENSATION**

Visual observation of film-wise and drop-wise condensation, as well as nucleate boiling, To determine overall heat transfer coefficient, To demonstrate of Dalton law of partial pressure.


**GAS CALORIMETER – JUNKER'S**

To determine Calorific Value of gaseous fuel, Compact, comprehensive, sturdy design, Entire assembly made of corrosion resistant metals, User-friendly operation, Junker's Type Gas Calorimeter consists of chiefly the calorimeter with burner on a tripod stand, gas flow meter (non recording type) and pressure governor.




**BOMB CALORIMETER**

To determine Calorific Value of Solid & Liquid fuels, Determination of heat of combustion, The Bomb Body- SS Calorimeter vessel, Study of High pressure Valve, Study of Electrodes, Study of Water Jacket, Study of Stirrer. Study of Firing unit, Study of Thermometer, Study of Pallet Press.


**CHANGE OF STATE OF GASSES APPARATUS**

Experimental investigation of gas laws Transparent measuring tank 1 for investigation of isothermic change of state, Hydraulic oil filling for changing volume of test gas, Built-in compressor generates necessary pressure differences to move the oil volume.


**HEAT EXCHANGER SUPPLY UNIT WITH DAQ**

Supply unit for heat exchangers, Hot water circuit with tank, heater, temperature controller, pump and protection against lack of water, Cold water circuit from laboratory mains or water chiller, Temperature controller controls the temperature of hot water, Flow adjustable using valves.


**TUBULAR HEAT EXCHANGER**

Demonstration of indirect heating/ cooling by transfer of heat from one fluid stream to another when separated by a solid wall, Energy balance determination (heat balance) and calculation of efficiencies by measuring the flow rates and temperature changes in the hot and cold fluid streams.


**PLATE HEAT EXCHANGER**

Compact, mobile unit, designed to provide required services for testing various Heat Exchangers using single source, Entire process is computer controlled, including change of direction of flow for parallel & counter-flow analysis.


**SHELL & TUBE HEAT EXCHANGER**

Supply unit for heat exchangers, Hot water circuit with tank, heater, temperature controller, pump and protection against lack of water, Cold water circuit from laboratory mains or water chiller, Temperature controller controls the temperature of hot water, Flow adjustable using valves.


**STIRRED TANK WITH JACKETED VESSEL AND COIL**

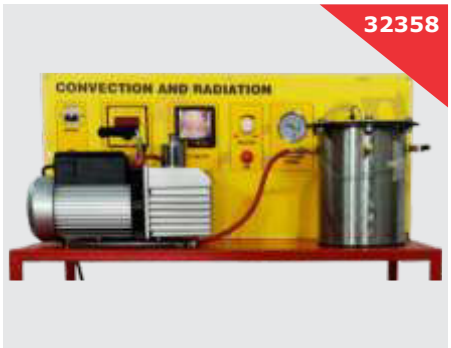
Using the Logarithmic Mean Temperature Difference (LMTD) in heat transfer calculations, Energy balance determination (heat balance) and calculation of efficiencies by measuring the flow rates and temperature changes in the hot and cold fluid streams, Demonstration of the transition from linear to turbulent flow.


**LINEAR CONDUCTION HEAT TRANSFER**

Understanding the Fourier rate equation in determining the rate of heat flow through solid materials, Measuring the temperature distribution for steady state conduction of energy through a uniform plane solid and a composite plane solid.

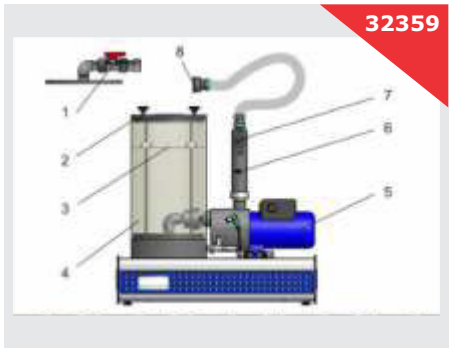

**CONCENTRIC TUBE HEAT EXCHANGER MODULE**

Concentric Tube Heat Exchanger Module allows the study of heat transfer between hot water flowing through an internal tube and cold water flowing in the ring area lying between the internal and the external tubes, This exchanger allows measuring hot and cold water temperatures at different points of the exchanger.




**HEAT TRANSFER BY CONVECTION & RADIATION MODULE**

Heat transfer between heating element and vessel wall by convection and radiation, Operation with various gases possible, Experiments in vacuum or at a slight positive gauge pressure.




**TURBINE PUMP BASE UNIT**

Basic experiments on a centrifugal pump together with the turbines, Determination of typical turbine curves, Performance curves at varying turbine speeds, Determination of efficiencies.


**AIR COMPRESSOR TEST APPARATUS INCLUDES DAQ**

To investigate performance of reciprocating Air Compressor, To study effect of delivery pressure on power consumption & compressor efficiency, To determine mechanical efficiency of reciprocating compressor, To determine Free Air Delivery (FAD) of the Air Compressor.


**TWO STAGE AIR COMPRESSOR TEST APPARATUS INCLUDES DAQ**

To investigate performance of reciprocating Air-Compressors of Single Cylinder and Two cylinder compressors, To study effect of delivery pressure on power consumption & compressor efficiency, To determine mechanical efficiency of reciprocating compressor.


**CENTRIFUGAL AIR COMPRESSOR TEST APPARATUS**

To investigate performance of Centrifugal Compressor, To study effect of blower speed on delivery pressure, air flow rate, To study blower characteristics as function of speed, air flow rate & delivery pressure, To determine mechanical efficiency of centrifugal compressor.


**DISTILLATION COLUMN**

Pressure drop across the column as a function of boil-up rate, Column efficiency as a function of boil-up rate, at total reflux, Binary mixture separation of components with changes in the feed flow rate, feed temperature, reflux ratios and reboiler temperatures. Comparing Raoult-Dalton Law using the method of McCabe-Thiele.


**POOL BOILING HEAT TRANSFER APPARATUS**

Study of Visualization of different forms of evaporation, Study of Free convection boiling, Study of Nucleate boiling, Study of Film boiling, Study of Heat transfer, Study of Effect of temperature and pressure on the evaporation process concept of a saturation line.


**NUCLEATE POOL BOILING HEAT TRANSFER APPARATUS**

Visualization of boiling and evaporation in a transparent pressure vessel, Evaporation with heating element, Condensation with tube coil, Safety valve protects against over-pressure in the system, Pressure switch for additional protection of the pressure vessel, adjustable.


**THERMAL CONDUCTIVITY OF LAGGED PIPES**

To determine heat flow rate through lagged pipe and compare it with the heater input for known values of thermal conductivity of lagging material, To determine thermal conductivity of lagging material by assuming input to be heat flow rate through lagged pipe.


**DOUBLE PIPE HEAT EXCHANGER**

A device used to transfer heat from a fluid flowing on one side of a barrier to another fluid (or fluids) flowing on the other side of the barrier, It is used to accomplish simultaneous heat transfer and mass transfer heat exchangers become special equipment types.


**DISCONTINUOUS RECTIFICATION**

Investigation and comparison of sieve plate and packed columns, In discontinuous mode, In vacuum mode, With different reflux ratios, With different numbers of plates, Determination of concentration profiles.


**DOUBLE PIPE HEAT EXCHANGER TRAINER**

Determine heat transfer coefficients for sensible heat transfer, Mobile, compact, comprehensive, sturdy design, Fully instrumentation for experimentation of Double pipe heat exchanger, Direct reading of temperature, voltmeter and ammeter measurement.


**FLOW THROUGH PACKED COLUMN**

Study of Function of a packed column - compare operating modes With water, Study of Water-air operation in parallel flow water-air operation in counter-flow, Study of Demonstration of wall effect, Study of Stream formation loading point, Study of Flooding point, Study of Hydraulic characteristics.


**GAS FLOW CLASSIFICATION**

Learning the fundamental principle of wind sifting (gas flow classification), Coarse material fraction, Fine material fraction, Dependent on solid mass flow rate and volumetric air flow rate, Separation function, Separation size, Sharpness of separation.


**ADVANCED OXIDATION PROCESS**
Study of advanced oxidation process for wastewater treatment, Study of advanced oxidation with hydrogen peroxide and UV light, Influence of the amount of hydrogen peroxide in the oxidation process, Analysis of the reaction kinetics.


**GAS CYCLONIC SEPARATOR**
Influence of solid content and volumetric air flow rate on, Pressure loss at the cyclone, Degree of separation, Separation function and separation size (with suitable analysis device), Comparison of pressure loss and degree of separation with theoretically calculated values.


**ADVANCED CONDUCTION UNIT**
Determination of thermal conductivity for various materials, Thermal energy balance of heat source and heat sink, Linear Heat Conduction in Metal Bars, Simple and Clear layout of system, Experiments are visible in a bell jar both ends of the test bar.

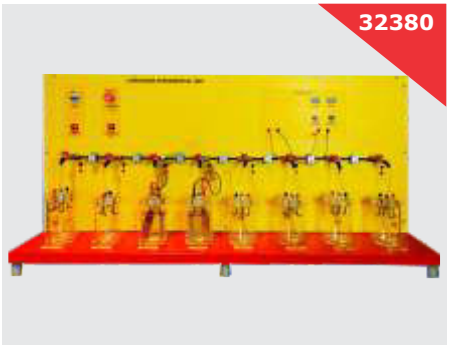

**ADSORPTIVE AIR DRYING**
Fundamental principle of adsorption and desorption, Investigation of the variables influencing adsorption and desorption, Air flow rates, Air humidity and temperature, Bed height of adsorbent, Depiction of the processes in a h-É diagram, Plotting of break-through curves and determination of breakthrough time.


**MULTI-VARIABLE CONTROL VACUUM DEGASSING APPARATUS**
Coupled level and pressure control, Level control with various controller types, Pressure control with various controller types, Plotting step responses.


**FIRST LAW OF THERMODYNAMICS TEST APPARATUS HEAT CONDUCTION AND CONVECTION**
Effect of heat conduction and convection on heat transfer, Effect of free and forced convection on heat transfer, Calculate convective heat transfers, Effect of different materials on heat conduction, Effect of sample length on heat transfer.


**FIXED BED CATALYZES**
Fundamentals of chemical catalysis, Fundamentals of enzymatic catalysis, Use of a photometric analyser Drawing up a quantity balance Determining yield, Investigation of catalytic reactions, 3 reactors (PMMA) for comparison of various fixed bed catalysis.


**FLOW INJECTION ANALYSIS**
Using the flow injection analysis (FIA), Determining the concentration, Determining the yield for TH 165, Injection valve, injection syringe and injection loop for adding the enzyme 'glucose oxidase' required for verification.




**CORROSION STUDIES APPARATUS**
Corrosion behavior of different metallic materials (rust/passivation), Formation of local elements, Influence of pH value of the electrolyte solution, Influence of salt concentration in the electrolyte solution, Oxygen corrosion, Corrosion protection.


**DIFFUSION OF LIQUIDS & GASSES APPARATUS**

Fundamentals of diffusion Fick's law, Derivation of the calculation formula for the diffusion coefficients for the given experimental conditions, Determination of the diffusion coefficient for the mass transport in gas.


**SCREENING UNIT**

Determination of particle size distributions, It enables users to separate a mixture of solids into several classes of particle sizes, In the screening process, each particle is compared with a screen mesh in terms of size and shape.


**HUMIDITY MEASURE METHODS APPARATUS**

Measuring methods for air humidity measurement, Psychrometric humidity measurement, Hygrometric humidity measurement, Capacitive humidity measurement, Characteristic variables to describe air humidity, Changes of the state of humid air in the h-x diagram.


**EXPANSION OF IDEAL GASSES**

Determination of the adiabatic exponent according to Clément-Desormes, Isothermal change of state by Boyle-Mariotte law, Isochoric change of state by Gay-Lussac's law, Idiabatic change of state of air, Isochoric change of state of air.


**RISING FILM EVAPORATOR MODEL**

Fundamental principle of film evaporation for increasing the concentration of temperature sensitive solutions, Investigation of the variables influencing the solid concentration in the solution, Influence of pressure and feed flow rate on the separating process, Influence of flow rate and pressure of the heating steam on the separating process.


**ION EXCHANGE CHAMBER**

Learning the fundamental principle of softening and desalination by ion exchange, Identification of the different modes of operation of cation and anion exchangers, Combined use of cation and anion exchangers for desalination, Exchanging capacities and regeneration.


**MULTI-PROCESSING VESSEL**

For Batch size from as low as 5 litres going to 20 litres, Comprehensive Control & instrumentation at front, Fully self contained system on lockable wheels, On board utilities, Dual purpose Heating as well as Cooling jacket.


**THERMAL EXPANSION TRAINING UNIT**

Measurement of the pipe sections elongation, Determination of the thermal expansion of different materials such as stainless steel, copper, PVC and PE, Study of the effect of varying pipe diameter in the thermal expansion, Determination of the thermal expansion coefficients.


**SIEVE PLATE DISTILLATION COLUMN**

To study the Sieve Plate Distillation Column, Stainless Steel tanks and wetted parts, Superb Painted structure, Simple to operate & maintain.


### PACKED BED DISTILLATION COLUMN

To estimate the batch distillation curves for a binary system and verify the binary batch distillation equation for a known packed height, To operate the column under total reflux condition and estimate the HETP for the packing.


### VAPOUR IN AIR DIFFUSION APPARATUS

Determination of the diffusion co-efficient of an organic vapour in air, To study the effect of temperature on diffusion co-efficient, A stirrer is fitted to maintain constant temperature inside the bath.


### SOLID IN AIR DIFFUSION APPARATUS

To calculate the mass transfer co-efficient of vaporization of naphthalene in air using a packed bed of spherical particles of naphthalene, The equip-ment is fitted with a vertical glass column with a mesh near the base of column to hold the spherical balls.


### BATCH DISTILLATION COLUMN

Preparation of solutions, Analytic valuation techniques, Filling of the column, Batch operation, Obtaining the McCabe-Thiele diagram Without reflux, Obtaining the number of plates Without reflux.


### FLUIDIZATION & FLUID BED HEAT TRANSFER UNIT

Observation of the behaviour in fluidized bed of a wide range of granular materials, from onset of fluidization to entrainment, Measurement of air flow and pressure drop through a variety of granular materials, as packed and as fluidized beds.


### DROP WISE & FILM WISE CONDENSATION APPARATUS

To study the Film wise & Drop wise condensation of steam on a vertical surface, Visualization of condensation process in drop wise as well as film wise condition.



## Our Clients

- MTC Military Technological College Oman
- Fiji National University Fiji
- African Development Bank
- The University of Southern Queensland, Australia
- The University of Zambia Zambia
- Wolaita Sodo University Ethiopia
- Emirates Aviation University UAE
- Asian Development Bank
- Food and Agriculture Organization of the United Nations
- Eldoret National Polytechnic, Kenya
- OL'Lessos TTI Kenya
- Princess Nourah Bint Abdulrahman University Saudi Arabia
- Bushenyi, Kichwamba, Kyema - Uganda
- Mbara University of Science and Technology Uganda
- National Institute of Technology Andhra Pradesh India
- Bharat Electronics Ltd Bangalore, Karnataka India
- Bhartiya Skill Development University India
- World Skill Center Odisha, India


**SUBSONIC WIND TUNNEL**

Flow past bodies with pressure and velocity observations in the wake, Performance of an aerofoil, Pressure distribution around a cylinder, Study of the pressure distribution around an aerofoil model to derive the lift and comparison with direct measurement of lift, Study of the characteristics of models involving basic measurement of lift and drag forces.


**SUBSONIC WIND TUNNEL FOR MACHINE**

Determine drag and lift coefficients for different models, Pressure distribution when flowing around drag bodies, Flow past bluff and streamlined bodies with pressure and velocity observations in the wake, Study of characteristics of models involving basic measurement of lift and drag forces.


**SUBSONIC WIND TUNNEL**

Measurement of static and total pressures in wind tunnel, Application of Pitot probe for mean velocity measurement, Wind tunnel flow velocity and fan speed measurement, Surface pressure measurements on a symmetric aerofoil, Lift, drag and pitching moment measurements in aerofoil testing.


**WIND POWER GENERATOR**

Low start-up wind speed is needed, High system efficiency, Little better in operation, Lower noise, Small and nice looking, Easy installation and maintenance, New unique technology eliminates the trouble of cable twist when in windward which often happens in traditional small wind energy conversion system (WECS).


**WIND TUNNEL SYSTEM**

Measurement of static and total pressures in wind tunnel, Application of Pitot probe for mean velocity measurement in wind tunnel, Wind tunnel low velocity and fan speed measurement and calibration, Surface pressure measurements on a symmetric aerofoil.


**AERODYNAMIC TRAINER**

Illustrative demonstration without detection or analysis of measured values, Flow patterns in real fluids when ?owing around and through models, Aerofoil with adjustable angle of attack, Orifice plate for change in cross-section, Flow separation and stall.


**SUPERSONIC WIND TUNNEL**

Velocity Range is Subsonic through Mach 1.8 with help of interchangeable Test Section, Continuous Operation using Variable Speed Air Blower, working on Vacuum Principle, Compressed air collecting tank & air dryer not required.


**SECTIONED STEAM PRESSURE RELIEF VALVE**

Study on the working principles of steam pressure relief valve, Familiarisation with the construction parts of steam pressure relief valve, Familiarisation with the function of each of the major components of steam pressure relief valve.


**COMPACT STEAM POWER PLANT**

Study of steam operated power plant, First and second low of thermo-dynamics analysis of completer steam plant, Determination of turbine power output with closed nozzles, Measure-ment of power by dynamometer, Study of Efficiency of generator.


**AIR - CONDITIONER BLOWER TRAINER**

The trainer components used are constructed from actual new model, vehicle components and connectors, The blower motor is made miniaturized version of actual motor for safety reasons.


**AIR - CONDITIONING SIMULATOR**

Simulates the magnet clutch fault condition, such as short circuit or open circuit, Simulates the faults in refrigeration components, Simulates high pressure switch cut off, Generates the pressure reading at various point of cycle, when it operates in abnormal condition.


**AIR – CONDITIONING SIMULATOR TRAINER**

Working of External temperature sensor, Operating principle of refrigeration cycle, Working of Exhaust gas sensor, Electrical test, Working of Linear pressure sensor, Operation of Sunlight sensor, Working of Anti-frost sensor, Troubleshooting.


**BUS AIR - CONDITIONING TRAINER**

Basic operating principal of vapour refrigeration cycle, Bus air conditioner operating principal, Electrical control of the system, Diesel engine operating principal, Basic trouble shooting skill training.


**AIR - CONDITIONING DEMONSTRATOR TRAINER**

The trainer consists of Basic element components in automotive air conditioner unit automotive compressor, electric motor, dryer, high / low pressure gauge set, side glass, air cool condenser, finned tube evaporator with force draft fan, temperature controllers, ammeter and voltmeter.


