

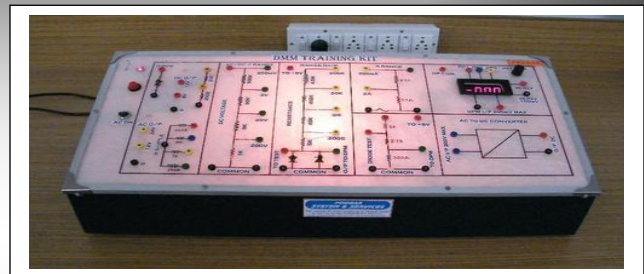


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Total Lab Concept

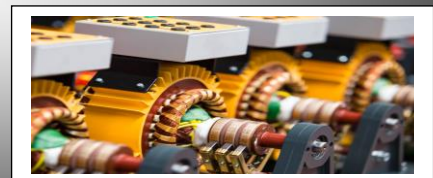


Electronics And Electrical Lab Training Modules



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Gym, Ring Road, Nagpur-15. Ph.:0712-3550901
Mob:9823151679, 9270509886
Email: deltaelectronics22@gmail.com ;
Website: deltaelectronicngp.com



TESTING MEASURING AND LABORATORY INSTRUMENTS

- Analog oscilloscopes
 - Digital storage oscilloscopes
 - Spectrum analyzers
 - Logic analyser (pc based)
 - Function generator/frequency counter/
 - Soldering stations
- DC regulated power supplies signal channel
 - Multimeter /clamp meter
 - Decade capacitance box
 - Decade inductance box
 - Decade resistance box



Fig. Cathod Ray Oscilloscope

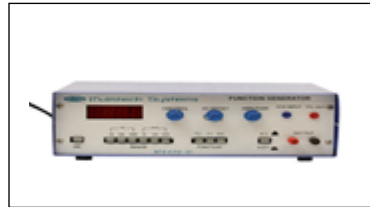
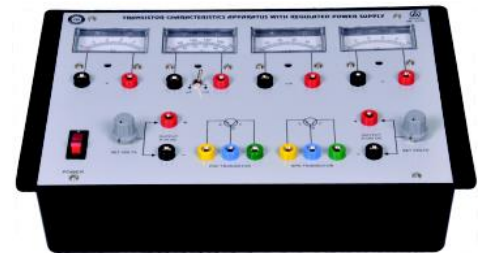


fig. AF Function Generator

ELECTRONICS LAB TRAINING MODULES

DE - 001	PN Junction Diode Characteristics
DE - 002	Zener Diode Characteristics
DE - 003	Experimental Set-Up For Plotting CB Characteristics
DE - 004	Zener Diode As A Shunt Regulator
DE - 006	Voltage regulator using IC LM 317
DE-007	Characteristics of Diode & LED
DE-008	JFET Characteristics
DE - 046	MOSFET Characteristics
DE - 047	IGBT Characteristics
DE - 051	SCR Characteristics
DE -052	Diac Characteristics
DE - 053	Triac Characteristics
DE - 054	UJT Characteristics
DE - 055	Transistor as a switch
DE-056	Study of Half - Wave rectifier
DE-056	Center - Tapped Fullwave Rectifier
DE-075	Bridge Type Fullwave Rectifier
DE-076	Logic Gate Trainer using IC,s
DE-077	Binary To Gray Code Converter
DE - 100	Basic Logic Gates using Diode & Transistors
DE - 101	Gray To Binary Code Converter

Fig.pn junction diode chcharacteristics



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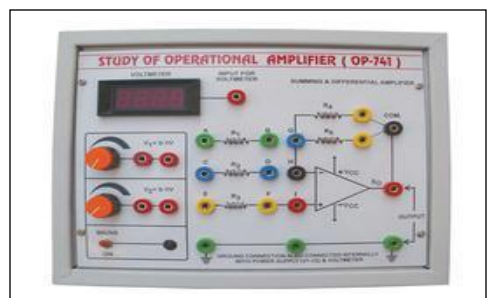
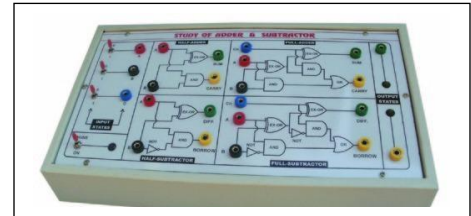
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DE-102	Half Adder Using Logic Gates
DE - 103	Half Subtractor Using Logic Gates
DE - 103	Half Subtractor Using Logic Gates
DE - 104	Full Subtractor Using Logic Gates
DE - 105	Full Adder Using Logic Gates
DE - 106	Demorgan's Theorem
DE - 107	Boolean Expression using logic gates
DE - 108	BCD to 7 Segment Decoder using IC 7447
DE-109	BCD to Decimal Decoder using IC 7442
DE-110	Decimal to BCD Encode using IC 74147
DE-111	Bidirectional Buffer Using Ic 74245
DE-112	NAND & NOR As a Universal Gate
DE - 115	4:1 Multiplexer Using IC 74153
DE - 119	8:1 Mux Using IC 74151
DE - 121	16:1 Mux Using IC 74150
DE - 122	1:4 Demultiplexer Using IC 74139
DE - 123	1:8 Demultiplexer Using IC 74138
DE - 124	1:16 Demultiplexer Using IC 74154
DE - 125	RS Flip- Flop Using NAND & NOR Gate
DE - 126	D & T Flip – Flop
DE - 131	J-K Master Slave Flip-Flop
DE - 134	J-K Flip-Flop Using NAND Gate
DE - 137	Controlled Invertor using Ex-OR Gate
DE - 138	Decade Counter Using IC 7490
DE - 140	Up-Down Counter using IC 7476
DE - 155	Mod N (2 to 9) counter using IC 7490
DE-156	4Bit Shift Register Using IC74194
DE-157	Arithmetic & logic unit using IC 74181
DE - 165	Study Of Kirchoff's Law (KCL & KVL)
DE - 200	Superposition Theorem
DE - 201	Norton's Theorem Fig. Network Theorem
DE -202	Thevenin's Theorem
DE -203	Maximum Power Transfer Theorem
DE -204	Reciprocity Theorem
DE -205	Tellegan's Theorem
DE -206	Millman's Theorem
DE -207	RLC Series Resonance Circuit
DE -208	RLC Parallel Resonance Circuit
DE-209	Two Port Network Parameter



