Electrical Technology GPI Mardan

Electrical Technology DAE

S.No	Module/Trainer/Description	Qty
01	**DC Fundamental trainer along with module and base unit to perform following topics :** • Circuit Voltage, Current, Resistance • DC Power Sources in Series and in Parallel Series • Opposing DC Sources • Switches Identification and Switching Concepts • Ohm's Law: Circuit Resistance, Current, & Voltage • Resistance, Voltage and Current in a Series Resistive Circuit • Resistance, Voltage and Current in a Parallel Resistive Circuit • Resistance, Voltage and Current in a Series-Parallel Resistive Circuit • Power in a Series and/or Parallel Resistive Circuit • Rheostat and Potentiometer • Voltage and/or Current Dividers • Measuring: DC Ammeter, DC Ohmmeter, DC Voltmeter • Currents and Node Currents in a Two-Element Branch Circuit • Voltages in a Three-Element Series Circuit • Algebraic Sum of Voltages in a Series Circuit • Generating Loop Equations and Node Equations • Kirchoff's Voltage and Current Laws with a Two-Source Circuit • Mesh Solutions, Superposition Solution and Millman's Theorem Solution of a Two-Source Circuit • Thevenizing a Single-Source Network and a Dual-Source Network • Thevenin Resistance (RTH) and Voltage (VTH) of a Bridge Circuit • Thevenin-to-Norton Conversion • Norton-to-Thevenin Conversion • Tee and Wye or Pi and Delta Networks • Transformation of Delta and Wye Networks • Troubleshooting Basics and DC Networks **(With complete accessories and instruction manual)**	01
02	**AC Fundamentals Trainer along with module and base unit to perform following topics :** • Measuring AC Voltage, Current and Impedance • Measuring and Setting Frequency • Inductors, Phase Angle, Series vs Parallel, Inductive Reactance and Impedance	01

	• Series and Parallel RL Circuits • Electromagnets, Solenoid, Relay • Transformer Windings, Mutual Inductance, Turns and Voltage Ratios, Secondary Loading • Capacitors, Series vs Parallel, Capacitive Reactance • Series and Parallel RC Circuits • RC Time Constants • RC/RL Wave shapes • Series and Parallel RLC Circuits • Series Resonant Circuits • Q and Bandwidth of a Series/Parallel RLC Circuit • Resonant Frequency in a Parallel RLC Circuit • Power Division and Power Factor • Filters: Low-Pass, High Pass, Band-Pass and Band-Stop **With complete accessories and instruction manual)**	
03	**Solid state Semiconductor Trainer along with module and base unit to perform following topics:** • Semiconductor Component Identification and Control of a Semiconductor Switch • Diode: DC Characteristics, Diode Waveshaping • Rectifiers: Half-Wave, Full-Wave Diode Bridge, Power Supply Filtering, Voltage Doubler • Zener Diode and Voltage Regulation • Transistor: Testing the Junctions, PNP Transistor Current Control Circuit, Emitter-Base Bias Potentials, Collector Current vs Base Bias, DC Circuit Voltages, Load Lines • Semiconductor Devices Circuit Board • Multistage Amplifier Introduction • Common Base, Common Elmitter and Common Collector Circuits AC/DC Operation • Temperature Effect on Fixed Bias Circuit and Voltage Divider Bias Circuit • Transistor Parameters Familiarization and Understanding the Specification Sheet • RC Coupled Amplifier DC Operation, AC Voltage Gain and Phase Relationship, Frequency Response • Transformer Coupled Amplifier AC/DC Operation, Frequency Response • Direct Coupled Amplifier AC/DC Operation , Frequency Response • Amplifier Circuits • Single-Ended Power Amplifiers: Introduction, DC Operation, AC Operation, Voltage Gain, Power Gain • Phase Splitter DC Operation • Voltage Gain and Input/Output Signal Phase Relationship • Push-Pull Power Amplifiers: DC Operation, AC Operation, Voltage and Power Gain • Complementary Power Amplifiers: DC Operation, AC Operation, Voltage	01