**ELECTRONIC CLIMATE CONTROL TRAINER**

Fully operational climate control trainer manufactured using original components, Including evaporator, compressor, condenser, associated pipe work, climate control and electronic control, Based on a Suzuki / Hyundai / Toyota climate control system or optionally regular air-conditioning system.


**ELECTRIC COOLING FAN TRAINER**

Defroster and Control Circuit, Two (2) Cooling Fans w/ Relays, Ten (10) Real World Faults for Diagnosis, Test Points for Diagnosis and Troubleshooting.


**HEATER AIR CON BLOWER MOTOR SYSTEM**

Magnetic-type motor is designed to handle the demands of continuous operation, Brushless and magnetic-brush styles available, Most are equipped with permanently lubricated, self-aligning bearings designed for long life and dependable performance.


**ABS BRAKING SYSTEM DEMONSTRATOR**

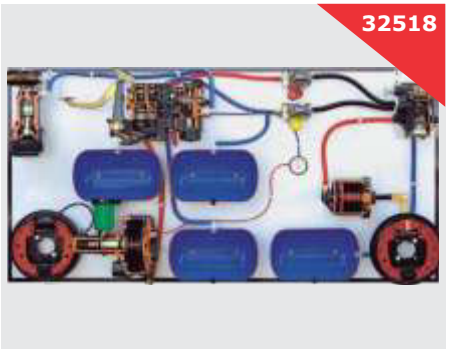
Clearly visible fully functional braking system and its components, Cross diagonal hydraulic braking system with front and rear discs with calipers, Functional parking brake, electronic ABS system, brake booster, With installed pressure gauges can be monitored the pressure in the brake circuit of each wheel.


**DISC BRAKE BRAKING SYSTEM**

Drum brake, Brake pump, Brake pedal, Hand brake lever, Oil tank-stop light, Sectioned pump, Sectioned cylinder, Sectioned caliper, On Stand with Wheels.


**DRUM BRAKE BRAKING SYSTEM**

Drum brake, Brake pump, Brake pedal, Hand brake lever, Oil tank, Stop lights, Sectioned pump, Sectioned cylinder, On Stand with Wheels.

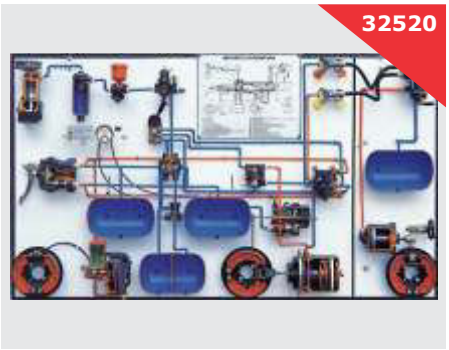



**HYDRAULIC PNEUMATIC BRAKING SYSTEM**

Piston Air Compressor Complete with Valves, Marelli-Triplex Distribution Assembly, Power-Assisted Pneumo – Hydraulic Brake, Complete Truck - Trailer Coupling, Automatically Re-loaded, Servo-Auto-Distributor for Braking.


**TWIN CIRCUIT DRUM & DISC BRAKE**

Disc Brake-drum Brake, Brake Pump-brake Pedal, Hand Brake Lever, Oil-tank Stop Light, Sectioned Pump, Sectioned Cylinder, Sectioned Caliper, Wall Mount Model.

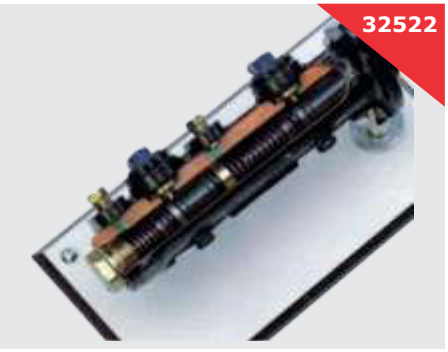



**TWIN LINE HYDRAULIC - PNEUMATIC BRAKING SYSTEM**

Duplex Brake Valves, Pedal-Operated, Dual Control Relay Valve, Triple Control Relay Valve Built, In Modulated Relay Emergency Diverter Valve, Hand Control Brake Valve, Load/Pressure Modulator, Hydraulic - Pneumatic Pump with Brake Chamber.


**BRAKE BOOSTER SECTION**

Sectioned original booster brake element, Function of the brake elements and linings can be demonstrated, Function of plunger can be demonstrated, Function of the holding spring can be observed, All sectioned parts and components are color coded.




**BRAKE MASTER CYLINDER SECTION**

Sectioned original tandem brake master cylinder, Function of the sliding pressure rod piston can be demonstrated, Function of closing chamber can be demonstrated, Function of the differential and tracking bore function, build up of pressure can be observed.


**CAR ABS TRAINER**

Study of ABS System Components & their functions, Demonstration of ABS Braking system, Fault Diagnostics of ABS System, Simulation of wheel lock to activate abs modulator, Speed simulation 0-160 KMPH.


**DRUM & DISC BRAKE SYSTEM TRAINER**

Automotive Drum and Disc Brake System Trainer Order Code : 32524 performs and exhibits actual brake operations in automobile, Bleeding brakes, Hydraulic pressure tests, Inspection of brake components.


### HYDRAULIC BRAKE SYSTEM TRAINER

All components are mounted on corrosion resistance metal plate, Hydraulic measuring points are provided for pressure measurement, Built in hydraulic pressure switch is provided to activate brake light.


### HYDRAULIC DOUBLE CIRCUIT BRAKE SYSTEM SIMULATOR

Study how to maintain of the braking system, Calculate the efficiency of braking system, Simulate the front circuit failures, Simulate the rear circuit failures, Simulate the presence of water in the braking system, Recognition study of servo brake, Study the functioning of service brake.


### BASIC HYDRAULIC DUAL CIRCUIT BRAKE SYSTEM DEMONSTRATOR

To show the operation of the hydraulic brake pump, To demonstrate the function of the servo unit, To display the transformation of the brake pedal movement into a movement of the brake cylinder in the disc and the drum brake at the wheels, To show the function of the hand brake at the rear wheels.


### TRUCK AIR BRAKE WITH ABS TRAINER

Implementation of ABS control system, Learning the method of setup & trouble shooting, Microprocessor based fault simulator, designed to enable the lecturer to enter various type of faults and then assess the fault-finding abilities of the student.


### SINGLE CYLINDER FOUR STROKE PETROL ENGINE, SECTIONED

single cylinder, four - stroke model of a petrol engine, The engine is water-cooled and the camshaft is in the engine block, Motorized and operates at 220 volts.


### SINGLE CYLINDER FOUR STROKE PETROL ENGINE, HAND CRANK OPERATED

Four Stroke Petrol Engine, cc. 220 – HP 5.5, Single Cylinder, Side Values, Camshaft in the Crankcase, Carburetor, Electronic Ignition, Splash Lubrication, Air Cooling, Sectioned, Hand Crank Operation.


### SINGLE CYLINDER FOUR STROKE PETROL ENGINE, RECOIL START

Four Stroke Petrol Engine, Single Cylinder, Side Values, Camshaft in the Crankcase, Carburetor, Electronic Ignition, Splash Lubrication, Air Cooling, Fully Operating @ 220V, 50Hz, AC, Recoil Starting.


### SINGLE CYLINDER FOUR STROKE DIESEL ENGINE WITH HAND-CRANK OPERATION

cc. 200 - 225, Single Cylinder, Direct Injection, Pushrod and Rocker Arms, Overhead Values, Camshaft in the Crankcase, Injection Pump operated by Camshaft, Air Cooling, Lubrication forced by Vane Pump.


### SINGLE CYLINDER FOUR STROKE DIESEL ENGINE, ELECTRIC START MOUNTED ON WORK-BENCH

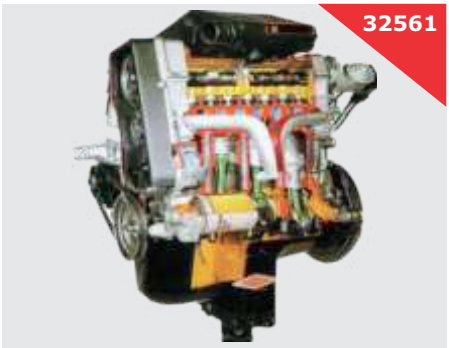
Four Stroke Diesel Engine, cc. 225 – HP 4.8, Single Cylinder, Direct Injection, Pushrod and Rocker Arms, Overhead Values, Camshaft in the Crankcase, Injection Pump operated by Camshaft, Air Cooling, Lubrication forced by Vane Pump.


**SINGLE CYLINDER FOUR STROKE DIESEL ENGINE, RECOIL START**

Four Stroke Diesel Engine, cc. 225 – HP 4.8, Single Cylinder, Direct Injection, Pushrod and Rocker Arms, Overhead Values, Camshaft in the Crankcase, Injection Pump operated by Camshaft, Air Cooling, Lubrication forced by Vane Pump.


**FOUR CYLINDER FOUR STROKE PETROL ENGINE WITH OVERHEAD CAMSHAFT, CARBURETOR TYPE**

Petrol engine, 4 strokes, 4 cylinders in line, overhead camshaft, toothed belt, air filter, gear oil pump, oil filter, water cooling, dry clutch single plate.




**FOUR CYLINDER FOUR STROKE PETROL ENGINE WITH OVERHEAD CAMSHAFT & ELECTRONIC INJECTION**

Petrol Engine, 4 Strokes, 4 Cylinders In Line, Overhead Camshaft, Toothed Belt, Air Filter, Gear Oil Pump, Oil Filter, Water Cooling, Dry Clutch Single Plate, Gearbox 4 Forward + Reverse differential.


**FOUR CYLINDER FOUR STROKE PETROL ENGINE**

4 Stroke 4 Cylinder Diesel Engine – Motor Driven Actual Cut Section Working Model with Valve Timing Attachment The engine can be sectioned to show the internal constructional details, The working of individual part and accessories like Valves, Pistons, pumps, Crank and Camshaft, etc. will be demonstrated.


**FOUR STROKE FOUR CYLINDER PETROL ENGINE WITH OVERHEAD CAMSHAFT WITH CLUTCH, GEARBOX & CARBURETOR**

Petrol Engine, 4 Strokes, 4 Cylinders In Line, Overhead Camshaft, Toothed Belt, Air Filter, Gear Oil Pump, Oil Filter, Water Cooling, Dry Clutch Single Plate, Gearbox 4 Forward + Reverse differential.


**FOUR CYLINDER FOUR STROKE PETROL ENGINE WITH OVERHEAD CAMSHAFT, CLUTCH, GEARBOX & ELECTRONIC INJECTION**

Petrol engine, 4 strokes, 4 cylinders in line, overhead camshaft, toothed belt, air filter, gear oil pump, oil filter, water cooling, dry clutch single plate, gearbox 4 forward + reverse differential.


**FOUR CYLINDER FOUR STROKE PETROL ENGINE WITH PUSHRODS AND ROCKER ARMS**

Petrol Engine, 4 Strokes, 4 Cylinders in Line, Camshaft in the Crankcase, Push Rods and Rocker Arms, Chain Drive, Carburetor, Air Filter, Coil Ignition, Gear Oil Pump, Oil Filter, Water Cooling, Dry Clutch Single Plate, Gearbox 4 Forward + Reverse, Electric Motor Operation.


**SECTIONED TRANSMISSION SYSTEM**

Transmission System carefully sectioned, complete with hydraulic converter and epicyclical gear change with 3 forward speeds + reverse, The torque converter, epicyclical braking system, multiple-plate clutches and control valves.


**2-STROKE PETROL ENGINE**

2- stroke engine, cut from real one in every details, carburettor, ignition, The suction-exhaust-transfer lights are especially highlighted so as to make is easy to learn the cycle, Piston displacement 46 cu. Cm, Air cooling, Electronic ignition, Box carburettor.


**DIRECT INJECTION 2-STROKE DIESEL ENGINE MODEL (ON BASE)**

Two Stroke Diesel Engine is a manual Driven engine, The engine is sectioned to show the internal constructional details, The working of individual part and accessories like Valves, Pistons, pumps, Crank and Camshaft.


**TWO STROKE SINGLE CYLINDER PETROL ENGINE**

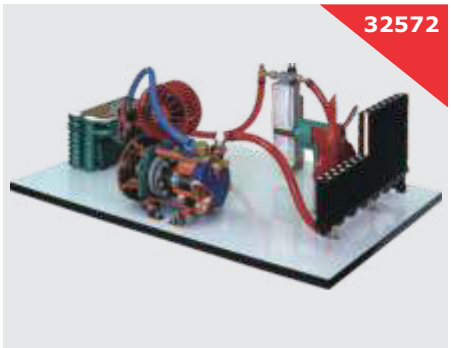
Two Stroke Single Cylinder Petrol Engine is a manual Driven engine, The engine is sectioned to show the internal constructional details, The working of individual part and accessories like Valves, Pistons, pumps, Crank and Camshaft.


**AIR COMPRESSOR TWO CYLINDERS**

Piston Air Compressor Complete with Valves, Marelli-Triplex Distribution Assembly, Power-Assisted Pneumo-Hydraulic Brake, Complete Truck-Trailer Coupling, Automatically Re-loaded, Servo-Auto-Distributor for Braking.


**AIR COMPRESSOR**

Piston Air Compressor Complete with Valves, Marelli-Triplex Distribution Assembly, Power-Assisted Pneumo–Hydraulic Brake, Complete Truck -Trailer Coupling, Automatically Re-loaded, Servo-Auto-Distributor for Braking.




**SECTIONED AIR CONDITIONING SYSTEM**

Radial piston compressor, Condenser, Filler, Expansion valve, Evaporator, Electric fans, High and low pressure connecting hose.


**SECTIONED ALTERNATOR**

On base, Dimensions: 22 x 22 x 20H in cms, Weight : approximately 5 Kgs.


**SECTIONED AUTOMATIC GEARBOX (3 SPEED + REVERSE)**

Hydraulic torque converter, Hydraulic valves, Epicyclical gear train, On Stand with Wheels, Handcrank Operation.


**CARBURETOR WITH MECHANICAL FUEL PUMP**

On Wooden Base, Dimensions: 32x22x30H in cms, Weight: approximately 5 Kgs.


**DIESEL INJECTION PUMP ELEMENT**

Single element in line injection pump, camshaft-pump cylinder, pump piston-adjustment rod, pump spring-injector-hand wheel, On Wooden Base.


**DOUBLE DISK CLUTCH**

Double Disk Clutch is one of the most common car clutch single disk type, It's operation can be clearly observed by pressing the foot pedal control and rotating the rotating the flywheel manually through a suitable hand-wheel.


**ELECTRIC FUEL PUMP**

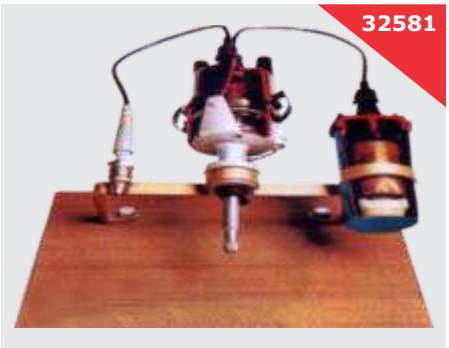
imensions: 8x8x14H in cms, Weight: approx. 1 kgs.


**SECTIONED GENERATOR**

On base, Dimensions: 22x22x20H in cms, Weight: approx. 6 kgs.

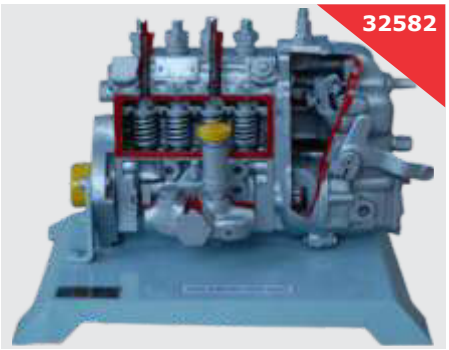

**HYDRAULIC CONTROL CLUTCH**

Hydraulic Control is used at carefully cut section of an hydraulic circuit controlling a diaphragm clutch for cars, The pump, the cylinder and clutch unit are fully sectioned in order to show all components.



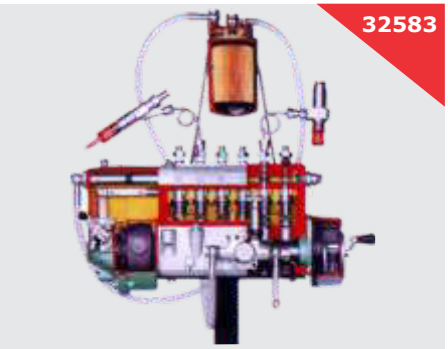

**IGNITION SYSTEM**

Dimensions: 32 x 22 x 30 cms, Weight: approx. 4 Kgs.




**IN LINE DIESEL INJECTION PUMP MODEL**

In line Diesel Injection Pump is a working of diesel fuel pump is shown with the help of actual parts assembled on iron base, All the necessary parts of diesel fuel pump are shown in actual working form, This model helps the student to understand the working of the diesel fuel pump very easily.




**IN LINE DIESEL INJECTION PUMP, INDIRECT INJECTION INJECTOR**

Camshaft, Centrifugal regulator, Adjustment rack, Pump cylinder, Pump piston, Injection timing, Fuel pump-fuel filter, Direct injection injector, Indirect injection injector, Hand wheel, On Stand with Wheels.


**TURBO - INTERCOOLER (ON BASE)**

Exhaust gas turbine, Waste-gate valve, Centrifugal compressor, Lubricating circuit, Air-air exchanger cutaway model, connected to the turbo-supercharger.


**WATER PUMP**

Weight and Dimensions, Cm :25x25x15cmH, Net weight:8 kg, Gross weight :12kg.


**OIL PUMP**

Two Stroke Diesel Engine is a manual Driven engine, The engine is sectioned to show the internal constructional details, The working of individual part and accessories like Valves, Pistons, pumps, Crank and Camshaft.


**POWER STEERING RACK AND PINION**

Rack type steering box, Hydraulic pump, Oil tank with relevant filter, Connecting pipes, Operated by hand through a hand wheel, The cutaway models are carefully sectioned for training purposes, professionally painted with different colours to better differentiate the various parts, cross-sections, lubricating circuits, fuel system.


**POWER STEERING RECIRCULATING BALLS (ON BASE)**

Ball type steering box, Hydraulic vane pump, Oil tank with relevant filter, Connecting pipes, Operated by hand through a hand wheel.


**PRESSURE POWER BRAKES FOR TRUCKS**

Cylinder, Piston - push rod, Spring - hydraulic brake pump, Oil tank, On Metal Base, Dimensions: 22x32x34H in cms, Weight: approx. 7 Kgs.