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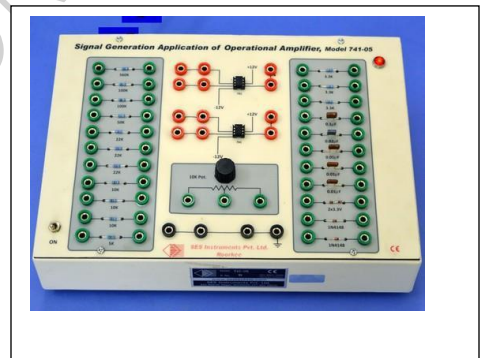
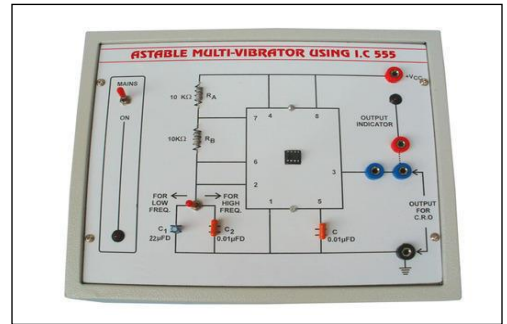
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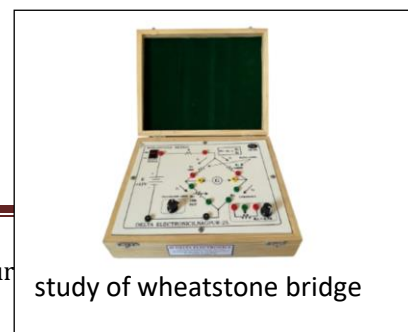
DE-210	Charging & Discharging of Capacitor
DE-211	Bridge Circuits
DE 252	Wheatstone Bridge
DE-300	Non-Inverting Op-Amp using IC 741
DE-301	Inverting Op-Amp using IC 741
DE-302	Op-Amp Parameter & Application Trainer
DE-303	Inverting/Noninverting Op-Amp using 741
DE-306	Op-Amp as Adder using IC 741 Fig. Study Of Operational OP-Amp
DE - 307	Op - AMP Buffer Using IC 741
DE - 308	OP - AMP Subtractor Using IC 741
DE-309	Op - AMP Comparator Using IC 741
DE - 310	Integrator Using OP - AMP IC 741
DE - 311	Differentiator Using OP - AMP IC 741
DE - 312	I to V & V to Converter
DE-313	Op - AMP Schmitt Trigger Using IC 741
DE - 314	Zero Crossing Detector
DE - 315	Active Peak Detector
DE - 316	IC 555 As Astable Multivibrator
DE - 317	IC 555 As Bistable Multivibrator
DE - 318	IC 555 As Monostable Multivibrator
DE - 319	Second Order Low - Pass Butterworth Filter
DE - 320	Second Order High - Pass Butterworth Filter
DE - 321	Wide Band Pass Filter
DE-322	Op-Amp as Clipper
DE-323	Op-Amp as Clamper
DE-324	Square Wave Generator using Op-Amp 741
DE-325	Instrumentation Amplifier using Op-Amp 741
DE-326	Astable Multivibrator using Op-Amp 741
DE-327	Monostable Multivibrator using Op-Amp 741
DE-328	Bistable Multivibrator using Op-Amp 741
DE-329	Phase shift oscillator using Op-Amp 741
DE-330	Triangular Generator using Op-Amp 741
DE -331	VCO using 565
DE-332	Sample & Hold Circuit
DE-400	Single Stage CE Amplifier
DE-401	Single Stage CB Amplifier
DE-402	Single Stage CC Amplifier
DE-403	Two Stage RC Coupled Amplifier



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DE-404	FET Amplifier
DE -405	Single Tunned Amplifier
DE - 500	Analog To Digital To Analog Converter
DE - 500	Astable Multivibrator Using Transistor
DE - 500	Differntiator Using Op- Amp IC 741
DE - 501	Clipper & Clamper Circuit
DE - 502	Astable Multivibrator using Transistor
DE - 503	Monostable Multivibrator Using Transistor
DE - 504	Bistable Multivibrator Using Transistor
DE - 505	RC Integrator & Differentiator
DE - 506	UJT As Relaxation Oscillator
DE - 507	Digital To Analog Converter
DE-508	RC Phase Shift Oscillator
DE-511	Colpitt Oscillator
DE -512	Hartley Oscillator using Transistor
DE -551	Study of RAM
DE -600	Solar Cell Characteristics Apparatus
DE -601	Energy Band Gap Apparatus
DE-602	Ohms Law Apparatus
DE-603	Thermister Charateristics Apparatus
RPS 501F	DC Power Supply 5V ,1A
RPS 1201F	DC Power Supply +- 12V, 1A
RPS 1501F	DC POWER SUPPLY +- 15V, 1A
RPS 1501R	DC REGULATED POWER SUPPLY 0-15V , 1A

