

TECHNICIAN POWER ELECTRONICS SYSTEMS TRAINEES TOOL KIT FOR 20 TRAINEES +1 INSTRUCTOR

SI No.	Names of the Items
1	Connecting screwdriver 100 mm
2	Neon tester 500 V.
3	Screw driver set (set of 5)
4	Insulated combination pliers 150 mm
5	Insulated side cutting pliers 150 mm
6	Long nose pliers 150 mm
7	Soldering iron 25 W. 240 V.
8	Electrician knife
9	Tweezers 100mm
10	Digital Multimeter (3 ½ digit) Technical Specifications: <ul style="list-style-type: none"> ▪ DC Voltage range : 200mV, 2V, 20V, 200V, 1000V ▪ Accuracy : +(0.5% + 3 Digit) ▪ DC Current range : 20microA, 2mA, 200mA, 20A ▪ Accuracy : +(1.5% + 3 Digit) ▪ AC Voltage range : 2V, 20V, 200V , 750V ▪ Accuracy : + (0.8% + 5 Digit) ▪ AC Current range : 2mA, 200mA, 20A ▪ Accuracy : +(1.5% + 3 Digit) ▪ Resistance range : 200ohm, 2Kohm, 20Kohm, 200Kohm, 2Mohm, 20Mohm ▪ Accuracy : + (0.8% + 3 Digit) ▪ Capacitance range : 20nF, 200nF, 20microF, 200microF ▪ Accuracy : + (2.5% + 20 Digit) ▪ Temperature : - 40°C ~ 100°C ▪ Accuracy : + (0.8% + 4 Digit) ▪ Input impedance : 10Mohm ▪ Sampling Rate : 3s ▪ AC Frequency Response : 40 ~ 400Hz ▪ Power requirement : Battery 9V (Included) Standard Accessories : <ul style="list-style-type: none"> ▪ Probes, Batteries, Instruction manual
11	Soldering Iron Changeable bits 10 W
12	De- soldering pump

B. General Machinery Shop outfit

SI.No	Name of the items
1	Steel rule 300mm
2	Steel measuring tape-3 m
3	Tools makers vice 100mm (clamp)
4	Tools maker vice 50mm (clamp)
5	Crimping tool (pliers)
6	Magneto spanner set
7	File flat 200mm bastard
8	File flat 200mm second cut
9	File flat 200mm smooth
10	100mm flat pliers
11	100mm round Nose pliers
12	Scriber straight 150mm

13	Hammer ball pen 0.5Kg
14	Allen key set (set of 9)
15	Tubular box spanner (set of 6Nos)
16	Magnifying lenses 75mm
17	Continuity tester
18	Hacksaw frame adjustable
19	Cold chisel 20mm
20	Scissors 200mm
21	Handsaw 450mm
22	Hand Drill Machine
23	First aid kit
24	Fire Extinguisher
25	Bench Vice
26	<p>Dual DC regulated power supply 30-0-30 V, 2 Amps</p> <p>Technical Specifications:</p> <p>Variable Output</p> <p>Dual Output Voltage : 0 ~ +30VDC</p> <p>Dual Output Current : 0 ~ 2A</p> <p>Fixed Output : 5VDC/2A</p> <p>Stability : 0 to nominal value continuously variable</p> <p>: Voltage: <0.01% +2mV</p> <p>: Load: < 0.01% +2mV</p> <p>Recovery Time : < 100ms</p> <p>Ripple & Noise : < 1mV rms (efficient value)</p> <p>Temperature Factor : < 300 PPM / oC 0 to nominal value Continuously</p> <p>Current Load Stability : < 0.2% +3mA</p> <p>Source Regulation : < 0.05% +10mV</p> <p>Load Regulation : < 0.05% +10mV</p> <p>Digital Display : 3 Digit voltage & current display</p> <p>Accuracy : +1%, +1 Digit</p> <p>Mode : Independent, Series and Parallel modes</p> <p>Power requirement : 220 VAC +10% , 50 Hz</p> <p>Standard Accessories :</p> <p>Power cable, Instruction manual</p>
27	<p>DC regulated variable power supply 0-24 V, 1Amp</p> <p>Technical Specifications:</p> <p>Variable Output</p> <p>Output Voltage : 0 ~ 24VDC</p> <p>Output Current : 0 ~ 1A</p> <p>Source Regulation : < 0.05% +10mV</p> <p>Load Regulation : < 0.05% +10mV</p> <p>Ripple & Noise : <1mV (rms)</p> <p>Digital Display : 3 digit voltage display</p>
28	<p>LCR meter (Digital)</p> <p>Technical Specifications :</p> <p>R: 0.0001ohm - 99.99 Mohm ,</p> <p>C : 0.01 pF -19999microF,</p> <p>L :0.01 microH - 9999H</p> <p>D: 0.0001 - 9.999,</p> <p>Q: 0.01 - 9999</p> <p>Measuring parameters : L-Q , C-D , R-Q</p> <p>Test frequency : 100 Hz , 1 kHz , 10 kHz</p> <p>Level : 0.3Vrms</p> <p>Accuracy : 0.25%</p>