**ROTATING DIESEL INJECTION PUMP**

Supply pump, High pressure pump with distributor, Mechanical regulator, Electromagnetic stop valve, Injection advance variator, Injector, Hand wheel, On Wooden Base, Dimensions: 37x22x30H in cms, Weight: approx. 8 Kgs.


**ROTATING DIESEL RADIAL PISTON INJECTION PUMP**

Drive shaft, Cam ring, Vane type pump Distributor plunger, Solenoid valve, Injector, Hand wheel, On Metal Base, Dimensions: 35x22x38H in cms, Weight: @ 10 kgs.


**ROTATING DIESEL INJECTION PUMP ELECTRONICALLY CONTROL**

Solenoid valve for quantity control, Digital-incremental distance measurement, Control pump unit, Regulator valve injector, Hand wheel, On Metal Base, Dimensions: 35x22x38H in cms, Weight: @10 Kgs.


**SECTIONED BATTERY**

Mobile, compact, comprehensive, sturdy design, All working Systems can be studied to their operations, Cut sections are painted with different colours, All-important parts are well elaborated.


**SECTIONED DIESEL INJECTION PUMP**

Sectioned Diesel Injection Pump is the in-line alternating pump for six cylinder diesel engine, The system is built up to expose the internal parts, a camshaft with it's characteristic profile, the injection advance, the centrifugal the rack, the small piston and the return spring.


**SECTIONED FRONT SUSPENSION UNIT**

Sectioned Front Suspension Unit demonstrates the operation and interaction of the steering on a McPherson structure type suspension, It is essentially designed to enable the students to study of The function of the stabilities, Shock absorbers Steering linkage Suspension.


**SECTIONED RACK AND PINION STEERING BOX**

The unit is carefully sectioned as to clearly show all the internal parts, All sectioned areas are painted and color-coded to allow for easy identification of parts, Steering gear operation can be demonstrated by using the hand wheel to turn the mechanism.


**SECTIONED WORM & ROLLER GEAR**

The unit is carefully sectioned and is painted with different colors and shades to better distinguish its parts, The sections clearly show all the internal parts and the steering gear operation can be demonstrated by using the hand wheel to turn the mechanism.


**SECTIONED SHOCK - ABSORBER**

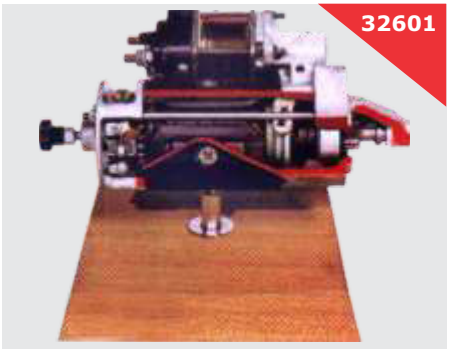
Sectioned Shock Absorber.


**SECTIONED SINGLE CARBURETOR**

On wooden Base, Dimensions: 20x20x25H in cms, Weight: @ 8 kgs.

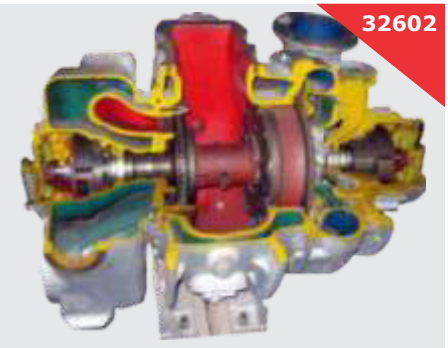

**SECTIONED SINGLE DISK CLUTCH**

Typical Single Disk Clutch is the most common car clutch single disk type, The operation can be clearly observed by pressing the foot pedal control and rotating the rotating flywheel manually through a suitable handwheel.




**SECTIONED STARTER MOTOR**

On Wooden Base, Dimensions: 30x22x20H in cms, Weight: approx. 6 Kgs.



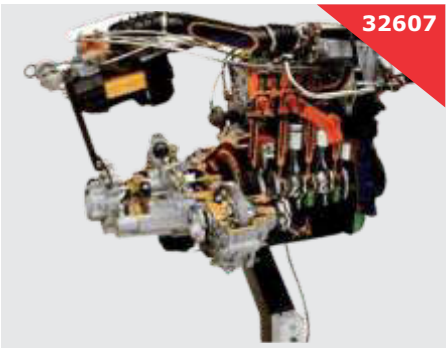

**SECTIONED TURBOCHARGER**
Centrifugal compressor, Centripetal turbine, Wastegate valve, On Wooden Base, Dimensions:30x22x26H in cms, Weight: approsx 8 Kgs.


**SECTIONED TWIN CARBURETOR**
On Wooden Base, Dimensions: 20x20x020H in cms, Weight: approx. 5 kgs.


**SECTIONED TWO STROKE PETROL ENGINE WITH GEARBOX AIR - COOLED**
Petrol engine, 2 strokes, 1 cylinders in line, Carburetor, Petrol feeding, Air cooling, Multi-disc clutch, Gearbox 3 forward, On Stand with Wheels.


**SECTIONED VACUUM POWER BRAKES FOR CAR**
Booster, Diaphragm, Piston - brake pedal, Spring - dual brake pump, Oil tank - depression valve, Power chamber, Slave cylinder, Valves, Fluid reservoirs, On Wooden Base.


**SECTIONED SINGLE CYLINDER TWO STROKE PETROL ENGINE**
Two Stroke Petrol Engine, 150cc to 250cc, Single Cylinder, Carburetor, Electronic Ignition, Petrol Feeding, Air Cooling, Fully Operating, Recoil Starting, Mounted on Working Bench.




**SECTIONED 4 CYLINDER PETROL ENGINE WITH K-JETRONIC IGNITION**
4 in-line cylinder displacement 1600/1800 cubic cm, Overhead camshaft, Distribution by means of a toothed belt, Gearbox 5 forward speeds + reverse with built-in differential, Carefully painted in different colors to distinguish every part section, cuts, fuel, lubrication and cooling system.


**AIR BRAKE SYSTEM MODEL**
Master cylinder, Wheel cylinder, Brake drum, Brake shoes, Foot valve, Unloading valve, Compressed air with brake lines.


**CLUTCH FUNCTIONAL MODEL**
Clutch Functional is an educational system to study internal structures and the operating principle of hydraulic type clutch equipped of passenger car by cross-sectioning it, Operations of master cylinder, release cylinder, release fork.


**CONTINUOUSLY VARIABLE TRANSMISSION CVT GEARBOX ON WHEELS & STAND**
Electro-magnetic clutch, Forward and Reverse insertion Lever, Primary Pulley, Secondary Pulley, Roller Belt, Final Reduction unit, Hydraulic command unit.


**GEARBOX WITH DIFFERENTIAL FRONT DRIVE (5 SPEED + REVERSE)**

Helical gears, Selector slider, Speed forks, Differential, On Stand with Wheels.


**DIFFERENTIAL WITH LOCKING SYSTEM BY DISK**

Crown, pinion, planets, satellites, Thrust rings, Friction disks, On Heavy Metal Base, Dimensions: 42x32x35H in cms, Weight: approx. 32 Kgs.


**GEARBOX WITH REDUCER (4 SPEED + REVERSE)**

Helical gears, Selector slider, Speed forks, Reduction gear, Drum brake, On Stand with Wheels.


**MECHANICAL GEARBOX (4 SPEED + REVERSE)**

Helical gears, Selector slider, Speed forks, Reduction gear, Drum brake, On Stand with Wheels.


**MECHANIC GEARBOX (5 SPEED + REVERSE)**

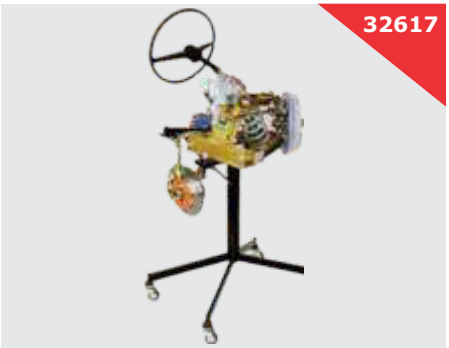
Helical gears, Selector slider, Speed forks, Dry clutch single plate, On Stand with Wheels.


**SECTIONED REAR AXLE**

Differential with crown, Pinion, planets, satellites, Axle shafts – drum brakes, On stand with wheel.


**SECTIONED REAR AXLE**

Differential with crown, Pinion, planets, satellites, Axle shafts – drum brakes, On stand with wheels, Dimensions: 60x45x125 h. cms, Weight: approx. 30 Kgs.




**STEERING SYSTEM WITH DISC & DRUM BRAKE**

Front independent suspension trapezoid-arm type, Swinging arms, Spring-shock absorber, Sector gear steering box, Drum brake-steering wheel, On Stand with Wheels, Dimensions: 80 x 60 x 140 H in cms, Weight: approx. 55 Kgs.


**STEERING UNIT WITH SUSPENSION & BRAKES**

The globe type steering unit is connected to the spindle through a steering bar, so that the steering operations can be seen, The trainer allows students to investigate all the principle and operations of a front wheel drive steering and suspension system.


**TURBO JET ENGINE MODEL**

High & Low Pressure Compressors, super model of a modern two wave turbine shown in detailed construction and operating system of such a motor, Low pressure and high pressure compressor, low pressure and high pressure turbine are readily recognizable.


**Ø 4-STROKE SINGLE-CYLINDER CVT ENGINE WITH CARBURETTOR**

Electronic ignition, Water cooling system, CVT automatic clutch, Disc brake, Silencer, Operated Manually, through a crank handle, On Stand with Wheels.


**Ø 4-STROKE SINGLE-CYLINDER CVT ENGINE WITH ELECTRONIC INJECTION**

Electronic ignition, Water cooling system, CVT automatic clutch, Disc brake, Silencer, Operated Manually, through a crank handle, Equipment Layout On Stand with Wheels.


**Ø 2-STROKE SINGLE-CYLINDER CVT ENGINE WITH CARBURETTOR**

These are single cylinder, two/four stroke continuously variable transmission engine models of a petrol engine, The engine is water-cooled and the camshaft is in the engine block, The model is motorized and operates at 220 volts.


**SECTIONED TWO WHEELED TRACTOR**

Actual sectioned independent two wheel tractor, Includes all the links & mechanisms, Cut sections are painted with different colors, Clutch Unit, Gearbox, Pinion gear-ring gear, Steering Clutch, Reducer.


**SECTIONED 4 WHEELED TRACTOR WITH DIESEL ENGINE**

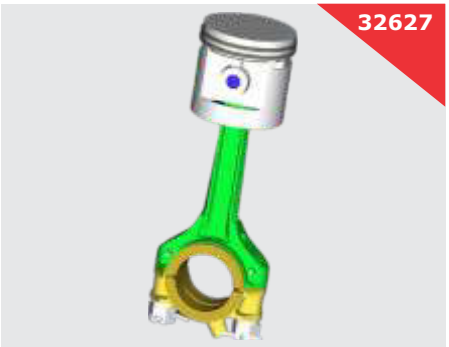
4 stroke / 2 cylinder engine, Indirect injection, Water cooling, Overhead valves, In-line injection pump, Steering box, Gear box.


**AUTOMOTIVE COOLING SYSTEM**

Cooling System consists of a working of a cooling system of a car is shown with the help of actual parts assembled on a metal stand, All the necessary parts of a cooling system of a car are shown in actual working form.

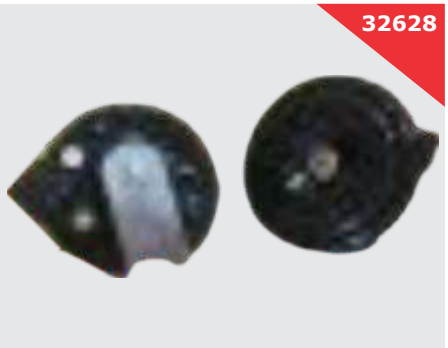

**BRAKE MASTER PUMP**

Brake Master Pump shows internal construction of the car brake master pump.




**SECTIONED PISTON WITH CONNECTING ROD**

Sectioned Piston with Connecting Rod shows internal construction of the car brake master pump.



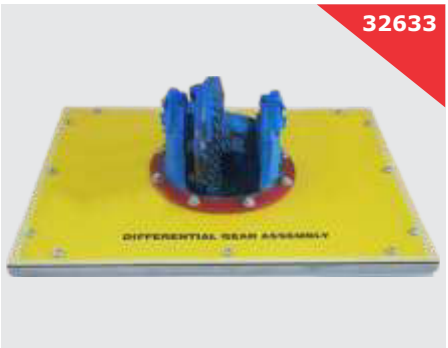

**SECTIONED CAR ELECTRIC HORN**
Sectioned Car Electric Horn shows internal construction of the car electric horn, mounted on a board with parts named.


**SECTIONED CAR ELECTRIC HORN RELAY**
Sectioned Car Electric Horn Relay shows internal construction of the car electric horn relay, mounted on a board with parts named.


**PETROL FUEL PUMP SYSTEM**
Petrol Fuel Pump System Model AM 280 consists of a working model with original parts, consisting of petrol fuel tank, fuel filter, feed pump and carburator.

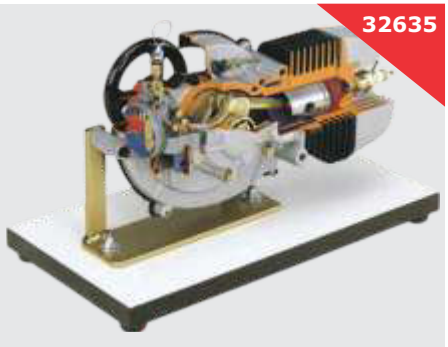

**SYNCHROMESH GEAR BOX – 4 FORWARD & 1 REVERSE**
Synchromesh Gear Box – 4 Forward & 1 Reverse is Actual Cut Section, The working of gear box is shown with the help of actual parts assembled on square iron pipe frame, All the necessary parts of gear box are shown in actual working form.


**SYNCHROMESH GEAR BOX – 7 FORWARD & 1 REVERSE**
Synchromesh Gear Box – 4 Forward & 1 Reverse is Actual Cut Section, The working of gear box is shown with the help of actual parts assembled on square iron pipe frame, All the necessary parts of gear box are shown in actual working form.



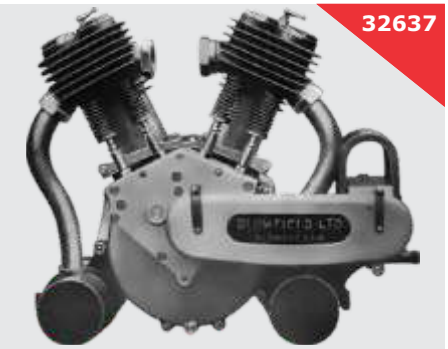

**DIFFERENTIAL GEAR ASSEMBLY**
The working of differential gear is shown with the help of actual parts assembled on square iron pipe frame, All the necessary parts of differential gear are shown in actual working form.


**SECTIONED STEAM ENGINE**
Instructive model of a modern horizontal steam engine with piston valve control, The model can be put in motion by turning the flywheel, thus showing the manner of operation of the engine and of the built-on centrifugal governor.




**2-STROKE MOTORCYCLE PETROL ENGINE MODEL (ON BASE)**
Piston displacement 48 cu. cm, Air cooling, Plug point and magnet flywheel ignition, Box carburettor, The engine operates manually through a crank handle, The cutaway models are carefully sectioned for training purposes.


**INTERCOOLER HEAT EXCHANGER (ON BASE)**
Dimensions: 50x20x30h cm, Net weight :7 kg, Gross weight :10 kg.




**V-TYPE 350-500CC MOTORCYCLE ENGINE**

Carefully sectioned of the motorcycle V-type twin-cylinder 350/500 cu. cm engine, The engine operates electronically on 220 volts and runs at a reduced speed to let student easily understand and observe the operation of the various mechanical par The cutaway models are carefully sectioned for training purposes.



**TWIN VALVES OHC ENGINE HEAD**

Accurate twin valves per cylinder engine head, Dimensions:25x20x20h, Net weight :5 kg, Gross weight :8 kg.


**REAR WHEELS WITH AXLE WITH DIFFERENTIAL GEARS ASSEMBLY**

Rear Wheels with Axle with Differential Gears Assembly Rigid rear axle complete with differential unit, axle shafts and rear drum brakes, carefully sectioned to show the operation of the differential unit where planetary gears, the ring gear and the pinion are clearly displayed.


**CHASSIS 4 WHEEL DRIVE TURBO PETROL ENGINE ELECTRONIC INJECTION**

Tilting Chassis Four Wheel Drive, Petrol Engine, 4 Strokes, 4 Cylinders in Line, Turbo-charger, Intercooler, Twin Overhead Camshaft, Toothed Belt, Electronic Injection SPI, Air Filter, Electronic Ignition, Gear Oil Pump.


**OPERATIONAL SINGLE CYLINDER 4 STROKE DIESEL ENGINE**

Four Stroke Diesel Engine, cc. 1000CC to 1500cc, Single Cylinder, Direct Injection, Pushrod and Rocker Arms, Overhead Values, Camshaft in the Crankcase, Injection Pump operated by Camshaft, Air Cooling, Lubrication forced by Vane Pump.


**OPERATIONAL SINGLE CYLINDER FOUR STROKE DIESEL ENGINE**

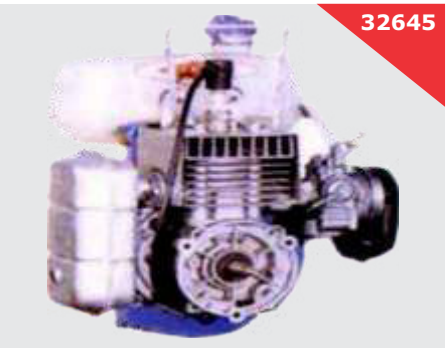
Four Stroke Diesel Engine, cc. 1000CC to 1500cc, Single Cylinder, Direct Injection, Pushrod and Rocker Arms, Overhead Values, Camshaft in the Crankcase, Injection Pump operated by Camshaft, Air Cooling, Lubrication forced by Vane Pump.


**OPERATIONAL TWO STROKE SINGLE CYLINDER PETROL ENGINE**

Two Stroke Single Cylinder Petrol Engine can operate in a normal way with great ease, The strong trestle has 4 wheels which can all be locked while the engine itself is fastened with elastic couplings so that vibrations are reduced almost to zero.

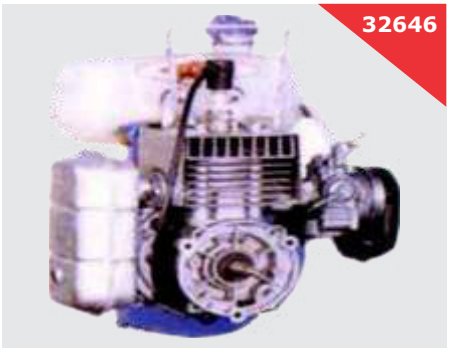

**OPERATIONAL TWO STROKE SINGLE CYLINDER PETROL ENGINE**

Petrol Feeding, Single Cylinder, Mounted on Working Bench, Two Stroke Petrol Engine, Carburettor, cc. 41 – HP 3.0, Electronic Ignition, Air Cooling, Fully Operational.