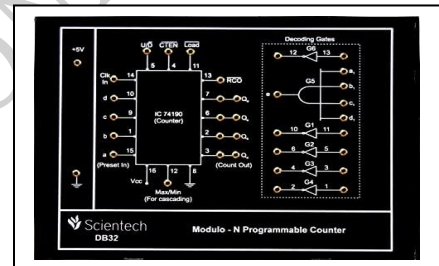


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DIGITAL ELECTRONICS LAB TRAINING MODULES

- Logic Gates using Six TTL IC's (6 in 1)
- RTL Logic Gates (5 in 1)
- Basic Logic Gate using Discrete Components (7 in 1)
- Digital Logic Trainer (Logic Gates, Boolean Identities & Demorgan's Theorems)
- Verification of truth tables of Logic Gates using Universal Gates
- Pulse/ Clock Generator using NAND Gate
- 4 Bit Adder & Subtractor Circuits using IC 7483
- Digital Full Adders & Subtractors using NAND Gates
- Flip Flops using NAND Gates & TTL IC's
- Decade / Modulo-N Counter
- 4 Bit Counters (Synchronous & Asynchronous)
- 4 Bit Shift Registers
- Encoder & Decoder Circuits
- 16 to 1 line Multiplexer & 1 to 16 Line Demultiplexer
- Encoder/Multiplexer
- Decoder/ DeMultiplexer
- RAM Circuit using IC 7489
- Parity Generator/Checker with Bakelite Front Panel
- 4 Bit Digital Comparator
- 4/8 Bit Analog to Digital Converter
- 4 Bit A/D Converter fig.dsb/ssb transmitter &
- 4/8 Bit Digital to Analog Converter
- 4 Bit D/A Converter
- Transfer Characteristics of TTL and TTL Schmit Trigger Inverter
- TTL-CMOS, CMOS-TTL Interfacing
- Arithmetic/Logic Unit (ALU)
- TTL IC Characteristics Apparatus
- CMOS IC Characteristics Apparatus
- Digital Lab Trainer (with Bread Board)



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BASIC AND ADVANCE COMMUNICATION LAB TRAINING MODULES

- Amplitude Modulation & Demodulation
- Frequency Modulation and Demodulation
- Pulse Amplitude Modulation & Demodulation
- Pulse Width Modulation & Demodulation
- Pulse Position Modulation & Demodulation
- PAM/PPM/PWM Modulation & Demodulation
- Phase Modulation and Demodulation
- Frequency Shift Keying Modulation & Demodulation
- Amplitude Shift Keying Modulation & Demodulation
- Phase Shift Keying Modulation & Demodulation
- Pulse Code Modulation and Demodulation
- Delta Modulation and Demodulation
- Adaptive Delta Modulation and Demodulation
- Single Side Band Modulation & Demodulation
- Sample & Hold Circuit using Op-Amp
- Detection of FM using Phase locked loop (PLL)
- Balanced Modulator/DSB-SC (DSB-SC Amplitude Modulation and Demodulation)
- Frequency Division Multiplexer & Demultiplexer
- QAM Modulation & Demodulation
- Frequency Modulation & Demodulation
- Delta, Adaptive Delta and Delta Sigma Modulation & Demodulation
- TDM Pulse Code Modulation Transmitter
- TDM Pulse Code Modulation Receiver
- Data Formatting and Carrier Modulation Transmitter
- Data Formatting and Carrier Demodulation Receiver
- Analog Signal Sampling & Reconstruction
- TDM Pulse Amplitude Modulation & Demodulation
- 8 Bit Variable Data Generator for Model
- DSB/SSB AM Transmitter
- DSB/SSB AM Receiver



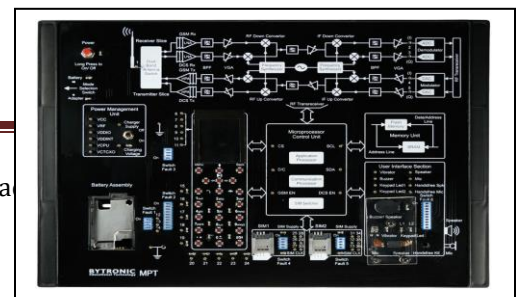
fig Modulation & Demodulation kit



Fig.Delta Modulation&Demodulation



fig.TDM



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- Transmission Line Trainer
- Mobile Phone Trainer
- GSM Trainer
- CDMA Trainer
- CDMA TRAINER

POWER ELECTRONICS LAB TRAINING MODULES

- Light Intensity control using SCR & Triac
- SCR Firing Circuits
- SCR Commutation Techniques
- Phase control using Triac
- Switching Action of a BJT
- Switching Action of a FET
- 6 Thyristor Firing Circuit Kit (UJT Controlled SCR Time Delay)
- Zero Voltage Switching using SCR
- Step up Chopper
- SCR Single Phase Half Wave, Full Wave, Fully Controlled Bridge Rectifier/Converter
- DC Motor Control using SCR's (with tachometer)
- Three Phase Fully Controlled Converter
- Three Phase Induction Motor Speed Controller
- Single Phase Cycloconverter
- SMPS Trainer Kit
- Jone's Chopper
- Morgan's Chopper
- Series Inverter using SCR's
- Parallel Inverter using SCR's
- Single Phase Inverter (using power mosfet)
- Chopper Circuit (using power mosfet with Motor) Bridge Converter
- DC Drive Trainer
- Single Phase Half Controlled DC Drive
- SCR Ring Counter



fig. 3 Phase Fully Controlled



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Fig. Speed Control of Single Phase Induction Motor