	<p>Display range : R, 0.0001ohm -99.99 Mohm : C, 0.01 pF -19999 microF : L, 0.01microH -9999 H : D, 0.0001 - 9.999 : Q, 0.01 - 9999</p> <p>Sampling rate : 5 times/sec. Equivalent circuit : Series, Parallel Test Mode : Auto, Hold Calibration : Open circuit, Short circuit and Zeroing Test Ports 5 terminals</p> <p>Display mode : Direct readout Power requirement : 220 VAC +10% , 50 Hz Weight : 3.0Kg Approx. Dimensions (mm) : 360(L) x 340(B) x 120(H)</p> <p>Standard Accessories : Power cable, Instruction manual</p>												
29	<p>CRO Dual Trace 20 MHz (component testing facilities) Features :</p> <ul style="list-style-type: none"> DC ~ 20MHz With component tester Dual channel/Dual tracing, X-Y mode 6" display cathode ray tube, sensitivity triggering up to 1mV/divison TV synchronous separation circuit to observe stable TV signal Hold-Off function <p>Technical Specifications :</p> <p>CRT : 6" Rectangular screen with internal graticule, 8 x 10 Div (1Div=1cm)</p> <p>Vertical Deflection Vertical Operation Mode: CH1, CH2, ADD, ALT, CHOP, CH2 INV Sensitivity : 5mV/div to 20V/div +3%, 1mV/div to 4V/div +5% (x5), 12 steps Rise time : <17.5ns <50ns Input impedance : 1Mohm +3% / 25pF +5pF Max. Input voltage : 400V (DC+AC p-p) at 1kHz Input coupling : AC, DC, GND</p> <p>Horizontal Deflection Sweep time : 0.2micro s to 0.5s/div +3% Sweep expansion : x10 Max. Sweep time : 20ns/Div</p> <p>Trigger System Triggering mode : Auto, NORM, TV-V, TV-H, Lever lock Trigger source : VERT, CH1, CH2, LINE, ALT Trigger coupling: AC Trigger slop : "+" or "-" Trigger sensitivity : 5Hz ~ 10MHz 10MHz ~ 20MHz</p> <table border="0" style="margin-left: 40px;"> <tr> <td>CH1, CH2</td> <td>-</td> <td>1Div</td> <td>1.5Div</td> </tr> <tr> <td>ALT</td> <td>-</td> <td>2.0Div</td> <td>3.0Div</td> </tr> <tr> <td>Ext</td> <td>-</td> <td>200mV</td> <td>300mV</td> </tr> </table> <p>TV sync pulse >2Div or 0.5V (Ext) External Trigger: Input impedance - 1Mohm+3%, 25pF+5pF Max. Input voltage - 400V(DC+AC peak)at1kHz X-Y Phase Difference : <30, DC-50kHz Calibration waveform : 1kHz square wave, 2Vp-p +2% Power requirement : 220 VAC +10% , 50 Hz Weight : 8.0Kg Approx.</p>	CH1, CH2	-	1Div	1.5Div	ALT	-	2.0Div	3.0Div	Ext	-	200mV	300mV
CH1, CH2	-	1Div	1.5Div										
ALT	-	2.0Div	3.0Div										
Ext	-	200mV	300mV										