	Gain and Power Gain • Darlington Pair Current Gain Characteristics, Input and Output Impedance • Oscillators Operation: Unijunction, Hartley, Colpitts • JFET: Operating Characteristics, Effect fo Gate Bias on Pinch-Off, Dynamic Characteristics, DC Amplifier Operation, Voltage Gain, DC Current Source Operation and Power/Load Voltage Variation • MOSFET: Zero Bias Characteristic, Modes of Operation, Voltage Amplifier, Dual Gate MOSFET Mixer • UJT: Operating Characteristics, Waveform Generation • Thermistor and Photoresistor Operation • Fiber Optic Light Transfer (**With complete accessories and instruction manual)**	
04	**Thyristors And Power Control Trainer along with module and base unit to perform following topics:** • Thyristor: Component Familiarization, Circuit Fundamentals • Silicon Controlled Rectifier (SCR): Testing, DC Operation, Gate Trigger Voltage and Holding Current • Rectifiers: Half-Wave Rectifier, SCR Controlled Half-Wave Rectifier, Full-Wave Rectifier, Phase Control • UJT: Characteristics, Half and Fuill-Wave Phase Control • Bidirectional Conduction, Triggering Modes (4) **With complete accessories and instruction manual)**	01
5	**Digital Logic Fundamentals Trainer along with module and base unit to perform following topics :** • Component Location and Identification • Operation of General Circuits and IC Package Fundamentals • Logic Functions:AND, NAND, OR, NOR, Exclusive OR, NOR Gates • Dynamic Response of XOR/XNOR Logic Gates • DC Operation of a NOT and an OR-TIE • Transfer Characteristics of a Schmitt and a Standard LS TTL Gate • Flip-Flops: Set/Reset, D-Type, Statik JK, Dynamic Operation • Tri-State Gate: Output Enable Control, Sink and Source Control • TTL and CMOS: Static Trigger Levels, Dynamic Transfer Characteristics • Static and Dynamic Control of a Data Bus • Component Location and Identification • Operation of General Circuits and IC Package Fundamentals • Basic Counter Control Functions, Ripple Counter Waveforms, Synchronous Counter Circuit Waveforms and Glue Logic • Basic Operating Modes of the Shift Register • Shift Register Circuit Waveforms • Fundamental Binary Addition, Addition with Input and Output Carry • Fundamental Binary Comparisons • Comparators and Counter Modulus Control • Circuits • Component Location and Identification	01

	• Operation of General Circuits and IC Package Fundamentals • Fundamentals: BCD Decoder Operation, Priority Encoder Operation, ADC Operation, DAC Operation • Data Selector, Multiplexer, 1-Line-to-8-Line Demultiplexer • 1-Line-to-8-Line Demultiplexer • LED Decoder/Driver, 7-Segment LED Display, ODD and EVEN Parity • ODD and EVEN Parity • Parity Generator/Checker Glue Logic • Circuits and Digital Circuits **With complete accessories and instruction manual)**	
6	**Analog Communications Trainer :(Complete)** • Analog Communication Concepts and Circuit Board Familiarization • Amplitude Modulation, RF Power Amplifier, Balanced Modulator, RF Stage • Mixer, IF Filter, Envelope Detector, Balanced Modulator, LSB Filter, RF Power Amplifier, Mixer, RF Stage • Mixer and RF Power Amplifier • RF Stage, Mixer, and IF Filter • Product Detector and Automatic Gain Control • Frequency and Phase Modulation • Demodulation (Quadrature Detector) • PLL Circuit and Operation, FM Detection with a PLL **(With complete accessories and instruction manual)**	01
7	**Sensor and Transducer Trainer Covering following topics:** Introduction to Transducers and the Circuit Board □ Temperature Measurement, Control, RTD, Thermocouple □ Capacitance Sensor, Touch and Position Sensing □ Strain Gauge Characteristics □ Bending Beam Load Cell (Strain Gauge) □ Ultrasonic Principles, Distance Measurement □ Infrared Transmission/Reception, IR Remote Control □ Force Measurement □ Computerized Temperature Control and Measurement • Control Panels • Plunger Switches	01