PHYSICS LAB EXPERIMENT SETUP

- Measurement of High Resistance using Substitution Method
- Lissajous Figure Apparatus
- Stefan Constant Apparatus
- Dielectric Constant Apparatus (Solid & Liquid)
- Hall Effect Experiment (Complete Setup)
- Fourier Analysis Kit
- Measurement of Susceptibility of Paramagnetic Solution by Quinck's Tube Method
- Heat Efficiency of an Electric Kettle
- Choke Characteristics Apparatus
- Inductance Measurement (using Impedance at Different Frequencies)
- Determine the Height of Tower with the Help of Sextant
- GM Counter Experimental Setup
- Determine The Ballistic Constant of a Ballistic Galvanometer (Complete Setup)
- Determine The ECE of Copper using Tangent Galvanometer (Complete Setup)
- Determine the Wavelength of Sodium Light by Fresnel's Biprism Kit (Complete Setup)
- Determine the Focal Length of Two Lenses by Nodal Slide and Locate the Position of Cardinal Points (Complete Setup)
- Determine of the Specific Rotation of the Cane Sugar Solution with the Help of Polarimeter (Complete Setup)
- Determine the Wavelength of Spectral Lines using Plane Transmission Grating (Complete Setup)
- Determine the Viscosity of a Liquid by Stoke's Method (Complete Setup)
- Determine the Frequency of AC Mains by Electrical Vibrator
- Determine the Wave Length of Sodium Lamp by Newton Ring Method (Complete Setup)
- Determine Magnetic Field using Stewart and Gee's Apparatus (Complete Setup)
- Determine the Velocity of Ultrasonic Waves by using a Crystal (Complete Setup)
- Laser Experimental Setup with Diode Laser (Complete Setup)
- Laser Experimental Setup with He-Ne Laser (Complete Setup)
- He-Ne Laser with Power Supply (Complete Setup)
- High Resistance by Leakage Method (Complete Setup)
- Thermo electric e.m.f. with temperature for a copper iron thermo couple, by means of

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- a potentiometer (Complete Setup)
- Calibration of Voltmeter using Potentiometer (Complete Setup)
- Determine Young's modulus's, modulus of rigidity and poisson's ratio of the material of a given wire by Searle's dynamical method (Complete Setup)
- Determine the Frequency of a Tuning Fork with the help of Sonometer
- Determine the Frequency of A.C. mains by means of a Sonometer (Complete Setup)
- Determine the Dispersive Power of the Material of the Prism for Violet & Yellow Colors of Mercury Light with the Help of Spectrometer (Complete Setup)
- Determine the Resolving Power of Telescope (Complete Setup)
- Determine the Wave Length of Sodium Lamp by Michelson Interferometer (Complete Setup)
- Determine the Refractive Index of Liquid using Diode Laser (Complete Setup)
- Determine the Malus Law using Diode Laser (Complete Setup)
- Determine the Brewster Angle using Diode Laser (Complete Setup)
- Determine the Refractive Index of Prism using white light & Spectrometer (Complete Setup)
- Carrey Foster Bridge with Four Gap (Complete Setup)
- Determine Thermal Conductivity using Lee's Disc Apparatus (Complete Setup)
- Sodium Vapour Lamp 35 Watt fitted in Box with Transformer
- Sodium Vapour Lamp 55 Watt fitted in Box with Transformer
- Mercury Vapour Lamp 80 Watt fitted in Box with choke



Fig. Energy band gap by four probe method with pc interface .



fig. Hall Effect apparatus



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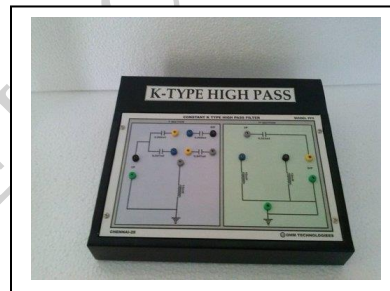
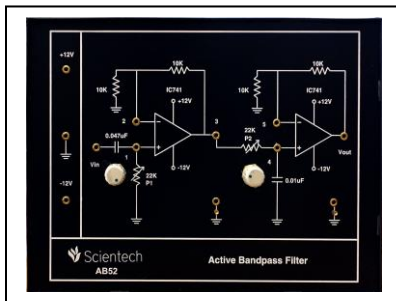
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Carey Foster Bridge Full Experimental Setup

FILTER CIRCUITS

- T' type Passive Low Pass, High Pass, Band Pass & Band Stop filters
- M-Derived 'T' type Passive Low Pass & High Pass Filters
- "p" type Passive Low Pass High Pass, Band Pass & Band Stop filter
- Twin-T Active Notch Filter using Operational Amplifier
- Active filters using Operational Amplifier
- Transient Response of RLC Circuit with built-in Square Wave Oscillator
- Cascaded Two Port Network
- "T", "p" & "Bridge T" Type Attenuators
- RC, Low Pass, High Pass, Band Pass & Band Stop Filters



Active Low Pass Filter Composite High Pass Filter

INSTRUMENTATION AND LAB TRAINING MODULES

Instrumentation Trainer Using Transducers (Complete with following Experimentalstudy)

- Study of LVDT
 - Study of RTD
 - Study of Thermocouple
 - Study of Thermistor
 - Study of Opto Devices (Photo Diode, Photo Transistor, LDR, Zener, Diode)
 - Study of Wheatstone Bridge & Instrumentation Amplifier
- Strain Gauge Trainer Kit (with Cantilever Beam)
- LVDT Trainer Kit



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- RTD Trainer Kit
- Thermocouple Trainer Kit
- Speed Measurement Module using Photo Electric Sensor
- Speed Measurement Module using Magnetic Sensor
- Inductive Pick Up
- Capacitive Pick Up
- Piezo Electric Transducer
- Hall Effect Sensor
- Pressure Measurement using Strain Gauge
- Load Cell Trainer Kit
- Temperature Sensors Kitfig. Transducer Trainer
- Study of Linear Potentiometer instrument trainer
- Data Logger (Voltage,Current,Temperature&Pressur)