**OPERATIONAL TWO STROKE SINGLE CYLINDER PETROL ENGINE, RECOIL OPERATED**

Base mounted Two Stroke Single Cylinder Petrol Engine, Two Stroke Petrol Engine, 41 – HP 3.0, Single Cylinder, Carburettor, Electronic Ignition, Petrol Feeding, Air Cooling, Fully Operating, Recoil Starting, Mounted on Base.




**OPERATIONAL SINGLE CYLINDER 4 STROKE PETROL VCR ENGINE**

In conjunction with AM 501 test stand and loading unit, in addition to the standard basic experiments, Influence of compression ratio, mixture composition, ignition timing on engine characteristics and exhaust gas temperature.


**OPERATIONAL FOUR STROKE FOUR CYLINDER DIESEL ENGINE**

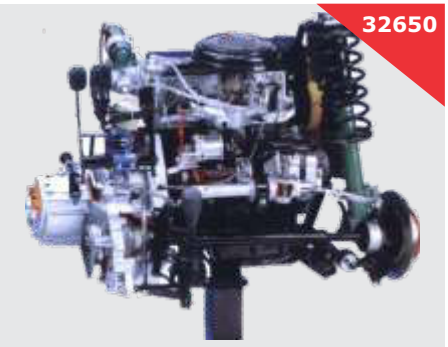
Four Stroke Water Cooled Diesel Engine, Power Output 47KW at 3000 rpm, Four Cylinder, Displacement: 1968cm, Torque: max. 200Nm at 1750rpm, Direct Injection, Pushrod and Rocker Arms, Overhead Values, Camshaft in the Crankcase, Injection Pump operated.


**OPERATIONAL ELECTRONIC INJECTION 4 CYLINDER 4 STROKE PETROL ENGINE WITH CNG & TWIN OVERHEAD CAMSHAFT**

Petrol engine: 1500cc, With Switch Over to CNG (Compressed Natural Gas), 4 strokes, 4 cylinders in line, Twin overhead camshaft, Toothed belt, Mono-Jetronic injection, Electronic ignition, Gear oil pump, Oil filter, Water cooling, Dry clutch single plate.


**OPERATIONAL FRONT-WHEEL DRIVE 4 CYLINDER 4 STROKE PETROL ENGINE OVERHEAD CAMSHAFT CARBURETOR**

4 Cylinders In Line, Overhead Camshaft, Toothed Belt, Air Filter, Gear Oil Pump, Oil Filter, Water Cooling, Radiator, Dry Clutch Single Plate, Gearbox 4 Forward + Reverse, Rack And Pinion Steering Box, Steering Wheel, Complete Pedal Board.




**FRONT-WHEEL DRIVE PETROL ENGINE OVERHEAD CAMSHAFT ELECTRONIC INJECTION**

4 Cylinders In Line, Overhead Camshaft, Toothed Belt, Air Filter, Gear Oil Pump, Oil Filter, Water Cooling, Radiator, Dry Clutch Single Plate, Gearbox 4 Forward + Reverse, Rack And Pinion Steering Box, Steering Wheel, Complete Pedal Board.


**MONO-JETRONIC INJECTION 4 CYLINDER 4 STROKE PETROL ENGINE TWIN OVERHEAD CAMSHAFT**

4 cylinders in line, Twin overhead camshaft, Toothed belt, Mono-Jetronic injection, Electronic ignition, Gear oil pump, Oil filter, Water cooling, Dry clutch single plate, Clutch and accelerator pedals.


**MULTIPOINT ELECTRONIC INJECTION 4 CYLINDER 4 STROKE PETROL ENGINE TWIN OVERHEAD CAMSHAFT**

4 cylinders in line, Twin overhead camshaft, Toothed belt, Mono-Jetronic injection, Electronic ignition, Gear oil pump, Oil filter, Water cooling, Dry clutch single plate, Clutch and accelerator pedals.


**CHASSIS STRUCTURE EDUCATIONAL SYSTEM (PETROL)**

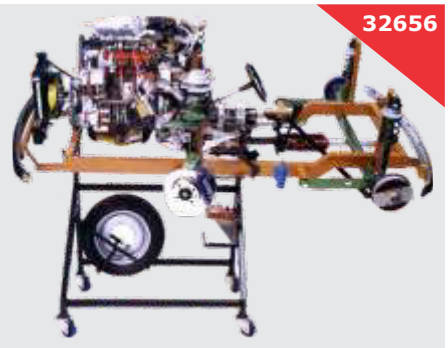
Engine system, Transmission, Rear axle and rear wheels of the car, It is also equipped with an electrical motor (with reduction unit) to rotate the engine and transmission for easy observation of the mechanical parts in movements.


**STRUCTURE EDUCATIONAL SYSTEM (PETROL) WITH ELECTRICAL FAULT SIMULATOR**

Rear axle and rear wheels of the car, It is also equipped with an electrical motor (with reduction unit) to rotate the engine and transmission for easy observation of the mechanical parts in movements.

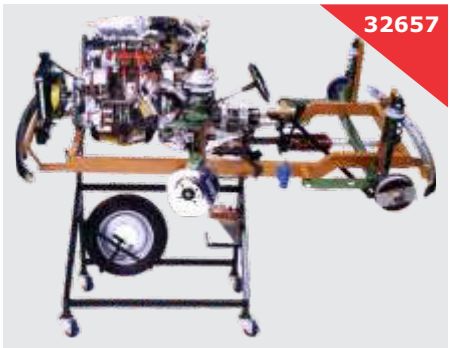

**CHASSIS 4 WHEEL DRIVE TURBO PETROL ENGINE ELECTRONIC INJECTION WITH WORKING LIGHT SYSTEM AND FULL OPERATING BRAKES**

Tilting Chassis Four Wheel Drive, Petrol Engine, 4 Strokes, 4 Cylinders in Line, Turbocharger, Intercooler, Twin Overhead Camshaft, Toothed Belt, Electronic Injection SPI.



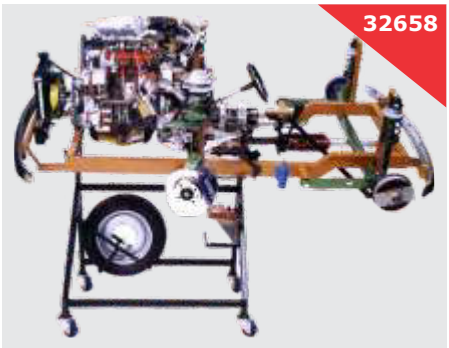

**CHASSIS FRONT – WHEEL DRIVE PETROL ENGINE CARBURETOR TWIN OVERHEAD CAMSHAFT**

Brake - Clutch - Accelerator, McPherson Suspensions, Rear Axle with Stabilizer, Hydraulic Shock - Absorbers, Front Wheel Disc Brakes, Rear Wheel Drum Brakes, Wheel with Sectioned Type, Stop Light - Rear Fog Lights - Reverse Light, Horn - Emergency Blinker, Fully Operating Brakes.



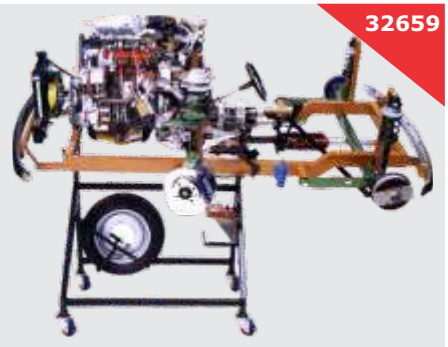

**CHASSIS FRONT – WHEEL DRIVE PETROL ENGINE**

Automatic Transmission Carburetor Twin Overhead Camshaft, Overhead Camshaft, Toothed Belt, Air Filter, Electronic Ignition, Gear Oil Pump, Oil Filter, Sectioned Battery, Wheel With Sectioned Type.



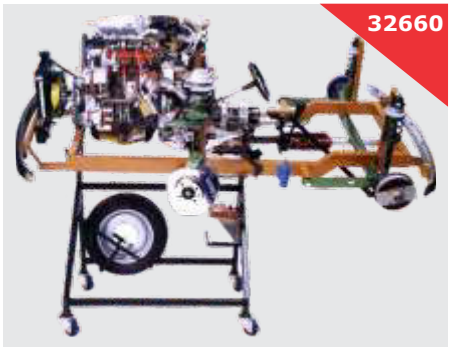

**WHEEL DRIVE DIESEL ENGINE**

Indirect Injection Rotating Distributor Overhead Camshaft With working Lighting System And Fully Operating Brakes, 4 Cylinders in Line, Turbo-charger, Intercooler, Twin Overhead Camshaft, Toothed Belt, Electronic Injection SPI, Air Filter, Electronic Ignition, Gear Oil Pump.



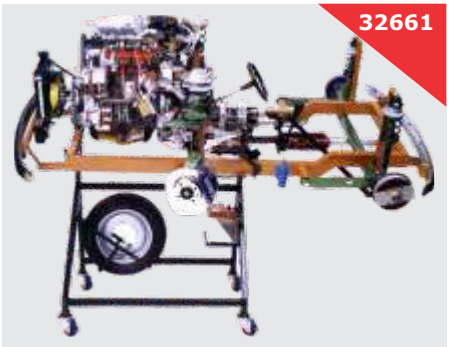

**WHEEL DRIVE PETROL ENGINE MULTIPOINT INJECTION**

Twin Overhead Camshaft with Working Lighting System and Fully Operating Brakes, Tilting Chassis, 4 Strokes, 4 Cylinders in Line, Overhead Camshaft, Toothed Belt, Air Filter, Sectioned Battery, Wheel with Sectioned Type.



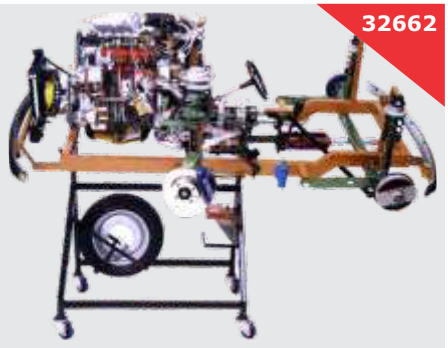

**CHASSIS FRONT - WHEEL DRIVE DIESEL ENGINE INDIRECT INJECTION**

Tilting Chassis, 4 Strokes, 4 Cylinders in Line, Overhead Camshaft, Toothed Belt, Air Filter, Sectioned Battery, Wheel with Sectioned Type, Electronic Ignition, Gear Oil Pump, Oil Filter, Water Cooling, Radiator.



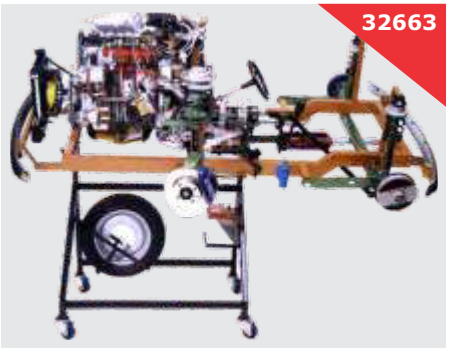

**CHASSIS FRONT - WHEEL DRIVE PETROL ENGINE MULTIPOINT INJECTION**

Twin Overhead Camshaft, Tilting Chassis, 4 Strokes, 4 Cylinders in Line, Overhead Camshaft, Toothed Belt, Air Filter, Sectioned Battery, Wheel with Sectioned Type.



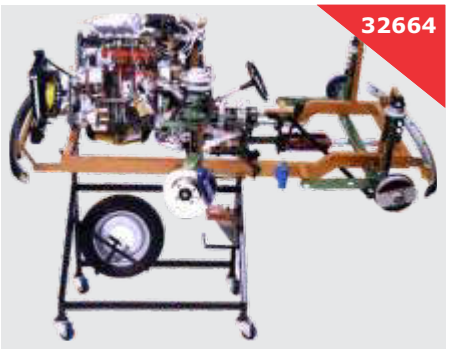

**CHASSIS FRONT - WHEEL DRIVE DIESEL ENGINE TRAVERSE POSITION**

Indirect Injection Rotating Distributor Overhead Camshaft with working Lighting System and Fully Operating Brakes, Tilting Chassis, 4 Strokes, 4 Cylinders in Line, Overhead Camshaft, Toothed Belt, Air Filter.



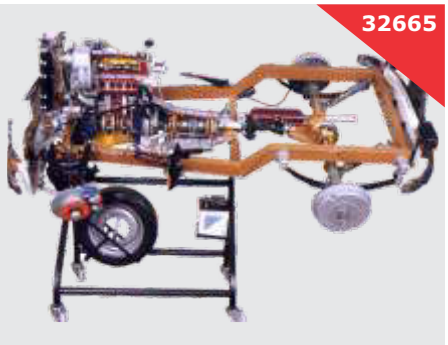

**CHASSIS FRONT - WHEEL DRIVE PETROL ENGINE CARBURETOR**

Working Lighting System and Fully Operating Brakes, Electronic Ignition, Gear Oil Pump, Oil Filter, Water Cooling, Radiator.



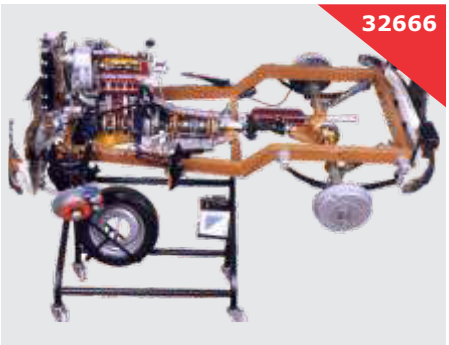

**CHASSIS FRONT - WHEEL DRIVE PETROL ENGINE K - JETRONIC INJECTION**

Tilting Chassis, 4 Strokes, 4 Cylinders in Line, Overhead Camshaft, Toothed Belt, Wheel with Sectioned Type, Air Filter, Electronic Ignition, Gear Oil Pump, Oil Filter.



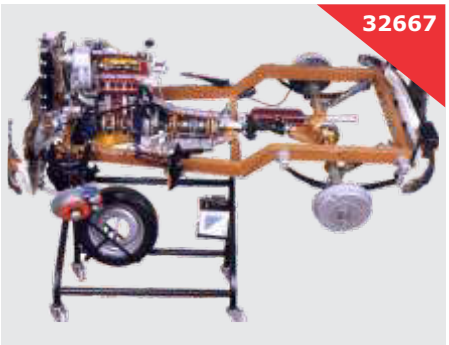

**CHASSIS REAR - WHEEL DRIVE DIESEL ENGINE IN-LINE INJECTION**

Pump Pushrods and Rocker Arms, Tilting Chassis, Diesel Engine, 4 Strokes, 4 Cylinders in Line, Air Filter, Gear Oil Pump, Oil Filter, Air Filter, Water Cooling, Radiator, Gearbox 4 Forward + Reverse, Worm and Sector Steering Box, Dry Clutch Single Plate.



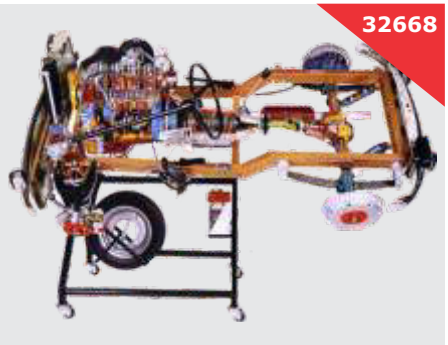

**CHASSIS REAR - WHEEL DRIVE SOHC DIESEL ENGINE IN-LINE INJECTION**

Dry Clutch Single Plate, Gearbox 4 Forward + Reverse, Worm and Sector Steering Box, Steering Wheel, Complete Pedal Board, Brake-Clutch-Accelerator, Shaft with Flexible Coupling and Cardan Joint, Front Helical Springs, Rear Leaf Springs.



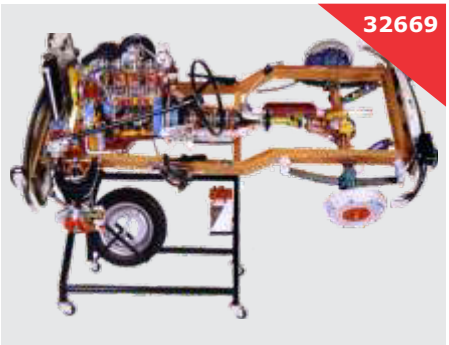

**CHASSIS REAR – WHEEL DRIVE DIESEL ENGINE ROTATING OVERHEAD CAMSHAFT**

4 Cylinders In Line, Overhead Camshaft, Toothed Belt, Air Filter, Gear Oil Pump, Oil Filter, Water Cooling, Radiator, Dry Clutch Single Plate, Gearbox 4 Forward + Reverse, Rack And Pinion Steering Box, Steering Wheel, Complete Pedal Board.




**CHASSIS REAR - WHEEL DRIVE 4 CYLINDER 4 STROKE PETROL ENGINE**

Complete Pedal Board, Brake-Clutch-Accelerator, Shaft with Flexible Coupling, and Cardan Joint, Front Helical Springs, Rear Leaf Springs, Differential, Hydraulic Shock-Absorbers, Front Wheel Disc Brakes, Rear Wheel Drum Brakes.




**REAR - WHEEL DRIVE 4 CYLINDER 4 STROKE PETROL ENGINE**

Twin Overhead Camshafts Without Body Ends, Worm and Sector Steering Box, Steering Wheel, Complete Pedal Board, Brake-Clutch-Accelerator, Shaft with Flexible Coupling, and Cardan Joint, Front Helical Springs, Differential, Hydraulic Shock-Absorbers, Front Wheel Disc Brakes.


**BASIC ENGINE FUEL TRAINER**

To Study Car fuel supply system, To Study Difference of diesel and fuel-injection fuel system, To Study Various fuel level indicator, To Study Actual fuel supply running condition.


**ENGINE LUBRICATION & COOLING SYSTEM**

The system consists of a sectional automotive cooling system radiator of the plate and tube design, The model includes a sectional air cooled and liquid cooled cylinder head, This system is mounted on the steel frame with heavy duty rollers.


**SECTIONED STRUCTURE FOR EDUCATIONAL SYSTEM OF A DIESEL ENGINE CAR**

Rear axle and rear wheels of the car, It is also equipped with an electrical motor (with reduction unit) to rotate the engine and transmission for easy observation of the mechanical parts in movements.


**SECTIONED STRUCTURE EDUCATIONAL SYSTEM OF A PETROL CAR**

Engine system, Transmission, Rear axle and rear wheels of the car, It is also equipped with an electrical motor (with reduction unit) to rotate the engine and transmission for easy observation of the mechanical parts in movements.