	• Magnetic Proximity Sensors • Shock/Vibration Sensors • Electronic Active Sensors • Electronic Passive Sensors **With complete accessories and instruction manual)**	
8	**Magnetism And Electromagnetism Trainer along with base unit and Module to cover the following topics:** • Magnetism, Magnetic Fields, Making a Magnet • Electromagnet, Solenoid, Relay **(With complete accessories and instruction manual)**	01
9	**Digital Communications Trainer Complete with Covering following topics :** • Concepts of Digital Communications, Circuit Board Familiarization • PAM Signal Generation, Demodulation, PAM TDM Transmission and Reception • PTM Signal Demodulation and Generation • PCM Signal Generation and Demodulation, Signal Time-Division Multiplexing • DM Transmitter, Receiver and Noise • Channel Bandwidth and Noise **With complete accessories and instruction manual)**	01
10	**DC Machines Trainer: (300 watts)** • DC Series motor • DC Shunt motor • DC Compound motor • DC Separately excited motor • DC Series Generator • DC Shunt generator • DC Compound generator • DC Separately excited generator • Techo meter (Optical) • PRONY brake • EDDY Current brake • Brake control unit for above item with torque and speed display capability • Resistive, capacitive, and inductive loads • Motor/generator control unit to operate above machines	01

	• Complete measuring instruments and related accessories • DC volt, ampere, watt,and meters **With complete accessories and instruction manual)**	
11	**AC Machines Trainers:** **(300watts or above)** • Single phase induction motor • Single phase capacitor start motor • Single phase capacitor run motor • Single phase shaded pole motor (30watt or above) • Single phase repulsion motor • Universal motor • 3 phase motors. ➢ Squirrel cage ➢ Phase wound ➢ Double speed • 3 phase synchronous machine • TECHO meter (Optical) • Resistive, capacitive, and inductive loads • Motor/generator control unit to Operate above machines • Complete measuring instruments and related accessories • AC volt, ampere, Active power, reactive power, inductive power, power factor, frequency, meters • Variable frequency drive control unit **(With complete accessories and instruction manual)**	01
12	**Digital logic trainer Breadboard based** • Input Logic switches • Output LED's • Power supplies • Seven segment displays • TTL and CMOS provision • Clock Signals • Connecting wires • Breadboard size: 2400 tie points or above **(Along with all standard accessories mention in the brochure and instructional**	10

	manual and Student manual)	
13	**Analog Trainer Breadboard Based** • Breadboard size: 2400 tie points or above • Function generator (sine , square, Triangle, and Ramp • Fixed and variable power supplies ±0~25V, ±12V, +5V **(Along with all standard accessories mention in the brochure and instructional manual and Student manual)**	03
14	**PLC Trainer** DC output: Voltage: 0 – 24V Current: 0 – 2A Ac Output: Voltage: 220V Current: 1 Amp Input/output terminals is 32 or above Memory: 32K or above Internal memory: 2K Timer/counter: 128/64 Base Module: Din Rail Power supply module: input:120/230 V (AC) Output: 24 V DC/5 A PC interface: USB or Ethernet With software supported (LAD, FBD, and STL). Accessories: Connection cords, PC cable, ac power cord, Program CD, Manual. PLC Application Modules: • Traffic Lights • Electro-Pneumatics	02

	• Electro-Mechanical – DC Motor • Electro-Mechanical – Stepper Motor • Level Process Control	
15	**Fire Alarm Training Systems:** • Wiring and Schematics • Component Location and Wiring • EOLR • Remote Zone Indicators • Pull Stations/Connections • Control Panels • Horn Strobes • Junction Boxes • Layout Diagrams **(With complete accessories and instruction manual)**	01
16	**Refrigerator and Air Conditioner Trainer:** Base unit for the refrigeration training system Condensing unit, consisting of hermetic compressor, condenser, receiver, pressure switches and shut-off valves Insulated refrigeration chamber with integrated evaporator, electric defrost heater and condensate drip tray Refrigeration chamber, condensing unit and power supply equipped with shock-proof lab jacks Refrigerant R134a, CFC-free **Air-cooled condensing unit** **Evaporator with fan** 220V 1 phase, 50Hz, 1 condensing unit 1 refrigeration chamber 1 set of instructional material **Air Conditioner Trainer** Air Conditioning System Trainer contains three types of liquid control devices, a capillary tube, Thermostatic expansion valve, and hand expansion valve. A reversing valve is included so that the system may be run as a heat pump. all of the system's fittings have been brazed. The trainer includes sight glasses and pressure gauges at the inlet and outlet of the evaporator and condenser, thermometer wells,	01