CONTROL LAB TRAINING MODULES

- PID Simulator
- 1 PID Controller Kit (Model Process)
- ON/OFF Temperature Controller (Indicator cum Controller)
- AC Servo Speed Torque Characteristics Trainer
- DC Servo Motor Speed Torque Characteristics Trainer
- AC Position Control System Trainer
- DC Position Servo Mechanism Trainer
- AC Servo Voltage Stabilizer as Servomechanism
- Stepper Motor Controller Trainer
- Stepper Motor Controller Trainer
- Potentiometer as Error Detector
- Synchro Transmitter Receiver Pair
- Study of Compensation Network
- Magnetic Amplifier
- Variac 2 Amps Single Phase
- AC Ammeter (Rectifier Type) 0-1A (Internal shunt) (With current transformer)
- AC Ammeter (Rectifier Type) 0-5A (Internal shunt) (With current transformer)
- DC Voltmeter 0-300V (Internal shunt)
- AC Voltmeter (Rectifier Type) 0-150V (Internal shunt)
- DC Regulated Power Supply Dual Channel (With Four Digital Panel Meters)
±30VDC/2 Amps with Fixed 5V/3.3V output
- Rheostat 50 Ohms/ 5 Amps. (Double Tube)
- Rheostat 250 Ohms/ 3 Amps.
- Magnetic Amplifier (Series & Parallel Connection of Magnetic Amplifier)



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- Accessories for ME 1115A
- AC Ammeter (Rectifier Type) 0-1A (Internal shunt) (With current transformer)
- AC Ammeter (Rectifier Type) 0-5A (Internal shunt) (With current transformer)
- DC Voltmeter 0-300V (Internal shunt)
- DC Regulated Power Supply Dual Channel (With Four Digital Panel Meters)
- $\pm 30\text{VDC}/2$ Amps with Fixed 5V/3.3V output
- Rheostate 50 Ohms/ 5 Amps. (Double Tube)
- Rheostate 250 Ohms/ 3 Amps.
- Magnetic Amplifier (Positive & Negative Feed Back)
- AC Ammeter (Rectifier Type) 0-1A (Internal shunt) (With current transformer)
- AC Ammeter (Rectifier Type) 0-5A (Internal shunt) (With current transformer)
- DC Voltmeter 0-300V (Internal shunt)
- DC Regulated Power Supply Dual Channel (With Four Digital Panel Meters)
- $\pm 30\text{VDC}/2$ Amps with Fixed 5V/3.3V output
- Rheostate 50 Ohms/ 5 Amps. (Double Tube)
- Rheostate 250 Ohms/ 3 Amps.
- DC Voltage Regulator as a Closed Loop System
- Relay Control System
- Measurement of water level using strain gauge
- Educational Analog Computer
- Light Intensity Control
- Digital Control System
- PLC Trainer Demonstration Unit
- Linear System Simulator (Open loop & Close loop System of First order & Second order system)



fig. PID Controller Kit



PLC Training Modules



Relay Control System DC Voltmeter



BREAD BOARD TRAINERS

- Bread Board Trainer with Power Supplies (General Purpose)
- Operational Amplifier Trainer (Bread Board Model)
- Digital Electronics Circuit Trainer (Bread Board Model)
- OP Set of 20 IC's & Instruction Manual for more then 60 Experiments

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- Analog Lab Trainer (with Bread Board)
- Digital Lab Trainer (with Bread Board)
- Analog & Digital Lab Trainer (Bread Board Model)
- Amplifier Lab Trainer with Power Supply (with Bread Board)
- Amplifier Lab Trainer with Built in Power Supply, AC Millivoltmeter & Function Generator (with



Fig. Bread board trainer kit.

DYNAMIC DEMONSTRATORS & TRAINER

- Black & White Television Demonstrator (with 14" CRT)
- Color Television Demonstrator (with 20" CRT)
- Color Television Demonstrator (with 14" CRT)
- Video Compact Disc Player Demonstrator
- Digital Versatile Disc Player Demonstrator
- Stereo Tape Recorder Trainer
- Analog Multimeter Trainer
- Digital Multimeter Trainer
- Analog Fiber Optic Voice Transmission Demonstrator
- CRO Demonstrator (20MHz Dual Channel)
- Function Generator Demonstrator
- FM Radio Receiver Demonstrator
- Telephone Trainer
- AM Radio Receiver Demonstrator (Two Band)
- UPS Trainer 500 VA
- Video Cassette Recorder Demonstrator
- EPBAX Demonstrator
- Fax Demonstrator
- Walkie Talkie Demonstrator
- Battery Monitoring System
- Washing Machine Trainer (Automatic)
- Washing Machine Trainer (Semi Automatic)
- LED TV Demonstrator
- Microwave Oven Demonstrator
- Two in One Trainer
- AM / FM Radio Receiver Demonstrator



Stereo Tap Recorder



Fig. LED TV Demonstrator

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- Pattern Generator (For TV)



Colour Pattern Generator for tv



Semi automatic washing machine

MICROPROCESSOR & MICROCONTROLLER LAB

- 8031 Microcontroller Training Kit with Inbuilt Power Supply
- 8031 Microcontroller Training Kit with Inbuilt Power Supply (LCD Display,ASCII Keyboard)
- 8085 Microprocessor Training Kit with Inbuilt Power Supply
- 8085 Microprocessor Training Kit with Inbuilt Power Supply (LCD Display,ASCII Keyboard)
- 8086 Microprocessor Training Kit with Inbuilt Power Supply
- 8086 Microprocessor Training Kit with Inbuilt Power Supply (LCD Display,ASCII keyboard)