**SECTIONED STRUCTURE EDUCATIONAL SYSTEM**

Petrol Car With Electrical Fault Simulator, The training model is built with the original automotive parts, fitted on a frame specially built by us, It is equipped with petrol engine-4 cylinders in line with water cooling.


**STRUCTURE EDUCATIONAL SYSTEM OF AUTOMATIC PETROL CAR**

Electrical Fault Simulator, Fuel Level Sensor, Engine Temperature, Ignition System, Fuel Injection System, Front Lighting System, Alarm Faulty, Alternator System, Charging System, Brake Switch Faulty.


**PETROL ENGINE CAR STRUCTURE EDUCATIONAL SYSTEM**

Petrol Engine Car Structure Educational System demonstrates the inter-relationship between components of an actual car, The training model is built with the original automotive parts, fitted on a frame specially built by us.


**AUTOMOTIVE IGNITION / CHARGING DEMONSTRATION TRAINER**

Relevant theory of engine ignition and charging systems, Practical activities using the circuit board, Multimeter and oscilloscope for observation, measurement and troubleshooting, Multimeter and oscilloscope is as an optional item.


**DISTRIBUTOR IGNITION TRAINER**

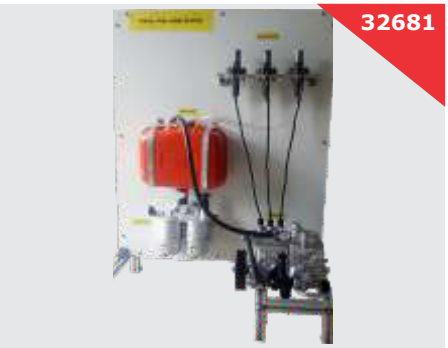
4 spark plugs – distributor, contact breaker points, rotor arm – coil, battery – hand wheel.


**TRANSISTORIZED DISTRIBUTOR IGNITION**

Dimensions: 70x19x55H in cms, Weight: approx. 11 Kgs, Main Supply : 220 V AC 50Hz 1Ph, 4 spark plugs – distributor, Pulse generator, Coil – battery, Hand wheel.

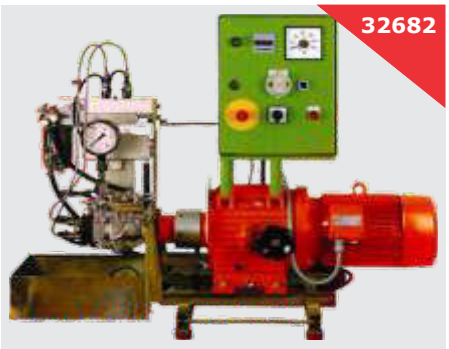

**AUTOMATIC IGNITION DEMONSTRATOR**

Mounted on to mobile dedicated test bed, Four cylinder with four stroke system, Spark ignition engine, Power of 55KW at 5500 rpm, Single point injection, The trainer is constructed from corrosive resistance materials on a mobile an robust test bed.




**DIESEL FUEL INJECTION SYSTEM**

The System is individual injection pump type to show the operating principle and structure of governor, timer and injection nozzle, The injection pressure and spray pattern allow to analyze by adopting two fuel pressure gauges and visible cylinder.




**DIESEL FUEL INJECTION SYSTEM TEST BENCH**

Compact and sturdy construction, Easy and versatile operation, Full performance tests possible, Design for fail-safe operation, Extensive choice of engines, Rapid change over of engines, Self contained-minimum service required.


**DISTRIBUTOR, IGNITION COIL & SPARK PLUG**

Automotive Distributor, Ignition Coil & Spark Plug demonstrates the operating principle and cross sectional view of distributor, ignition coil and spark plug, Starter switch, Resistor, Spark plugs, Distributor, Ignition coil.


**EFI IGNITION DEMONSTRATOR**

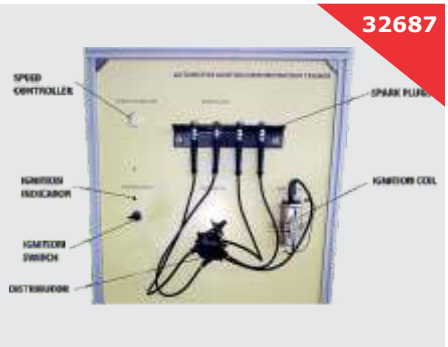
Graduated Fuel Volume Meter for each Injector, Complete Ignition System (detailed below), Variable speed drive for ignition with Tachometer, Silk-screened engine Diagram showing layout of components, Throttle position sensor.


**FUEL INJECTION SYSTEM TRAINER**

Stoichiometric ratio, Pulse injection & continuous injection system, Air flow meter ratio, Operation sensor reporting to the ECM, Sequential electronic fuel injection system Hardware, Throttle - body injection, Solenoid-operated fuel injector.


**IGNITION DEMONSTRATION TRAINER**

Mounted on a dedicated reduce-wear-bed (RWD) type mobile unit, Suitable for Four cylinders, 4-stroke Engine, Single point injection with mono-motronic control unit, Error switch integrated into the control system.




**IGNITION DEMONSTRATION TRAINER**

Air quantity indication shown by inclined-tube manometer, Pressure measurement gauge to indicate system pressure and control pressure, Engine speed measurement digital display, Boost switch-off with digital display of cut-in speed.


**K-JETROIC 1.5 ELECTRONIC FUEL INJECTION/IGNITION TRAINER**

Air quantity indication shown by inclined-tube manometer, Pressure measurement gauge to indicate system pressure and control pressure, Engine speed measurement digital display, Boost switch-off with digital display of cut-in speed


**LE-JETROIC 1.5 ELECTRONIC FUEL INJECTION/IGNITION TRAINER**

Air boost supply provided by means of high performance speed dependent suction blower, Multiple measuring sensors allowing individual measurement of fuel delivered by fuel injectors, Power supply cable, Operating instructions, Circuit diagram practice board.


**LH-JETROIC 1.5 ELECTRONIC FUEL INJECTION**

Multiple measuring sensors allowing individual measurement of fuel delivered by fuel injectors, Power supply cable, Operating instructions, Circuit diagram practice board, Training films and worksheets, Plug-board cable set, test lamp and storage rack.


**MOTRONIC 1.5 ELECTRONIC FUEL INJECTION/IGNITION TRAINER**

Air boost supply provided by means of high performance speed dependent suction blower, Multiple measuring sensors allowing individual measurement of fuel delivered by fuel injectors, Power supply cable, Operating instructions, Circuit diagram practice board.


**IGNITION SYSTEMS TRAINER STEERING TRAINERS**

Measure the waveforms and check the changes according to RPM speed, Engine operation check the operation of the injector and sparks in the order of switch plugs (1, 3, 4, 2) and inspect whether normal operation of each sensor, Failure code the device allows to inspect failures on purpose.


**DUAL STEERING SYSTEM**

Dual front independent suspension trapezoid–arm type springs, Shock absorber, Sector gear steering box, Drum brake-steering wheel, On Wooden Base, Dimensions: 75x30x50H in cm.


**RACK AND PINION STEERING BOX**

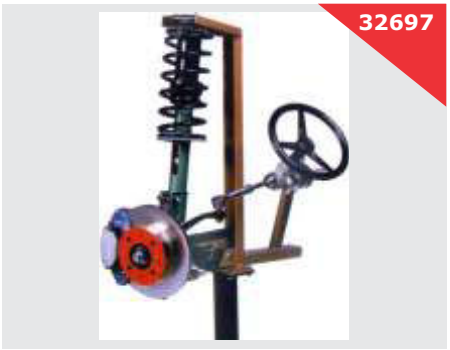
Steering wheel, Rack, Pinion, On Wooden Base, Dimensions: 74x27x35H in cm, Weight: approx. 6 Kg.


**STEERING BOX GROUP**

Worm and Sector, Re-circulating Balls, Worm and Roller, Rack and Pinion Steering Boxes, Stand with Wheels, Dimensions: 80x65x140H in cm, Weight: Approx. 25 Kg.


**STEERING GEOMETRY**

Effect of the JEANTEAUD quadrilateral-camber, Angle of incidence-turning radius, Steering angle-toe-in and toe-out, All real driving conditions can be simulated, An instruction manual is provided for correct use both in theory and practice.




**STEERING SYSTEM WITH MCPHERSON SUSPENSION**

McPherson suspension, Shock absorber, Spring, Rack-and-pinion steering box, Disc brake, Steering wheel, On stand with Wheels.


**FRONT AXLE STEERING, SUSPENSION, BRAKE & TYRES MECHANISM TRAINER**

Adjustment of the wheels and centering of the steering mechanism, Adjustment of castor and camber King pin angle inclination, Wheel alignment toe-in and toe-out.


**FRONT AXLE POWER STEERING TRAINER**

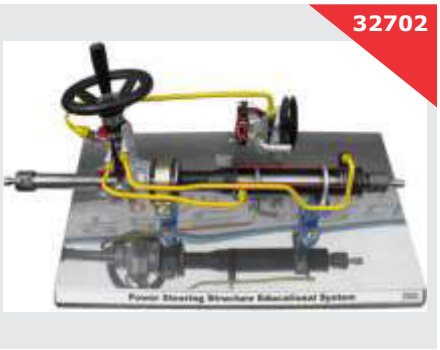
Fully operational Electric power assisted steering and suspension trainer manufactured using Original components, Based on a generic locally available cars, complete with sub-frame, torsion bar, wishbone's, front hub assembly.


**FRONT AXLE THREE TYPES OF POWER STEERING TRAINER**

Jacks fitted beneath the road wheels to load the suspension, Rotating parts covered by mesh guards, Board mounted in a box section frame with castors, Powder coated paint finish.


**FRONT AXLE STEERING GEOMETRY TRAINER**

The training model is built to demonstrate with ease the various angles and positions of the steering wheels as well as the effect geometries when the vehicle is moving, Adjustment of the wheels and centering of the steering mechanism.




**RACK & PINION POWER STEERING BOX**

Oil pump, control valve, and chamber are precisely cross-sectioned for education of structures and the movement of rack and pinion can be clearly seen during operation, Mirror finish stainless steel adjustable base frame.


**RACK AND PINION STEERING BOX**

On Metal Base, Rack, Composed of, Weight: approx. 6 Kg, Steering wheel, Pinion, Dimensions: 74x27x35H in cm.


**POWER STEERING & SUSPENSION EDUCATIONAL SYSTEM**

Steering rack and pinion with power assist, Tilt steering wheel and column assembly, Power steering pump, MacPherson struts, Front wheel assembly, Electric motor and drive, Electric control box.


**RACK & PINION POWER STEERING TRAINER**

Power Steering & Suspension Educational System is able to demonstrate the actual operation and study of steering and suspension system, The system is constructed on a robust chassis mounted on wheels for mobility.


**RACK AND PINION POWER STEERING TRAINER**

To Study Basic rack & pinion steering & recirculation ball steering operating principle, To Study Power steering components operating principal, such as pump, rotary valve, steering arm linkage & hydraulic fluid circuit.

32707

### COMPLEX STEERING GEOMETRY STUDY

To Study the steering geometry is a rational training model allowing easy explanation of the complex steering geometry, provided with active suspension, The wheels can be adjusted separately to emphasize all faults which can occur in a car having front carriage defects.

32708

### FRONT END STEERING & GEARS SYSTEM

Front independent suspension trapezoid-arm type, Shock absorber, Stabilizer, Disc brakes, Linkages, Rack and-pinion steering box, Steering gear, Spring, Steering wheel.

32709

### STEERING, SUSPENSION, BRAKE & TIRES TRAINER

Direct view of the structure, working principle and real-time running status of the system, Data from all sensors can be detected & tested with millimeters & other instruments, Strong, processed with high-temperature spray painting.

32710

### SUSPENSION AND STEERING TRAINING PROGRAM

Explain alignment procedures, Experiment of steering angles and how each affects vehicle handling, Experiment of Diagnose and correct suspension and steering problems, Experiment of Diagnose and service wheels, tyres and wheel bearings.

32711

### ELECTRONIC POWER STEERING TRAINER

Understanding the operating principle and diagnostic test of electronic power steering system, Real-time automobile EPS system is used to illustrate the structure of the system, 3-phase motor drives a booster pump to operate the steering wheel and adjust the speed signal imitation knob.

32712

### CENTRAL MONITORING WARNING SYSTEM TRAINER

The control unit has the task of the continuously monitoring the system and if fault is detected, the corresponding fault indicator lamp is lit, Some control functions (e.g. oil and fuel levels), include a delay time to prevent unnecessary short-term indications.

32713

### AUTOMOTIVE CLUTCH TESTING MACHINE

Determination of Power Transmitted by Single Plate Clutch at different speed & torque inputs, Designed for demonstration of power transmission by frictional clutch, Digital Instruments for measurement of parameters Torque, Input power, RPM.

32714

### COMPUTERIZED IC ENGINE TEST RIGS

Three Cylinder Four Stroke MPFI Petrol Engine 796 cc, Calculation of Mechanical Efficiency & Plot brake power versus mechanical efficiency, Measurement & Calculation of Volumetric efficiency, Measurement & calculation of specific fuel consumption.

32718

### ELECTRICAL-ELECTRONIC SIMULATOR TRAINING SYSTEM

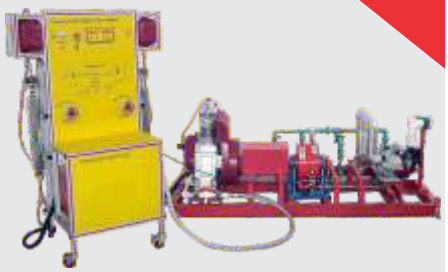
The system provides exhaustive study of electrical circuitry of automotive vehicles, such as starting, ignition, lighting and other electrical system of the car, The simulator is mounted on a working table with intermediate board to hold power supply units.

32719

**SINGLE CYLINDER PETROL / DIESEL ENGINE TEST BED**

Investigate Engine Performance at different Throttle Settings & Load conditions, Calculation of Mechanical Efficiency & Plot brake power versus mechanical efficiency, Measurement & Calculation of specific fuel consumption.

32720



**SINGLE CYLINDER PETROL AND/OR DIESEL ENGINE TEST BED WITH DAQ**

Investigate Engine Performance at different Throttle Settings & Load conditions, Calculation of Mechanical Efficiency & Plot brake power versus mechanical efficiency, Measurement & Calculation of Volumetric efficiency.

32724

**SINGLE CYLINDER PETROL & DIESEL ENGINE TEST BED SCADA**

Investigate Engine Performance at different Throttle Settings & Load conditions, Calculation of Mechanical Efficiency & Plot brake power versus mechanical efficiency, Measurement & Calculation of Volumetric efficiency.

32725

**EXHAUST GAS CALORIMETER**

Calorimeter consisting of finned pipe heat exchanger and insulated tank, Instrumentation 4 temperature sensors, flow meter, Measuring amplifier with digital displays, Connection between engine, Calorimeter using exhaust gas hose.

32726

**BRAKE & CLUTCH MASTER CYLINDER PRESSURE TEST KIT**

Unique Brake & Clutch Master Cylinder Pressure Test Kit measures the pressure of front or back master cylinders, The adapters install directly into master cylinder line access holes.

32727

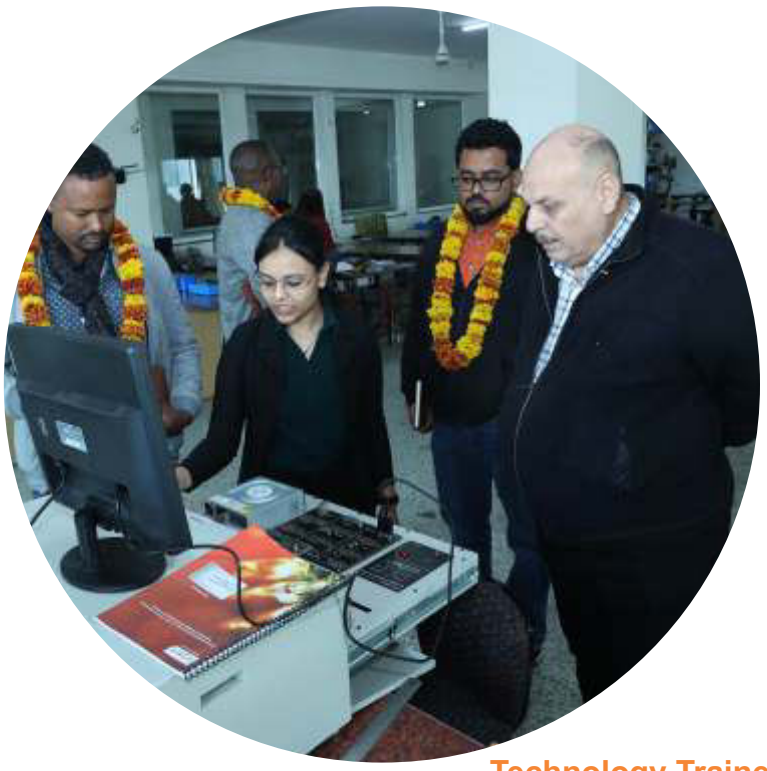
**TABLE-TOP SINGLE CYLINDER PETROL AND DIESEL ENGINE TEST BED W/O DAQ**

Unique Brake & Clutch Master Cylinder Pressure Test Kit measures the pressure of front or back master cylinders, The adapters install directly into master cylinder line access holes.