	temperature and pressure controls, Receiver, filter dryer, and accumulator. It is factory charged withR-410A refrigerant. Furnished complete with operating instructions, experiment and teacher manuals. The components are mounted to a panel and completely piped and wired. All components are clearly identified by legends. The panel is mounted to a mobile cart with four (4) casters, two with brakes.	
17	**Analog Dual Trace Oscilloscope, 40 MHz:** The module should include CH 1, CH 2, CHOP, and ALT display modes, an operating instruction manual, one line cord, and two low-capacitance probes. **(With complete accessories and instruction manual)**	03
18	**Laboratory Instruments demonstration type:** The Laboratory Instruments module should consist of the following devices. • DC meter • Sine/square wave generator • Electronic volt-ohm-millimeter (VOM) • AC/DC power supply **(With complete accessories and instruction manual)**	02
19	**Digital Function Generator** 20MHz, Sine, Square, Ramp, Noise waveform Amplitude, DC Offset and other key setting information shown on the 5~8 digit display **(With all accessories mention in the brochure and instructional manual)**	02
20	**Digital storage oscilloscope** 100 MHz Bandwidth with 2 Input Channels with color display. **(With all accessories mention in the brochure and instructional manual)**	02
21	**Digital Multimeter with dual measurement displays (Bench Type)** DC Voltage :100 mV ~ 1000V DC Current: 100µA ~ 10A Resistance : 100Ω ~ 100 MΩ	02

	AC Voltage: 100mV ~ 750V AC Current: 100mA ~ 10A Power Source: 230 V **(With all accessories mention in the brochure and instructional manual)**	
22	**Digital Clamp on meter:** AC Amp: 200A AC Vtg: 600V DC Vtg: 600V Ohms: 20MΩ **(With complete accessories and instruction manual)**	05
23	**Digital Multimeter (Hand Held):** DC Voltage : 1000 V DC Current: 10A Resistance : 20 MΩ AC Voltage: 600 V AC Current: 10 A **(With complete accessories and instruction manual)**	05
24	**Digital LCR Meter bench type** Resistance : 0.00001Ω ~ 99999kΩ Capacitance: 0.00001pF ~ 99999uF Inductance : 0.00001mH ~ 99999H Quality Factor : 0.0001 ~ 9999	02

	Impedance : 0.00001Ω ~ 99999kΩ **(With all accessories mention in the brochure and instructional manual)**	
25	**Multiple output Dual range DC power supply:** 0 ~ 30V x 2, 0~5amp x 2 **(With complete accessories and instruction manual)**	02
26	**Single and 3-phase Transformer Trainer:** ➢ Input single phase: 220~260vac, 2amp ➢ Input 3 phase: Phase ~ phase 380 ~ 440vac, 2amp (phase ~ neutral) ➢ Output single phase: 80%, 90%, 100%, and 110% ➢ Output 3 phase: 80%, 90%, 100%, and 110%. • Distribution Transformer • Single-Phase Transformers Supplying Single-Phase Loads • Single-Phase Paralleling • 3-Phase Paralleling • Efficiency calculation of each transformer • Open/no load test • Load/Short circuit • Polarity test • Three-Phase Banking of Single-Phase Transformers	01
27	**Motor Winding Kit:** • Equipment Familiarization • Split-Phase Capacitor-Start Motor • Three-Phase Squirrel Cage Induction Motor • DC compound motor • Motor Winding machine with counter • Coil winding range up-to 8 inch • All motors should be without winding **(With complete accessories and instruction manual)**	01
28	**Electric Iron** 1000 W or above	05
29	**Pedestal Fan 24''** Standard Type	05
30	**Ceiling Fan 56''**	05

	Standard Type	
31	**Kitchen Grinder** Standard Type	05
32	**Juicer blender**	03
33	**Water Heater 2 KW or above**	05
34	**Kitchen Microwave Oven**	03
35	**Electricians Tool belt Tool Kit 13Pcs:**(One kit for each student) 5m/16" ST tape measure, 125-250V AC mains tester, junior hacksaw, 210mm pocket level, electricians knife, 160mm combicutter, 170mm snipe nose pliers and 185mm combination pliers; 5 x screwdrivers (PZD 2 x 100mm, SLP 2.5 x 75mm, SLP 5.5 x 125mm, SLP 6.5 x 150mm). **(With complete accessories and instruction manual)**	15 set