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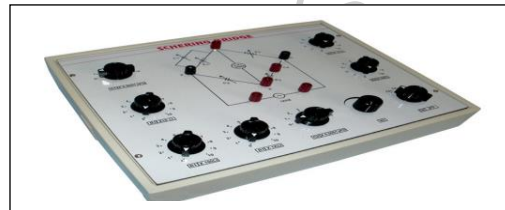
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ELECTRICAL LAB TRAINING MODULES

Electric bridges

- Anderson Bridge
- Schering Bridge
- Kelvin Bridge (Industrial)
- Kelvin Bridge (Student)
- Maxwell Inductance Bridge
- Weins Bridge (Capacity Measurement)fig. schering bridge
- Weins Bridge (Frequency Measurement)
- Wheatstone Bridge (Portable)
- Desauty Bridge
- Hay's Bridge
- Owen's Bridge
- Callender and Griffith's Bridge
- Crompton Potentiometer (Complete Setup)
fig. Kelvin Bridge



Isolation Transformer.

- Single Phase Transformer 0.5KVA/230VAC With Tappings at 50% & 86.6%
- Single Phase Transformer 1KVA/230VAC With Tappings at 50% & 86.6%
- Single Phase Transformer 2KVA/230VAC With Tappings at 50% & 86.6%
- Three Phase Transformer 3KVA/440VAC(Air Cooled)
- Three Phase Transformer 1KVA/440VAC(Air Cooled)
- Three Phase Transformer 3KVA/440VAC(Oil Cooled)
- Variable Auto Transformers (VARIAC), Loading Rheostats & Motors

Variac closed type and rheostat

- Variac 2 Amps Single Phase
- Variac 4 Amps Single Phase
- Variac 8 Amps Single Phase
- Variac 10 Amps Single Phase
- Variac 15 Amps Single Phase
- Variac 4 Amps Three Phase



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- Variac 8 Amps Three Phase
- Variac 10 Amps Three Phase
- Variac 15 Amps Three Phase
- Rectifier Unit, I/P-440VAC ,O/P-0-250VDC/20A
- Rectifier Unit, I/P-440VAC ,O/P-0-250VDC/50A
- Loading Rheostat 1 KW Single Phase in 5 Steps of 200 Watt Each
- Loading Rheostat 2 KW Single Phase in 8 Steps of 250 Watt Each
- Loading Rheostat 3 KW Three Phase (Each Phase of 1 KW) in 8 Steps.
- Loading Rheostat 1.5 KW Three Phase (Each Phase of 0.5 KW) in 4 Steps.
- Resistive lamp Load 500W in 5 steps
- Resistive Lamp Load 1 KW in 10 steps
- Resistive lamp Load 1000W in 5 steps
- Capacitive Load 200mfd Single Phase in 20 Steps
- Inductive Load 5Amp. Single Phase in 5 Steps
- Resistive Lamp Load 3 KW
- Resistive Lamp Load 5 KW
- Current Transformer (CT 30/50v)fig. Rheostat
- Potential Transformer (PT 220/100V)
- Phase Shifting Arrangement
- Rheostat 10ohms/10Amps
- Rheostat 300ohms/2Amps
- Rheostat 100ohms/5Amps
- Rheostate 50 Ohms/ 5 Amps. (Double Tube)
- Rheostate 250 Ohms/ 3 Amps.
- Synchronous Motor 3HP
- DC Shunt Motor 1HP Synchronous Motor 3 HP
- Study of Construction of a DC Motor 1HP
- Loading Arrangement for DC Shunt Motor 1HP
- AC Induction Motor 3HP Single Phase Coupled with 1KW DC Series Generator
- DC Series Motor 1HP
- Induction Motor 3 Phase 5 HP/ 415V.
- Induction Motor Single Phase 1 HP/ 230V Capacitor Type.
- Starter DC Motor 1HP (3 Point)
- Starter DC Motor 1HP (4 Point)

f



Experimental control panel for Electrical Lab.

- Measurement of Power in Three Phase Circuit by Three Wattmeter method.
- Measurement of Power in Three Phase Circuit by Two Wattmeter method.

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- Measurement of efficiency of Single Phase Transformer (Direct Loading).
- Parameter and Losses in a Single Phase Transformer by OC.
- and SC Test and efficiency of Single Phase Transformer (Direct Loading)
- Parameter and Losses in a Single Phase Transformer by OC and SCtest
- Study of Single Phase Energy Meter
- Earth Resistance by Fall of Potential Method (Complete Setup)
- Calibration of Wattmeter by DC Potentiometer (Complete Setup)
- Calibration of Voltmeter & Ammeter by DC Potentiometer (Complete Setup)
- Single Phase Energy Meter with Phantom Loading
- Sumpner's Test (Back to Back) Test on Single Phase Transformer
- Sumpner's Test (Back to Back) Test on Single Phase Transformer
- Parallel Operation Single Phase Transformer
- Voltage Relationship of Three Phase Transformer in Various Connections
- Speed Control of D.C. Shunt Motor (By Armature and Field Current Control method)
- Efficiency by Swinburn's Speed Control by Armature & Field Control Method
- To Study Scott Connection of a Transformer
- Load Test of DC Shunt Motor
- To Plot Magnetizing Curve of a DC Series Generator
- Different Type of Contactor Control Circuit (4 Types)
- Angular Displacement Measurement of Synchronous Motor
- Speed Control of 3 Phase Induction Motor by Applying Voltage Variation
- To Plot OCC of a DC Shunt Generator
- Measurement of Power & Power Factor in Single Phase Circuit
- Measurement of Power in 3 Phase Circuit by CT, PT & 3 Phase Wattmeter
- Measurement of Power in Single Phase Circuit by CT, PT & Single Phase wattmeter
- Panel for Load Test of DC Series Motor
- To Obtain Efficiency of DC Shunt Motor by Swinburne's Test
- To Obtain Losses & Efficiency of DC Machine by Hopkinson's Test
- Panel For Study of Different Type of Fuses,MCBs& ELCBs
- To Connect, Start & Reverse the Direction of Rotation of a 3 Phase Induction motor
- To Proform the Block Rotar Test of 3 Phase Induction Motor
- Motor Generator Set to plot OCC and Load Charcteristics of DC Shunt generator
- Motor Generator Set to plot Load Charcteristics of DC Series Generator
- Motor Generator Set to plot Load Charcteristics of DC Compound Generator
- Domestic Home Wiring Demonstration Panel
- Characteristics of DC Shunt & Series Motor
- To Perform Load Test of Single Phase Induction Motor & Plot Torque Speed characteristics
- DC Motor Drive Trainer
- Parallel Operation of Two 3 Phase Transformers