32728

**TABLE-TOP SINGLE CYLINDER PETROL AND DIESEL ENGINE TEST BED WITH DAQ**

Investigate Engine Performance at different Throttle Settings & Load conditions, Calculation of Mechanical Efficiency & Plot brake power versus mechanical efficiency, Measurement & Calculation of Volumetric efficiency.



| Order Code | Item Name |
|---|---|
| 32729 | Single Cylinder Petrol Engine with Variable Compression Ratio W/O DAQ |
| 32730 | Single Cylinder Petrol Engine with Variable Compression Ratio With DAQ |
| 32731 | Air-cooled Single-cylinder Four-stroke Diesel with Variable Compression Ratio Engine Test Bed W/O DAQ |
| 32732 | Air-cooled Single-cylinder Four-stroke Diesel with Variable Compression Ratio Engine Test Bed With DAQ |
| 32733 | Single Cylinder 4 Stroke Asynchronous Start Petrol Engine Test System W/O DAQ |
| 32734 | Single Cylinder 4 Stroke Asynchronous Start Petrol Engine Test System With DAQ |
| 32735 | Single Cylinder 2 Stroke Petrol Engine With DAQ |
| 32736 | Single Cylinder 2 Stroke Petrol Engine Without DAQ |
| 32737 | 4 Stroke 4 Cylinder Petrol Engine Test Bed With DAQ |
| 32738 | 4 Stroke 4 Cylinder Petrol Engine Test Bed Without DAQ |
| 32739 | 4 Stroke 3 Cylinder Petrol Engine Test Bed With DAQ |
| 32740 | 4 Stroke 3 Cylinder Petrol Engine Test Bed Without DAQ |
| 32741 | 4 Stroke 4 Cylinder Diesel Engine Test Bed With DAQ |
| 32742 | 4 Stroke 4 Cylinder Diesel Engine Test Bed Without DAQ |
| 32743 | 4 Stroke 4 Cylinder Diesel Engine Test Bed With DAQ |
| 32744 | 4 Stroke 4 Cylinder Diesel Engine Test Bed Without DAQ |
| 32745 | 4 Stroke 1 Cylinder Diesel Engine Test Bed With DAQ |
| 32746 | 4 Stroke 1 Cylinder Diesel Engine Test Bed Without DAQ |
| 32747 | 4 Stroke 2 Cylinder Diesel Engine Test Bed With DAQ |
| 32748 | 4 Stroke 2 Cylinder Diesel Engine Test Bed Without DAQ |
| 32749 | 4 Stroke 1 Cylinder Petrol Engine Test Bed With DAQ |
| 32750 | 4 Stroke 1 Cylinder Petrol Engine Test Bed Without DAQ |
| 32751 | Universal Brake & Drive Unit |
| 32752 | CRDi Diesel Engine Fault Simulator With DAQ |
| 32753 | CRDi Diesel Engine Fault Simulator Without DAQ |
| 32754 | CRDi Diesel Engine Automatic Transmission Trainer With DAQ |
| 32755 | CRDi Diesel Engine Automatic Transmission Trainer Without DAQ |
| 32756 | CRDi Diesel Engine Fault Simulation Trainer With DAQ |
| 32757 | CRDi Diesel Engine Fault Simulation Trainer Without DAQ |

# BIO-MEDICAL TRAINERS

We have a special range for Biomedical Engineering Institutes to provide detailed learning for their students. In this segment students can get hands on practice and can understand complete technology behind the working of major instruments used in Biomedical Sector like Blood Pressure (BP) Measurement Trainer | Pulse Rate Meter Trainer | Respiration Rate Monitor Trainer | Phono cardiograph Trainer | Electro Encephalogram (EEG) Trainer | Electro Myograph (EMG) Trainer | Electrocardiogram (ECG) Simulator Trainer | Heart Rate cum ECG Monitor Trainer | Bio Medical Instrumentation Trainer covering all in one set up.




**DC SUPPLY**

Study of Placement of Electrodes. Measuring the electrical activity generated by the heart, Different Lead combination. Study of normal ECG waves, intervals and segments, The waves an ECG include the P wave, Q wave, R wave, S wave, T wave & signal processing Placement of Electrodes.


**ECG AMPLIFIER 12 LEADS SELECTOR**

Measuring the electrical activity generated by the heart, Different Lead combination I, II, III, aVR, aVL, aVF, V1 to V6 Chest lead, tudy of normal abnormal ECG waves.


**ECG AMPLIFIER 3 LEAD WITH HEART RATE + HI-LO**

To Study Measuring the electrical activity generated by the heart R wave Detection, To Study Heart Rate Measurement, Study of arrhythmias & signal processing, Placement of Electrodes, Amplification.


**ECG AMP.12 LEADS SELECTOR +USB BIOWAVE**

To Study Measuring the electrical activity generated by the heart, To Study Different Lead combination lead, Study of normal abnormal ECG waves.


**ECG AMPLIFIER 3 LEADS WITH PLETHYSMOGRAPH**

Study of Measuring the electrical activity generated by the heart wave Detection, Study of Heart rate Pulse Measurement, Study of PPG Signal & signal processing, Placement of Electrodes, Amplification, Filters, Gain, Self test.


**EEG AMPLIFIER 3 LEAD ELECTRODES**

EEG (Electroencephalography) Real Time 3 Lead amplifier trainer kit, EEG output to DSO through 4mm socket, Test Point on the top of Instrument, Amplifier available with & without USB connectivity, Study of eye & Brain activity & signal processing.


**EEG AMPLIFIER 10-20 METHOD SINGLE 1CH.**

Study of electric potentials generated by the Brain, Study of patterns as Beta, Alpha, Theta, and Delta, Study & Analyses of Neurology & signal processing Placement of Electrodes 10-20 Method, Amplification, Filters, Gain, Self-Test & Frequency responses.


**EEG AMPLIFIER 10-20 WITH USB +BIOWAVE**

Study of Brain activity & signal processing, Power Supply 230 ±10%, 50Hz, Dimensions 305 X100 X 250 mm±, EEG DSO & USB output through 4mm socket & USB.


**EOG AMPLIFIER 3 LEAD ELECTRODES**

Study of electric potentials generated by the eyes movements of a stationary subject, Detection Moment Right, Left, Up & Down. Study of Pick voltage & Duration of Moments & signal processing.


**EOG AMPLIFIER 3 LEAD WITH USB +BIOWAVE**

Study of electric potentials generated by the eyes movements of a stationary subject, Detection Moment Right, Left, Up & Down, Study of Pick voltage & Duration of Moments & signal processing Placement of Electrodes, Amplification, Filters, Gain, Self test, Voltage & Frequency responses.


**EMG AMPLIFIER 3 LEAD WITH AUDIO**

Bipolar Real Time EMG Amplifier 3 Lead with Audio Trainer, Real time EMG wave measurement, Unipolar & Bi-polar Mode Disc Electrodes with Velcro & Disposable Electrodes, EMG & Self Test Mode, Gain & Test adjustable. DSO output through 4mm sockets Audio output CW 1wat ±.


**EMG AMPLIFIER 3 LEAD WITH SIMULATOR**

Study of electric potentials generated by the muscles, muscle activity, Nerve Conduction Velocity, Muscle feedback, Muscle strength & signal processing Placement of Electrodes, Amplification, Filters, Gain, Self test, Voltage & Frequency responses, Simulator.


**EMG AMPLIFIER 3 LEAD WITH STIMULATOR**

Bipolar Real Time EMG Amplifier 3 Lead with Stimulator Trainer Kit, Study on EMG Amplifier 3 Lead with Stimulator, Power Supply 230 V, 50Hz, Dimensions 305 X100 X 250 mm±, Disc Electrodes with Velcro & Disposable Electrodes.


**EMG BIOFEEDBACK 3 LEAD**

Bipolar Real Time EMG Biofeedback 3 Lead Trainer, EMG & Self Test Mode, Gain, Threshold & Audio adjustable, Disc or disposable Electrodes with Velcro.DSO output through 4mm socket, Audio output CW 1wat ±. Test Point on Top of Instrument.


**EMG AMPLIFIER WITH USB + BIOWAVE**

EMG & Self-Test Mode, Gain & Test adjustable. USB & DSO output, Audio output CW 1wat ±., Test point on the top of instrument 2mm Sockets, Power Supply 230 V, 50Hz. Dimensions 305 X100 X 250 mm±, Disc Electrodes with Velcro & Disposable Electrodes.


**PCG AMPLIFIER WITH 5 FILTER**

Phonocardiogram Amplifier with 5 Filter Trainer Kit, Real time amplified PCG output up to 15Vpp±, PCG Transducer. Adjustable Gain & Adjustable Audio with Head Phone. Rotary switch to select 5 positions Filter, Filter Range 25Hz to 1400Hz±, Heart beat indication. Output PCG through 4mm socket. Test points.


**AUDIOMETER**

Tests both the intensity and the tone of sounds, balance issues, and other issues related to the function of the inner ear, also measure ability to discriminate between different sound intensities, recognize pitch, or distinguish speech from background noise.


**HEAT RATE INDICATOR LED**

Heart rate the number of heart beats per minute, Study of Heart Rate, Finger Optical transducer, signal processing, Placement of Electrodes, Amplification, Filters, Gain, Comparator, Frequency to Voltage Converter, Voltage & Frequency responses.


**HEAT RATE INDICATOR LCD MICROCONTROLLER**

Real Time Finger Heart Rate Monitor, Finger Plethysmograph, Pulse Monitor, Visible & Audible indication DSO output through 2mm socket, Monitor with using Microcontroller, LCD Display 16 X 2, Key Board 4x1 matrix.


**RESPIRATION RATE METER LED**

Real Time Respiration Rate Monitor, Display 3 Digit, 7 Segment LED Display, Piezoelectric Transducer, Output up to 5Vpp±, Real time wave measurement, DSO output through 4mm socket, Test point on the top of instrument.


**RESPIRATION RATE LCD-MICRO APNEA MONITOR**

Respiration Rate Monitor Trainer using Microcontroller, Real Time Respiration Rate Monitor, LCD Display 16 X 2, Key Board 4x1 matrix, Piezoelectric Transducer, Output up to 5Vpp±, Output Rate Pulse, Tachypnea and Apnea indicator, Self-Test.


**PRESSURE AMPLIFIER**

Display 3 Digit, 7 Segment LED Display or LCD Display, Air Pressure Transducer, Input from Mouth or Air Pump, Microcontroller with 16x2 LCD Display.


**PHYSIOGRAPH 6 CHANNEL (WITHOUT AMP.)**

Real Time AD C, 6 Channel USB Trainer Kit, 6 Analog Inputs through 3 pin connectors, 6 channel USB interfacing physiograph Trainer Kit, Amplified output to PC through USB.


**PHYSIOGRAPH ECG, EEG , EMG (3 AMPLIFIERS)**

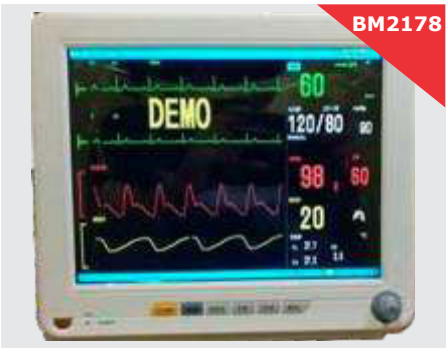
EEG (Electroencephalography) Real Time 3 Lead amplifier trainer kit, EEG output to DSO through 4mm socket, Test Point on the top of Instrument, Amplifier available with & without USB connectivity, Study of eye & Brain activity & signal processing.


**PHYSIOGRAPH ECG/EEG/EMG/PCG-USB BIOWAVE**

Study of ECG, EEG, EM G, PCG. Study Signal Processing & Graph, Close, Exit, Offset Setting, Voltage, Time & Frequency measurement, Signal Values in Excel, Multicolour Signal Wave, Capture the signal & put on PC screen, Signal Store, Print, Open, Save As, Start, Responses of Subject.


**PHYSIOGRAPH ECG/EEG/EOG/EMG/PCG/GSR/RR M/PMG/TEMP(ANY 6CH)-USB**

Indigenous Digital Student Physiograph, It is Compact light weight and easy to operate by a beginner. , On screen 6 channels select. By external switching can be set up to Input 9 Signal, Unit having PC Interfacing's USB output.




**PATIENT MONITOR**

Patient Monitor ECG/Sp02/BP Patient Monitor, high quality "Multi Parameter Monitor" 12 inch Five Standard parameters like ECG, RESP, NIBP, SPO2, TEMP, PR/HR.


**BABY INCUBATOR MICROCONTROLLER**

Using microcontroller, Supply 230V/ 50Hz, Test point in the front panel of instrument, Dimension 600 X 300 x 500mm±, Two Sensor, Body & Canopy Temperature Sensor.


**BLOOD PRESSURE MONITOR(BP) (ONLY DIGITAL)**

Blood pressure measurement Trainer, Automatic Air Release Valve, LCD Display, Test points AC & DC air pressure, Compressor, Valve.


**BP CAL & MEASUREMENT**

Study of BP Measurement using different technique, Study of Sphygmomanometer, Aneroid (Dial), Digital Bp Apparatus, Compare the pressure sensitivity, Readings, Stability, Accuracy, Effect of applied pressure on Blood Flow.


**BLOOD FLOW MEASUREMENT ULTRASONIC**

Ultrasonic Blood Flow Measurement Trainer Kit, Transducer Piezoelectric Doppler Type, Audio & visible indication, Control Audio & Output Control, Output audio Head Phone & speaker, Power Supply 230V / 50Hz, Dimension 250 x 75 x 250 mm.


**BLOOD CELL COUNTER**

Blood Cell Counter Demonstration Type Trainer Kit for Electrodes, Vacuum Socket, Indication Zero position, start Wait, End process Threshold control for Trigger the samples, Barker, Test Tube, BNC or EP Socket Blood Cell, Red Blood Cell, Haemoglobin, PCV, MCV, MCH, Mean Cell.


**SOLID STATE ELECTRO SURGERY 250W / 500W**

Study of Solid State Electro Cautery Machine, Study of Principal & Operating Procedure, Study of Electrodes, Mono-polar & Bipolar, Pencil Switch, Foot Switch.


**SHORT WAVE DIATHERMY (VALVE TYPE)**

Heat generation through short wave diathermy, Study of molecular activity within the tissue exposed, Differential heating is noted within bone, muscle and fat, Heat stimulation to superficial nerve endings.


**LONG WAVE THERAPY**

Study of Operation Principal of Long Wave Diathermy machine, Study of effect on Body of Diathermy, Study advantages & disadvantages of Long Wave Diathermy & other Physiotherapy Machine, Study of placement of Electrodes.


**TNS MINI**

Study of TENS operating, Study effect of TENS on Body, Study of Different frequency & its effect, Study of output signal, Study of Placements of Electrodes, Study of different models & it's applications.


**NERVE AND MUSCLE STIMULATOR**

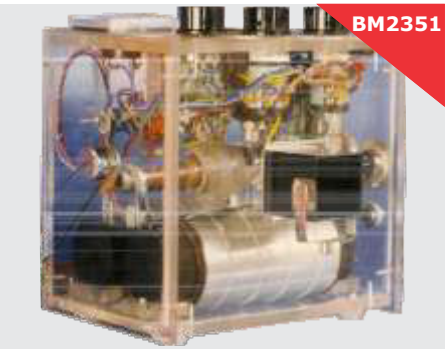
Study of Normal Activity & after Stimulation activity of Muscle, Study of Intensive Galvanic (IG) & Search Faradic (SF) Signal, Study of Signal Duration & Effect on object, Study of Muscle activity using EMG & Stimulator, Study of Block Diagram, Study Signal Generation.


**ULTRASONIC THERAPY 1MHZ**

Digital or Microprocessor based digital model, Digital treatment timer, Timer 0 to 15 Minutes, Select the Mode Pulse & Continues, LCD/Digital Display, Key for Select the parameters, Operating Frequency 1MHz & 3 MHz, Continuous 15 Watts ±/ cm2, Pulse 21 Watts±/cm2.


**INTERFERENCE THERAPY MICROCONTROLLER**

Study of basic principle of Interferential Therapy, Study of what is physiological effects of low frequency electrical stimulation of nerves, Study of effect of IFT & other Therapeutic instruments, as TENS and IFT.




**IR/RED/BLUE/ IR-RED THERAPY 500MW**

Power supply-230 V / 50Hz, 5 Amp, X-RAY System-Demonstration, X-RAY Generation-Simulation, using dummy X-RAY tube, X-RAY tube - Dummy tube with visible radiations to simulate X-RAY.


**DIGITAL VIBROSENSE**

Study of Placement of Transducer, Measuring the electrical activity generated by the Transducer, Study of Human Body Vibration sensitivity, Study of Diabetic Patient & Normal Person, Study of Sensitivity of Human Body.


**ECG SIMULATOR PORTABLE**

Compact & Portable, 12 Lead 4 Arrhythmia - Bradycardia 30, Normal 60, 100, Tachycardia 120, Standard PQRST Waveform, Feather Touch Arrhythmias selection, LED indicates for each Arrhythmia, 10 Leads- RA, LA, RL, LL, & V1-V6 with Universal Sockets.


**ECG SIMULATOR TABLE MODEL**

Normal 60, 90, Bradycardia, Tachycardia, Ventricular Tachycardia, Artial Fibrillation, Pacid Arrhythmia, Missed Beat, Fusin Beat, R on T, Ventricular Fibrillation, Asystol, Pulse, Universal Output Sockets for Button & 4mm Pin.


**ECG ARRHYTHMIAS SIMULATOR 12L,15A**

Compact & Portable, 12 Lead 15 Arrhythmia-Normal 60, 90, Bradycardia, Tachycardia, Ventricular Tachycardia, Artial Fibrillation, Pacid Arrhythmia, Heart Block, Bigminy, Missed Beat, Fusin Beat, R on T, Ventricular Fibrillation, Asystol, Pulse.


**EEG SIMULATOR**

Testing & Calibration of EEG Machine, Study of Signal Patterns, Normal rhythms, Adjustable rhythms, Rhythms Selection, Delta (d), Theta (f), Alpha (a), Beta (b), Gamma (g), Amplitude adjustable 0 to 10mV±.


**EMG SIMULATOR**

EMG Simulator 3 Lead Educational Trainer kit, Testing & Calibration of EMG related Instruments or System, Multiple Patterns gradation by Conduction (Voltage) & Frequency knob, Output 0 to 10mV, For Differential Output Button type Male connector.


**BIO-SIGNAL SIMULATOR ECG/EEG/EMG/HR**

Bio-signal Simulator with four Parameter, Calibration & Testing of ECG, EEG, EMG Instruments, Pulse output for Heart Rate or Respiration, Select 3 Parameters or any one by Selector switch.


**D.C. DEFIBRILLATOR USING MICROCONTROLLER**

Study of Defibrillation technique, How to use in emergency, Study of an electrical shock to reset the electrical state of the heart so beat to a rhythm controlled by its own natural cells, Study of Different Block & output at test point.


**D.C. DEFIBRILLATOR WITH SIMULATOR**

Study of Defibrillation technique, How to use in emergency, Study of an electrical shock to reset the electrical state of the heart so beat to a rhythm controlled by its own natural cells, Study of Different Block & output at test point.


**D. C. DEFIBRILLATOR SIMULATOR**

Work as dummy Patient, Output ECG 0 to10mV ±Adjustable, Pulse 9V±, ECG Output RA, LA, RL, Output to ECG amplifier, Normal & three rhythms, Adjustable Threshold.


**IMPLANTABLE PACEMAKER**

Study of Pacemaker working. Study & need of Mode Internal External, Study of Placement of Electrodes, Study of Demand & Fixed Mode, Study of Signal Processing, working of each Block


**PACEMAKER WITH SIMULATOR**

Study of Pacemaker working, Study & need of Mode Internal External, Study of Placement of Electrodes, Study of Demand & Fixed Mode using Simulator. Study of Simulator, Study of Signal Processing, working of each Block.


**PACEMAKER SIMULATOR**

Study of Signal pattern of Patients AV Block, Bradycardia, Tachycardia, Study Dummy Heart, Testing & Calibration of Pacemaker using Simulator, Study of Demand & Sync Mode.


**MEDICAL TELEMETRY PULSE SIGNAL HRI / RRM**

Study of Defibrillation technique, How to use in emergency, Study of an electrical shock to reset the electrical state of the heart so beat to a rhythm controlled by its own natural cells, Study of Different Block & output at test point.