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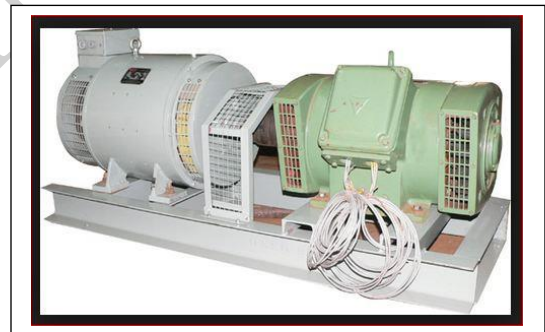
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- To Plot V & Inverted V Curves of a Synchronous Motor
- Thyristor / IGBT Controlled AC Motor Drive with VVVF controls
- OC & SC Test on 3 Phase Synchronous Machine
- To Study the Speed Control of A DC Shunt Motor by Ward Leonard Method.
- OC & SC Test on A 3 Phase Transformer
- To Study the Controlling of Universal AC/DC Motor
- To Perform Load Test on a 3 Phase Induction Motor & To Plot Torque V/S speed charc.
- Speed Control of 3 Phase Slip-Ring Induction Motor By Rotor Resistance control
- To Study The Speed Control of 3 phase Induction Motor by Cascading of Two Induction Motor ,i.e by feeding the slip power of one motor into other motor.
- To Find Voltage Regulation of an Alternator by Zero Power Factor (z.p.z) method
- To Measure Negative Sequence & Zero Sequence Reactance of Synchronous machines
- Electrical Machine Trainer (Complete Setup)
- Electrical Machine Trainer



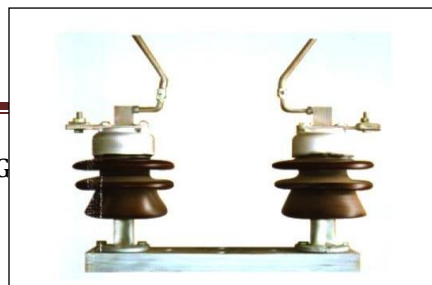
Fig



Motor Generator Set

HIGH VOLTAGE ELECTRICAL LAB

- 100kV, testing transformer with control panel
- 50kV, testing transformer with control panel
- 100mm Sphere gap with water resistor (manual)
- 50mm Sphere gap with water resistor (manual)
- Rod-Gap apparatus with uniform and non-uniform field electrodes
- 0-60kV Oil test kit (manual)
- 30kV,30mA High voltage tester with jig for solid insulating materials
- 150kV, 225J, 5 stage impulse generator with suitable oscilloscope
- 11kV Disc Insulator
- Electrolytic tank with electrodes
- Corona cage without transformer



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- Horn gap apparatus
- 50KV Capacitance divider
- 100KV Capacitance divider
- 50KV resistance divider
- 100KV resistance divider

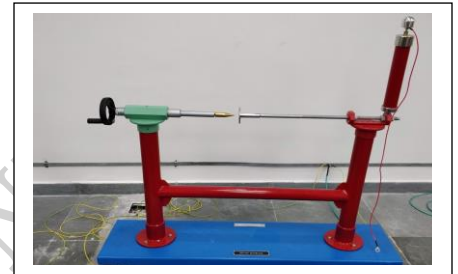
Fig. Horn Gap Apparatus



Fig. Sphere Gap Assembly



11KV Disc Insulator



RF & MICROWAVE EXPERIMENTAL TRAINERS

- Experiments of Reflex Klystron
- Experiments on Gunn Diode
- Experiments to measure the Polar Pattern & gain characteristics of the antenna
- Experiment to measure dielectric constant of Solids & Liquid and to measure Phase Shift & 'Q' of a cavity.
- Study of Microwave components (Magic T, Directional Coupler, Isolator, Circulator)

Microwave power meters

- Microwave Power Meters 8.2GHz ~ 12.4GHz
- Microwave Power Meters 10MHz ~ 18GHz



Microwave component and power supplies

- Klystron power supply (Square & Saw Wave Digital readout)
- Gunn power supply (Digital)
- VSWR Meter Solid State
- BNC Cable