**MEDICAL TELEMETRY ANALOG SIGNAL ECG**

Study of Transmitter & Receiver, Study of Effect of Range, Study of Transducer, Study of Signal Processing, Instrumentation Amplifier, Filter High Pass & Loaw Pass, Notch Filter Amplifier.


**MEDICAL PATIENT SAFETY MEASUREMENT**

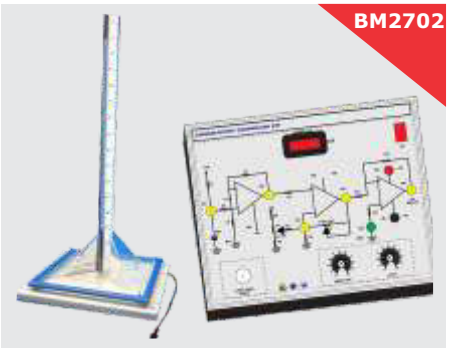
Study of Safety Measurement, Testing of Transformer open, short, Electrodes Testing, Body Conductivity or Insulation Measurement with Mains Supply, Wire Testing, Frequency & Voltage Response of ECG, EEG, EMG Machine.


**HEMO -DIALYSES MACHINE**

Study of Hemodialysis Machine, Study kidney, Study of Blood pump, Measure the Maximum & Minimum Speed of Blood Pump with & without load, Study Flow Dialysate & Blood Flow, Study of Detectors.


**HEART-LUNG BY PASS MACHINE**

Study of Heart Lung Machine, Study of Reservoir & Oxygenator, Study of Temperature Control & PT100 sensor, Study of Blood Pump & Flow rate, Study of Blood Bubble Detector & Blood Leak Detector.




**PIEZOELECTRIC TRANSDUCER KIT**

Study of measurement of Piezoelectric Transducer, Effect of zero adjust & Gain adjust, Determination of Linear Range of Operation, Determination of Sensitivity / Repeatability of the system.


**LOAD CELL TRANSDUCER KIT**

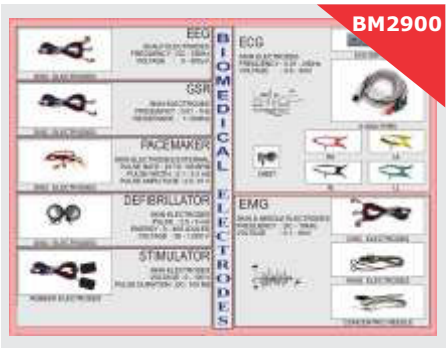
Study of measurement of load using Load Cell Effect of zero adjust & Gain adjust, Determination of Linear Range of Operation, Determination of Sensitivity / Repeatability of the system RL, LL, & V1-V6 with Universal Sockets.


**LVDT TRANSDUCER KIT**

LVDT Full Stroke : + 10 mm range, Actual Displacement : By Micro meter arrangement, Pitch: 1 mm, Circuit : AC Excitations Source, Phase detector & digital display, Excitation Source : Sine wave of 2 KHz to 5 KHz variable frequency and 0 to 3V variable amplitude.


**ELECTRODES DISPLAY BOARD**

ECG, EEG, EMG Disc Electrodes, EMG Ring, EMG Needle, Defibrillator, Pacemaker, Stimulator, GSR, IFT.




**TRANSDUCER DISPLAY BOARD**

Heart Rate, Respiration, Sp02, PCG, Plethysmograph, IR, Spiro meter, Fetus Doppler, Temperature Pt100, Thermocouple, Thermostat, Aluminum powder coated Frames, Acrylic Front, Approximately Size 42 x 30 x 4 inch (3.5 x 2.5 x 0.75 Feet).



# Test & Measurement Instruments

We offers a wide range of Test & Measurement Instruments to full fill the needs of proper and accurate calculations while working in a laboratory or industry. In our range we have AC/DC Power Supplies | Analog Oscilloscopes | Digital Storage Oscilloscopes | DDS Function Generators | Arbitrary Waveform Generators | Frequency Counters | Multimeters | Clampmeters | Power Quality Analyzers | Analoge Portable Voltmeters | Ammeters | PF Meters | Wattmeters | Rheostats | Ohmmeters | Decade Resistance Box | Conductance Box | Inductance Box | LCR Meters | Lux Meters | Tachometers | IC Testers | Infrared Thermometers | Spectrum Analyzers | Etc.




Waveform

16913

**COLOUR PATTERN GENERATOR**

Type of Patterns : Vertical Bras, Horizontal Bras, Dots, Circle White, Multi Colour Colour Pattern : White, Red, Green, Blue, Black, Yellow, Magenta, Cyan, Sound Signal-Frequency : 5.5 Mhz Video Carrier Frequency modulated by 1KHz internally 50 Khz sweep, Colour Signal : 4.43 Crystal controlled

16984


**DIGITAL TACHOMETER - NON CONTACT TYPE**

Microcomputer and advanced semiconductor laser technology are used for fast and highly accurate measurement, The non-contact meter analyses laser beam reflected off a rotating object into the meter and converts it into RPM value, the laser reflection is eyeable for easy object locating.

16985

**DIGITAL TACHOMETER - CONTACT TYPE**

Microcomputer technology is used for fast and accurate measurement, Memory button recalls the last, Min and Max values during measuring period, Wide measuring range, high resolution and high reliability, Measurements can be read as RPM, meters /min or feet/ min, Auto zero adjustment.

16986

**DIGITAL TACHOMETER - CONTACT + NON CONTACT TYPE**

LCD display with backlight, High resolution measurement, CC/CP/CR mode, Over voltage/ current/ power/ heat/ polarity reversion protection, 10 steps program, Can be controlled by PC, Can be connected in parallel, Data storage protection in power down.

AM-890

**ANALOG MULTIMETER**

Analog Multimeter with Mirror Scale, Inbuilt Buzzer and LED, 0W Ajustment with x100 Range, Transistor Test, hFE with Diode, Heavy ABS Housing plus compact protective holster alongside, High input impedance 20 Kohm/DCV, 9 Kohm/ACV, Dry Battery Test, Continuity Buzzer Test.

AWG-1011F

**ARBITRARY WAVEFORM / FUNCTION / SIGNAL GENERATOR**

Advanced DDS technology, upto 10MHz frequency output, 125MS/s sample rate, and 1μHz frequency resolution, Vertical Resolution : 14 bits, and 8K arb waveform length, Comprehensive waveform output : 5 basic waveforms, and 45 built-in arbitrary waveforms, Comprehensive modulation functions : AM, FM, PM, FSK, Sweep, and Burst

AWG-1022F

**ARBITRARY WAVEFORM / FUNCTION / SIGNAL GENERATOR**

Advanced DDS technology, 25MHz frequency output, 125MSa/s sample rate, and 32 bits frequency resolution, Vertical Resolution : 14 bits, 8K arb waveform length, Comprehensive waveform output : 5 basic waveforms, and 26 built-in arbitrary waveforms.

AWG-3102

**ARBITRARY WAVEFORM FUNCTION SIGNAL GENERATOR**

Max 250MHz frequency output, Max 1.25GS/s sample rate, and 1μHz frequency resolution, Vertical Resolution :14 bits, max 1M arb waveform length, Comprehensive waveform output : 6 basic waveforms, and 152 built-in arbitrary waveforms.

CM-1500

**LCR / CAPACITOR / TRANSISTOR METER CAPACITOR METER**

The Handheld Instrument can detect as well as measure Capacitance, Resistance and Diode automatically. Also the instrument self discharges the Charged Capacitor before measure-ment.

CRO-1016B

**CATHODE RAY OSCILLOSCOPE 10 MHZ.**

The simple control panel is similar to an analogue oscilloscope, Bandwidth : 10MHz, Sample rate : 100MS/s, 1-Channel, 130,000 wfms/s waveform capture rate, easily capturing exceptional and low probability events, 3.7" Colored LCD, Compact case.

DMM-1041


**DIGITAL MULTIMETER SEMI BENCH DMM,55000 COUNT**

3.5 inch (480x320) high resolution LCD 55000 counts, DC voltage accuracy up to 0.05% Up to 60 readings per second, True RMS AC voltage / current measurement, Dual line display supported, Trend analysis accessible in chart mode, SCPI support, Models available in AC powering.

DMM-3051


**DIGITAL MULTIMETER BENCH DMM , 5.5 DIGIT**

4 inch 480 x 320 pixels high resolution LCD, Resolutions up to 5 1/2 digits, Reading rates up to 150 readings/s, True RMS AC voltage / current measurement, Dual line display supported, The change trend analysis accessible via special chart mode, SCPI supported - remote control, and data-sharing.


**DIGITAL STORAGE OSCILLOSCOPE 20 MHZ.**

Bandwidth : 20MHz - 100MHz, 2-Channel, Sample rate : 100MS/s - 1GS/s, Ultra-thin body, 7 inch high resolution LCD, SCPI, and LabVIEW supported.


**DIGITAL STORAGE OSCILLOSCOPE 50 MHZ.**

Bandwidth : 20MHz - 100MHz, 2-Channel, Sample rate : 100MS/s - 1GS/s, Ultra-thin body, 7 inch high resolution LCD, SCPI, and LabVIEW supported.


**DIGITAL STORAGE OSCILLOSCOPE 100MHZ.**

Bandwidth : 20MHz - 100MHz, 2-Channel, Sample rate : 100MS/s - 1GS/s, Ultra-thin body, 7 inch high resolution LCD, SCPI, and LabVIEW supported.


**DIGITAL STORAGE OSCILLOSCOPE, 200 MHZ.**

Bandwidth : 20MHz - 200MHz, 2-Channel, Sample rate : 100MS/s - 1GS/s, Ultra-thin body, 7 inch high resolution LCD, SCPI, and LabVIEW supported.


**DIGITAL STORAGE OSCILLOSCOPE 60 MHZ.**

Digital Storage Oscilloscope 60 MHz., 2CH ,1GS/s, 25MHz. AWG, Multimeter, TouchScreen, VGA, USB Software.


**DIGITAL STORAGE OSCILLOSCOPE 60 MHZ.**

Digital Storage Oscilloscope 60 MHz. , 4CH, Coloured LCD 8 ", 1GS/s, USB Software.


**DIGITAL STORAGE OSCILLOSCOPE 100 MHZ.**

Digital Storage Oscilloscope 100 MHz. , 4CH, Coloured LCD 8 ", 1GS/s, USB Software.


**DIGITAL STORAGE OSCILLOSCOPE 30 MHZ.**

Ultra Thin: min 7cm, Super Light: 1.8kg, Sharp View: 8" Color LCD, Storage Depth: Max 10M, Display Extension: SVGA Output 6. LAN: Network Data Sharing.


**DIGITAL STORAGE OSCILLOSCOPE 60 MHZ.**

Ultra Thin: min 7cm, Super Light: 1.8kg, Sharp View: 8" Color LCD, Storage Depth: Max 10M, Display Extension: SVGA Output 6. LAN: Network Data Sharing.

DSO-7102

**DIGITAL STORAGE OSCILLOSCOPE 100 MHZ.**

Bandwidth : 60MHz - 300MHz with dual-channel, Sample rate : 500MS/s - 3.2GS/s, 10M record length for each channel, Smart design with easy portability, Large 8 inch 800 x 600 pixels LCD, LAN remote control, Multi-function : auto-scale, Pass / Fail, current-measuring, and digital filtering.

DSO-8202

**DIGITAL STORAGE OSCILLOSCOPE 200 MHZ.**

Bandwidth : 60MHz - 300MHz with dual-channel, Sample rate : 500MS/s - 3.2GS/s, 10M record length for each channel, Smart design with easy portability, Large 8 inch 800 x 600 pixels LCD, LAN remote control, Multi-function : auto-scale, Pass / Fail, current-measuring, and digital filtering SCPI, and LabVIEW supported.

FC-3165

**FREQUENCY COUNTER DIGITAL**

8 Digits Green LED Display, Selective Range, High Stability, Two Channels, Operation mode memory, Range and Gate time adjustable, Power Supply : AC 220V, +10%.

FG-1001

**DIGITAL FUNCTION GENERATOR**

Frequency range : 0.1Hz to 1MHz in Six ranges, Wave forms : Sine, Square and Triangle and TM output, Output amplitude : 0-20V peak to peak for Sine, Triangle, 0-15V peak to peak for Square, DC Offset : ±10V with adjustable to 0V, Power Supply : 220volts /50Hz, -10%.

FG-1515

**DDS FUNCTION GENERATOR 15 MHZ.**

Function Generator can generate multiple waveforms such as sine wave, square wave, triangle wave, pulse wave, and arbitrary wave. The frequency range up to 15MHz with duty cycle adjustment, sweep frequency, frequency signal frequency and counter function, and the output signal, amplitude, and frequency can be simultaneously.

FG-2002

**FUNCTION GENERATOR DIGITAL, 2 MHZ.**

The Table Top Function Generator is capable of Multi Signal i.e. Sine, Triangle and Square with Amplitude Control. Triangle and Square with Amplitude Control.

LCR-301

**LCR / CAPACITOR / TRANSISTOR METER LCR BRIDGE METER**

Any loss factor in capacitor or inductor does not affect measurement. It has a FUNCTION switch to select resistance (R) inductance (L) or capacitance ©. Measurement with this is as simple as with a multi-meter.

LCR-4070

**LCR / CAPACITOR / TRANSISTOR METER LCR METER**

A LCR meter (Inductance (L), Capacitance (C), and Resistance is a piece of electronic test equipment used to measure the inductance, capacitance and, resistance of a component. In the usual versions of this instrument these quantities are not measured directly, but determined from a measurement of impedance.

LCR-8C

**LCR / CAPACITOR / TRANSISTOR METER LCR METER**

Useful for measurement of winding inductance and resistance of coil, transformer, motors, wires, cables, relays, chokes etc. and capacitance of capacitors, wire, cables etc. Superior performance employing LSI IC's. Instant values of D factor measurement, cover wide measurement range 0.1mH - 2000H,

MSO-7072TD

**MIXED SIGNAL DIGITAL OSCILLOSCOPE 60 MHZ.**

2 in 1(DSO LA), 8 inch LCD color display, Support USB for data transmission to PC, USB Flash Disk Storage, 20 Automatic measurements, Max.2M record length, Slope trigger and pulse trigger added.

MSO-7102TD

**MIXED SIGNAL DIGITAL OSCILLOSCOPE 100 MHZ.**

2 in 1(DSO LA), 8 inch LCD color display, Support USB for data transmission to PC, USB Flash Disk Storage, 20 Automatic measurements, Max.2M record length, Slope trigger and pulse trigger added.

PC-1021

**PC DIGITAL OSCILLOSCOPE 25 MHZ., PEN TYPE**

25MHz bandwidth, 100MS/s sample rate, 5K record length, Human engineering design, Multi- action mode via creative trackball, Multi- trigger option edge, slope, and pulse, 5mV micro signal supported, USB bus powering, and optional USB isolation function.

PC-1022

**PC DIGITAL OSCILLOSCOPE 25MHZ.**

25MHz bandwidth, and 100MS/s real-time sample rate, 2-channel 1 multi-channel (aux.), 5K record length, Friendly UI : FFT, or X-Y, and waveform 2 views displayed on the same screen, Multi-trigger option: edge, video, slope, pulse, and alternate, USB bus powering, and LAN remote control (optional).

PPS-3033


**PROGRAMMABLE DC POWER SUPPLY**

Power Supply Programmable DC, 4" Coloured LCD, 3 Ch., 2*0-30V/3A, 1*0-6V/3A, USB Software.

PPS-4305

**PROGRAMMABLE DC POWER SUPPLY**

Small body for easy carry, 180W maximum output power, High resolution%uFF1A 1mV / 1mA, Low ripple/noise, Over voltage/over current protection, Multi-directional cooling system with smart fan, 3.7 inch TFT LCD display, Support RS232 digital communication, Support SCPI and Labview.

PS-3002


**POWER SUPPLY DIGITAL 30V DC**

DC Regulated Power Supply is an easy to use, low ripple high regulation precision instrument. It is particularly suitable for experimental development and low voltage applications. Its unique feature is over load protection, which makes it a safe power source for testing of electronic equipment.

SA-1015TG

**SPECTRUM ANALYSER WITH TRACKING GENERATOR 1.5GHZ.**

Frequency Range from 9 kHz up to1.5 GHz, 150dBm Displayed Average Noise Level, Phase Noise -82dBc/Hz @1Gz and offset at 10KHz, Total Amplitude Accuracy <1.5dB, 10Hz Minimum Resolution Bandwidth (RBW), EMI Pre-compliance Test Kit.

SA-1036TG

**SPECTRUM ANALYSER WITH TRACKING GENERATOR 3.6GHZ.**

Frequency Range from 9 kHz up to 3.6 GHz, 150dBm Displayed Average Noise Level, Phase Noise -82dBc/Hz @1Gz and offset at 10KHz, Total Amplitude Accuracy <1.5dB, 10Hz Minimum Resolution Bandwidth (RBW), EMI Pre-compliance Test Kit, Up to 3.6 GHz Tracking Generator Kit.

SM-1021M-N

**FSCOPE - METER HANDHELD SCOPE, 20 MHZ., 1CH**

Autoscale, 20 Automatic Measurements, 2 in 1(DSO Multimeter), Single channel, Bandwidth: 20MHz, Support USB for data transmission, TFT true color display(65535 colors), Replaceable li-ion battery back up (6 hours).

SM-1022M-N

**SCOPE - METER HANDHELD SCOPE, 20 MHZ., 2CH**

2 in 1 (DSO Multimeter), Auto-scale function, FFT function, 20 group automatic measurement options, Bandwidth : 20MHz, USB data transmission supported, Rechargeable Li-ion battery (6 hours' backup), Waveform record and replay, Multimeter newly supported SCPI.

SMD-1098

**SMD TWEEZER METER, RESISTANCE , CAPACITANCE, DIODE WITH PROBE**

The Meter is a handheld and battery operated very convenient small Tool, that is specially used to measuring SMD(Surface Mounting Device),there are resistor, Capacitor, Diode, Zenger and LED, Moreover, the Meter have the continuity checking function And MAX DC 36V Measurement.

16974

**LOW TENSION AC/DC POWER SUPPLY WITH VOLT & CURRENT METER**

Low Tension AC / DC Variable Power Supply. Output Voltage can be easily varied with the help of a Variac. Power Supply can be used for variety of applications like in Education, Engineering, Telecommunication, Industrial Electronics, Nuclear Sciences, Analogue and Digital Computers, etc...


19002

**DECADE RESISTANCE BOXES SIX DIALS**

Decade Resistance Box are precision instruments intended for general laboratory use, R&D and educational purposes. These are used as a multiplier, shunt, substitution resistor, or as an arm for AC or DC bridges. Metal Film Resistor Accuracy : ± 1%, Power rating: 1Watt, Maximum Working Voltage : 500 Volts.

Work Station ESD
Safe -120 x 60 x 180 cm

Work Station Table

Work Station ESD
Safe -120 x 60 x 150 cm

Component Organiser -
25 Drawers

Electronics Work Bench

Electrical Work Bench



On - Grid Solar Power Plant

All in One Solar Light

Solar Street Light

Solar Street Light- High Mast

Solar Water Heater

Solar Power Inverter

Solar Home Lighting System

Advance Solar Home
Lighting System

Solar Water Pump

Active Networks

Laptops & Desktop PC

Passive Network - Cat6/ Patch Panel

Printers

Projectors

Racks

ThinClient & Nodes


UTM Hardware Firewall

Video Conferencing

Mobile Applications


Website Development

ERP Solution


IT Solution


E-Learning LMS


E-Learning CMS

Circle Making Machine

Special Purpose Hydraulic Pipe Bender

Bending Radius Gauge

Reinforcement Bar Bending / Braking Machine

Portable Reinforcement Hydraulic Bar Cutter

Gasoline Concrete Mixer

Tapping Machine

Hydraulic Press & Crimping Plier

Hydraulic Hand Pallet Trucks

Hydraulic Hose Crimping Machine

Puncture Pipe Repair Clamps

Electric Hoist

Electric Trolley

Hand, Electric & Battery Winch

Drill Machines & Drill & Professional Hammer

Electronics Tool Kit

Coil Winding Machines

Adjustable Spanners

All Type Pliers

Screw Drivers

Screw Driver Bits

Square Drive Socket & accessories

Wrenches

Hammer

C, F - Clamp

Double Ended & Ring Spanners

Chisels, Punches, Centre Punch

Magnetic Products

Bolt Cutters

Knife & Cutter Blade

Soldering Station 60W

Soldering Station 90W

Soldering Station 60W with Japanese Ceramic Heater Element

Soldering Station 90W with Japanese Ceramic Heater Element

Soldering Station Lead Free 100W

De Soldering Station

Soldering & Desoldering Station

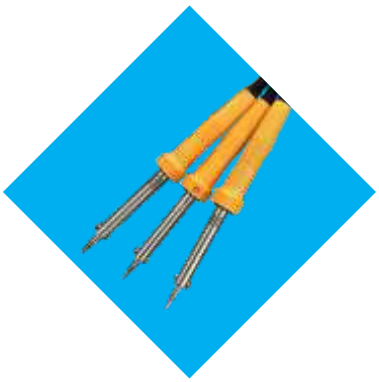
SMD Rework Station - 2 in 1

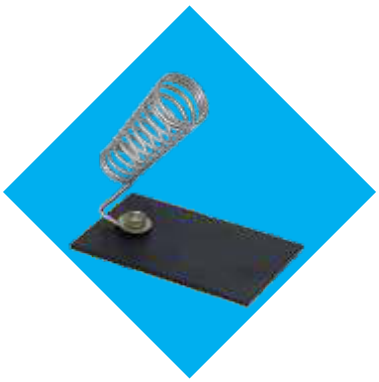
Soldering & De Soldering Digital Rework Station - 3 in 1 - 60 / 70W

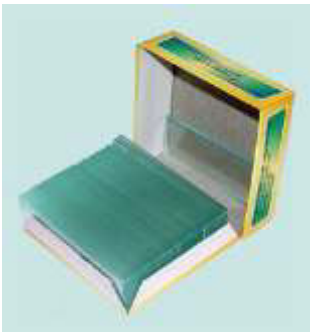
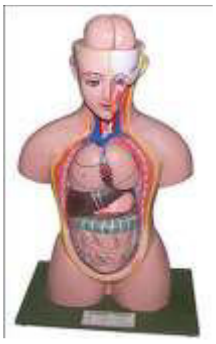
Soldering & De Soldering Digital Rework Station - 4 in 1 - 60 / 70W

Complete Rework Station

**23000**
**Square Feet of Operations**





| | | |
|---|---|---|
|  Microscopes |  Mechanical Stage Standard |  Dissecting Instruments |
|  Kymograph Electrical |  Microscope Slides |  Chart Stand |
|  DNA Model |  Human Torsos |  Human Skeleton With Stand |
|  Model of Human Eye |  Human Brain |  Human Lungs |
|  Frog Dissection |  Rabbit Skull |  Flower Section Model |



Model Sets



Slide Mailers, Boxes & Rack

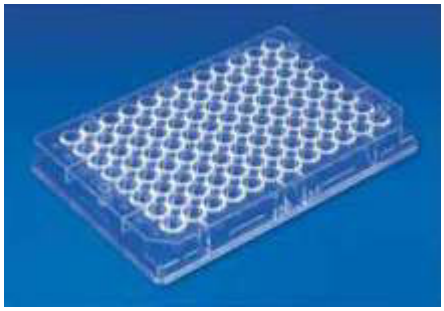


Float, Twin, & Tube Racks

Centrifuge Tubes


Containers


Vials



Test Plates

Rack for Petri Dishes


Multi Rack




Multy Type Stands


Baskets


Pipette Stand



Measuring Cylinders

Seperatory Funnel


Scoop & Spatula

PCB Art Work Film Maker

Artwork Table (Iluminated)

PCB Shearing Machine

Photo Resist Dip Coating Machine

Double Sided UV Exposure Machine

Dye & Developer Machine

DNA Roller Tinning Machine

PCB Etching Machine

PCB Drilling Machine

PCB Curing Machine (Oven)

## BANGKOK EXHIBITION

6 Axis Industrial Robotic Arm Trainer

Robot - Line Tracking Mouse Kit

Robot - Escape Robot Kit

Robot - Titan Tank Wireless Remot Controlled

Robot - Robotic Arm USB Based

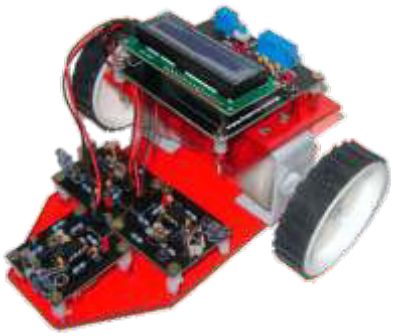
Robot - 3 in 1 All Terrain Robot Kit

Golbo

Wall Following Robot

Vacuum Cleaning Robot

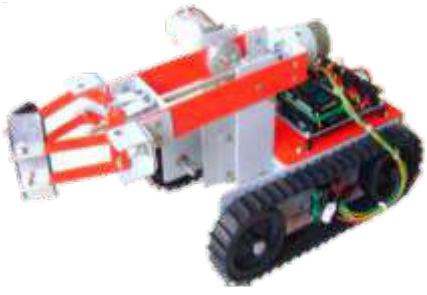
Fire Fighting Robot



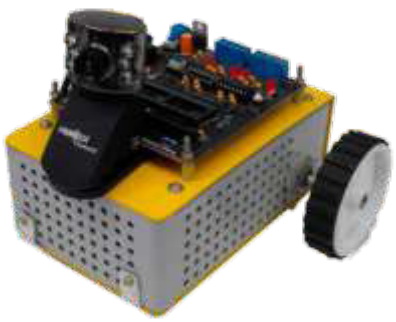
Obstacle Avoiding Robot

Quark-Servo Based Hexapod

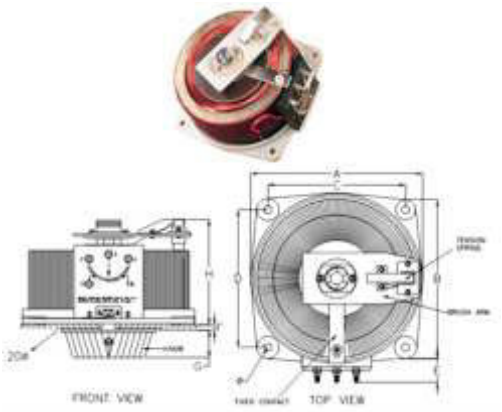
AVS Robotics Workshop Advance Kit



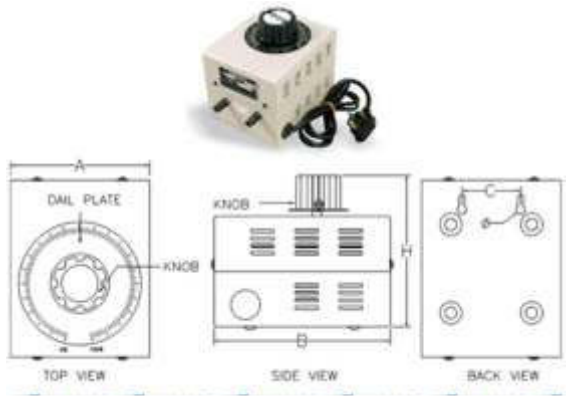
URDP Arm Kit



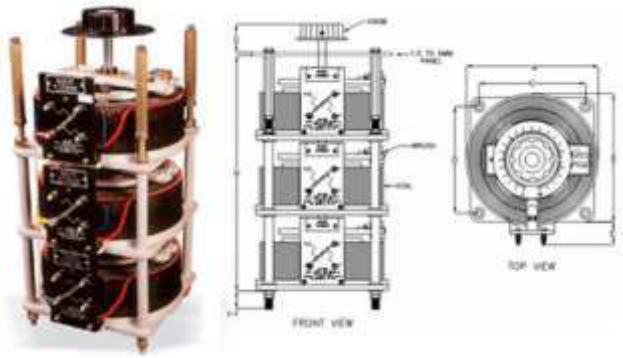
MATLAB based Surveillance Robot



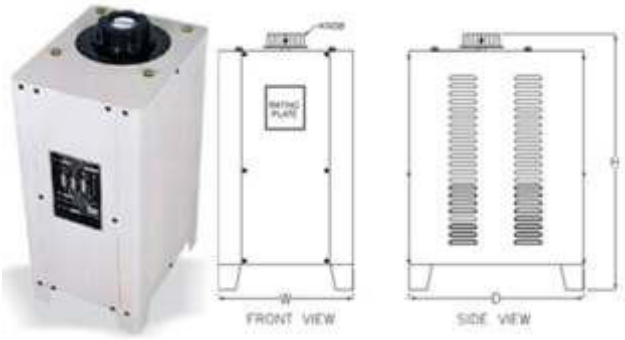

**Variac - Single Phase Flush Back of Panel Open**




**Variac - Single Phase Portable Table / Floor Mounting Enclosed**




**Variac - Three Phase Flush Back of Panel**




**Variac - Three Phase Portable Table / Floor Mounting Enclosed**

| | | Input 230V A.C., Output 270V A.C., 50-60Hz | | Input 415V A.C., Output 470V A.C., 50-60Hz | |
|---|---|---|---|---|---|
| S. No. | Output Current Rating in Amps | F1- Variac - Single Phase Flush Back of Panel, Open | P1- Variac - Single Phase Portable Table/Floor Monuting Enclosed | F3- Variac - Three Phase Flush Back of Panel,Open | P3- Variac - Three Phase Portable Table/Floor Monuting Enclosed |
| 1 | 0.75A | 0.75F1 | 0.75P1 | 0.75F3 | 0.75P3 |
| 2 | 1A | 1F1 | 1P1 | 1F3 | 1P3 |
| 3 | 2A | 2F1 | 2P1 | 2F3 | 2P3 |
| 4 | 3A | 3F1 | 3P1 | 3F3 | 3P3 |
| 5 | 4A | 4F1 | 4P1 | 4F3 | 4P3 |
| 6 | 5A | 5F1 | 5P1 | 5F3 | 5P3 |
| 7 | 6A | 6F1 | 6P1 | 6F3 | 6P3 |
| 8 | 8A | 8F1 | 8P1 | 8F3 | 8P3 |
| 9 | 10A | 10F1 | 10P1 | 10F3 | 10P3 |
| 10 | 15A | 15F1 | 15P1 | 15F3 | 15P3 |
| 11 | 17.5A | 17.5F1 | 17.5P1 | 17.5F3 | 17.5P3 |
| 12 | 20A | 20F1 | 20P1 | 20F3 | 20P3 |
| 13 | 28A | 28F1 | 28P1 | 28F3 | 28P3 |
| 14 | 40A | 40F1 | 40P1 | 40F3 | 40P3 |
| 15 | 50A | 50F1 | 50P1 | 50F3 | 50P3 |

# Our Clients

MTC Military Technological College
Oman

Fiji National University
Fiji

African Development Bank

The University of Southern Queensland, Australia

The University of Zambia
Zambia

Emirates Aviation University
UAE

Asian Development Bank

Food and Agriculture Organization of the United Nations

Eldoret National Polytechnic, Kenya

OL'Lessos TTI
Kenya

Bushenyi, Kichwamba, Kyema - Uganda

Mbara University of Science and Technology
Uganda

National Institute of Technology Andhra Pradesh
India

Bharat Electronics Ltd
Bangalore, Karnataka
India

Bhartiya Skill Development University, India

World Skill Center
Odisha, India

Amity University
Jaipur/Noida, India

National Institute of Technology Agartala
India

Indian Institute of Technology Jodhpur
India

Indian Institute of Technology Kanpur
India

University of Electro Communication
Tokyo, Japan

Wolaita Sodo University
Ethiopia

University of Jyvaskyla
Finland

Princess Nourah Bint Abdulrahman University
Saudi Arabia

University of Baghdad
Iraq

Challenger Institute of Technology
Australia

Mumford Technology University
Ghana

Buradha College
Saudi Arabia

New York University
Abu Dhabi

Soroti University
Uganda

University of the West Indies
West Indies

Manipal University
Malaysia

University Pendidikan Sultan Idris
Malaysia

University of Science and Technology
Yemen

Tribhuvan University Central Department of Physics
Nepal

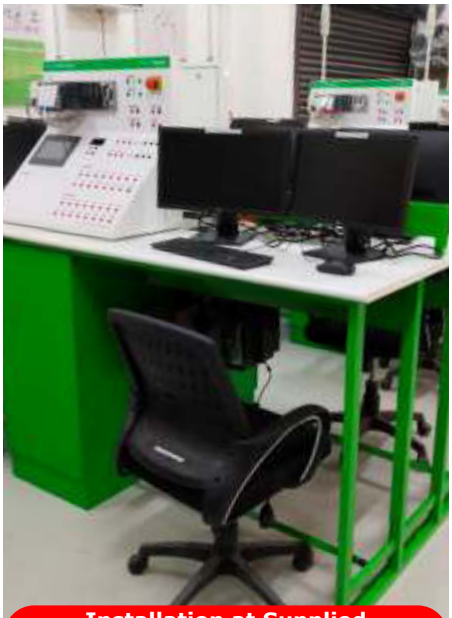
# Worldwide Installations

Installation at Wolaita Sodo University, Ethiopia

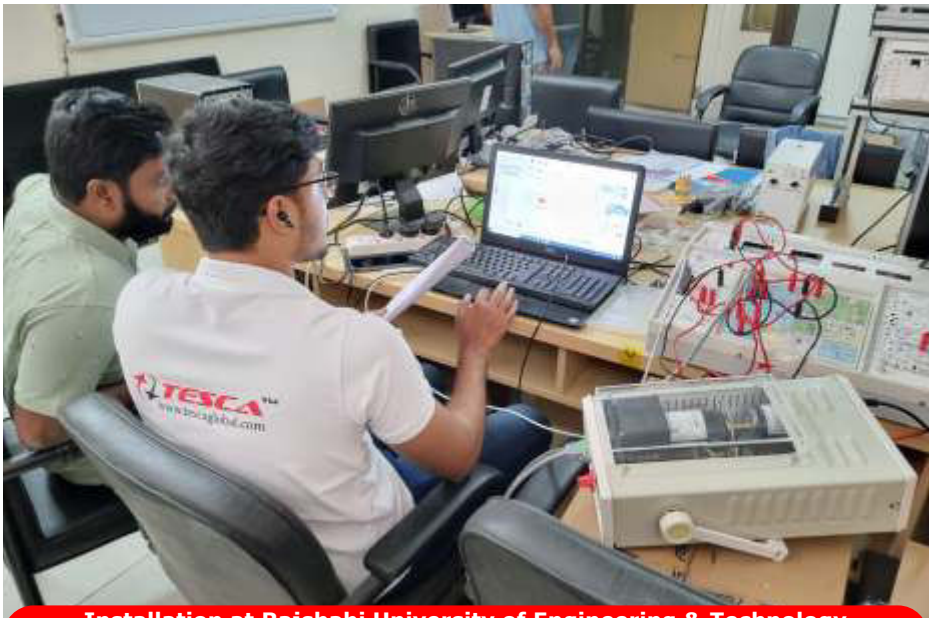
Installation at CEDT, Senegal, Dakar

Installation at World Skill Center, Odisha, India

Installation at Eldoret National Polytechnic, Kenya



Installation at Supplied Lab Furniture's at Kashipur , India




Installation at Rajshahi University of Engineering & Technology Bangladesh (CSE Department)

# sales 85+ countries

## Africa

| | |
|---|---|
| A | Algeria |
| | Angola |
| B | Benin |
| | Botswana |
| | Burkina Faso |
| C | Cameroon |
| E | Egypt |
| | Ethiopia |
| | Eritea |
| G | Ghana |
| I | Ivory Coast |
| K | Kenya |
| L | Lesotho |
| M | Malawi |
| | Mali |
| | Morocco |
| | Mozambique |
| N | Nigeria |
| R | Rwanda |
| S | Somalia |
| | South Africa |
| | Sudan |
| T | Tanzania |
| | Tunisia |
| U | Uganda |
| Z | Zimbabwe |
| | Zambia |

## Asia

| | |
|---|---|
| B | Bangladesh |
| | Bhutan |
| | Brunei |
| C | Cambodia |
| | China |
| F | Fiji |
| H | Hongkong |
| I | India |
| K | Indonesia |
| J | Japan |
| M | Mangolia |
| | Malaysia |
| | Mauritius |
| | Myanmar |
| N | Nepal |
| P | Pakistan |
| | Philippines |
| S | Singapore |
| | Sri Lanka |
| T | Taiwan |
| | Thailand |
| V | Vietnam |

## Middle East

| | |
|---|---|
| A | Albania |
| B | Bahrain |
| I | Iraq |
| | Israel |
| J | Jordan |
| L | Lebanon |
| O | Oman |
| P | Palestine |
| S | Saudi Arabia |
| U | UAE |
| Y | Yemen |

## America/Europe/Australia

| | |
|---|---|
| A | Austria |
| B | Brazil |
| | Bolivia |
| C | Canada |
| | Chile |
| E | Ecuador |
| F | Finland |
| | France |
| G | Germany |
| | Greece |
| H | Honduras |
| I | Iceland |
| | Italy |
| J | Jamaica |
| L | Luxembourg |
| M | Macedonia |
| | Mexico |
| N | New Zealand |
| P | Peru |
| | Portugal |
| S | Serbia |
| | Spain |
| | Switzerland |
| T | Turkey |
| U | UK |
| | USA |

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SCAN ME