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- Circulator
- Circular to Rectangular wave guide transition
- Coaxial to W/G Adopter
- Conical antenna
- Cooling fan
- Cross directional coupler
- Detector – IN-23
- Detector mount with detector
- Dielectric antenna
- E H Tuner
- E H Tuner precision with micrometer
- E Plane bend
- E Plane tee
- Fixed attenuator (3,6,10 db) Any One
- Frequency meter (Direct reading)
- Frequency meter (Micrometer type)
- Gunn oscillator
- H Plane bend
- H Plane tee
- Isolator
- Klystron mount
- Klystron tube
- Liquid Dielectric Cell M H D Coupler (3,10,20 db) Any One
- Magic tee
- Matched termination
- Microwave Cavity
- Movable short
- Movable short precision with micrometer
- Parabolic disc (with dipole feed)
- Phase shifter
- Pick up horn
- Pin Modulator
- Pyramidal horn (Gain 16 db)
- Pyramidal horn (Gain 22 db)
- Radiation pattern turn table
- Sectoral horn – E plane
- Sectoral horn – H plane
- Dielectric Samples (Solid)
- Slide Screw Tuner

Cross Directional Coupler

E H Tuner



fig. Phase Shifter

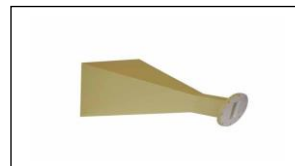


fig. Pyramidal Horn

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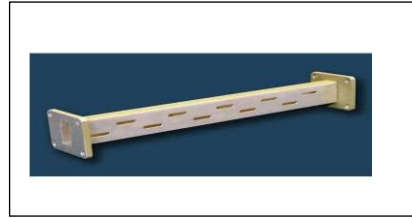
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- Slide screw tuner precision with micrometer
- Sliding termination precision
- Slot antenna – Narrow wall
- Slot antenna- Broad wall
- Slotted section with probe carriage
- Solid Dielectric Cell
- Stand
- Tripod stand
- Tunable probefig. Slotted Antenna
- Variable attenuator
- Wave guide twist
- Fixed short
- Wave guide bend 90 Degree
- Wave guide cavity
- Smith Charts (Set of 100 Sheets)
- N-N Coaxil cable



POWER SUPPLIES

DC Regulated Power Supplies Single Channel / Dual Channel

- Single Output 0 - 30VDC/2 Amps with fixed 5V/3.3V output
- Single Output 0 - 30VDC/5 Amps with fixed 5V/3.3V output
- Single Output 0 - 30VDC/10 Amps
- Single Output 0 - 60VDC/5 Amps
- Single Output 0 - 60VDC/10 Amps (Dual Supply used in series mode)
- Dual Output 0 - +30VDC/2 Amps with fixed 5V/3.3V output
- Dual Output 0 - +30VDC/5 Amps with fixed 5V/3.3V output
- Multiple DC Regulated Power Supply (CH 1: 0-6VDC / 100mA-2Amps, CH 2: 0-32VDC / 100mA-2Amps, CH 3: 0-+15VDC / 100mA-1Amps)



Dual DC Regulated Power Supply

Special Purpose Power Supplies

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- DC Power supply 0 - 16Volts / 2Amps with One Digital Voltmeter
- Electronic Standard Cell 1.018 VDC
- Fixed Output DC Regulated Power Supply +5VDC/1Amp
- Fixed Output DC Regulated Power Supply +12VDC/1Amp
- Fixed Output DC Regulated Power Supply +12VDC/2Amp
- Fixed DC power Supply 2V/1A, +6V/1A
- Fixed DC Power Supply 2V/1A , 1.018VDC



Triple Output DC Power Supply

POWER SYSTEM / RELAY LAB TRAINERS

- Transmission line trainer (ABCD, T & Pi parametrs, Ferranti effect load test)
- IDMT over current relay testing kit (electromechanical type)
- Earth fault relay testing kit (electromechanical type)
- Percentage bias differential relay testing kit (electromechanical type with rehostat)
- Transformer protection using percentage biased differential relay (static type)
- Transformer protection using percentage biased differential relay (microprocessor type)
- Thermal overload relay testing kit
- Bucholz relay test setup (with compressor & oil)
- CT test set (with reference CT &CT under test)
- Resistive lamp load 1000w in 5 step without lamo
- Under voltage / over voltage relay testing kit (static type)
- Instantaneous earth fault relay testing kit (electromechanical type)
- Under / over frequency relay testing kit for frequency variation
- Over voltage relay testing kit (electromechanical type)
- Under voltage relay testing kit (electromechanical type)
- Over current &earth fault relay testing kit (three phase static type)
- Over currentrelay (directional type) testing kit(electromechanical type with rehostat)
- Over current relaytesting kit(static type)
- Negative sequence relay testing kit (with 3 phase 3 HP induction motor)
- Reverse power relay testing kit (static type)
- Oil testing kit



Relay

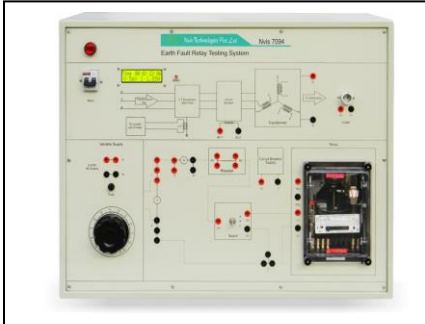
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Earth fault relay testing kit



Distance Protection Relay



Current injector

ELECTRICAL WORK BENCH

- Work bench for dc motor shunt type
- Work bench for dc series motor
- Work bench for dc motor compound type
- Work bench for dc generator shunt type
- Work bench for dc generator compound type
- Work bench for ac squirrel cage induction motor
- Work bench for motor generator set (AC to DC) And (DC to AC)
- Electrical machine trainer
- Advanced Electrical machine trainer set of 5 panels
- Electrical machine trainer set of 2 panels for 15 experiments
- Test bench for single and three phase energy meters
- Work bench for transformers (single phase & three phase) experiments



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