	<p>Dimensions (mm) : 310 (L) x440(B) x 145(H)</p> <p>Standard Accessories : Power cable, Probe - 2Nos., Instruction manual</p>
30	<p>Signal Generator, 0-100 KHz</p> <p>TECHNICAL SPECIFICATIONS:</p> <p>Display : LCD type displaying setted frequency & type of waveform selected.</p> <p>Frequency Counter : Int / Ext (up to 20Mhz)</p> <p>FREQUENCY RANGE : 1Hz - 200KHz in six steps.</p> <p>WAVES : SINE / SQUARE / TRIANGULAR selectable using "WAVEFORM" selector bandswitch.</p> <p>AMPLITUDE : 0 - 20V peak to peak(approx.)</p> <p>ACCURACY : + 3% on all ranges.</p> <p>OUTPUT IMPEDANCE : 60 Ohms (Approx.)</p>
31	Battery Charger 0-12V /2 Amp
32	<p>Analog multimeter</p> <p>Technical Specifications :</p> <p>DC Voltage range : 0.1, 0.5, 2.5, 10, 50, 250, 1000V</p> <p>Accuracy at FSD : 4%</p> <p>Sensitivity : 20Kohm / V</p> <p>DC Current range : 50microA(at 0.1VDC position),2.5~25mA, 0.25A</p> <p>Accuracy at FSD : +3%</p> <p>Volt drop : 250mV</p> <p>AC Voltage range : 10, 50, 250, 1000V</p> <p>Accuracy at FSD : 5%</p> <p>Sensitivity : 9Kohm / V</p> <p>Decibel meter : -10 ~ +50dB, 0dB = 1mw/600</p> <p>Resistance range : X1~0.2ohm up to 2Kohm, Mid scale at 20ohm : X10~2ohm up to 20Kohm, Mid scale at 200ohm : X1K~200ohm up to 2Mohm, Mid scale at 20Kohm : X1K~2Kohm up to 20Mohm, Mid scale at 200Kohm</p> <p>ICEO (leakage current test) : 150microA, 15mA, 150mA</p> <p>hFE (DC amplification) : 0-1000</p> <p>Power requirement : Battery AA, 1.5V x 2nos. &9V (Included)</p> <p>Weight : 300g Approx.</p> <p>Standard Accessories : Probes, Batteries, Instruction manual</p>
33	<p>Function generator (Triangular, square and sine wave)</p> <p>Features :</p> <p>Output Waveform: Sine, Square, Triangle, Ramp, Pulse</p> <p>Voltage Control Frequency (VCF) capability</p> <p>TTL/CMOS and output synchronous output</p> <p>1Hz~30MHz(Ext.) Frequency Counter</p> <p>AM &FM Output</p> <p>Technical Specifications :</p> <p>Frequency range : 0.1Hz ~ 10MHz</p> <p>Output waveform : Sine, Triangle, Square, Positive & Negative Pulse, Positive & Negative Ramp</p>

<p>Output impedance : 50ohms \pm 10%</p> <p>Amplitude : Not less than 20V p-p (open circuit)</p> <p>DC voltage : 0 ~ +10V continuously adjustable</p> <p>Symmetry range : 90:10 – 10:90</p> <p>Rising edge of square : <50ns</p> <p>Sine characteristics : < 1% at 10Hz ~ 100KHz</p> <p>Distortion</p> <p>Frequency response : 0.1Hz ~ 100kHz :< \pm 0.5dB : 100kHz ~ 2MHz :<\pm 1dB</p> <p>TTL/CMOS Output level : TTL low level <0.4V in pulse wave, highlevel <3.5V. CMOS low <0.5V in pulse wave, High level 5V~14V continuously Variable</p> <p>Rising time : < 100ns – 50ns</p> <p>VCF Input</p> <p>Output voltage : -5V~0V \pm 10%</p> <p>Max. Volt-controlled : 1000:1</p> <p>Input signal : DC ~ 1kHz</p> <p>Frequency Counter</p> <p>Measuring range : 1Hz ~ 30MHz</p> <p>Input impedance : Not less than 1Mohms/ 20pF</p> <p>Sensitivity : 100mV rms</p> <p>Max. Input : 150V (AC + DC)</p> <p>Input attenuation : 20dB</p> <p>Accuracy : Less than 0.003% \pm 1 digit</p> <p>Power requirement : 220 VAC +10% , 50 Hz</p> <p>Weight : 3.0Kg Approx.</p> <p>Dimensions (mm) : 225(L) x 270(B) x 85(H)</p> <p>Standard Accessories :</p> <p>Probe - 1No., Power cable, BNC to Crocodile Clip Probes - 1No & BNC to BNC Instruction manual</p>	
<p>Or ELECTRONIC WORK BENCH</p> <p>Features :</p> <p>All devices (Instruments, Power Supplies, etc) are integrated in the device panel with modular construction</p> <p>Workbench have painted frame and device panel made of laminated board</p> <p>All fitting supplied with uniform color scheme</p> <p>Lockable wheels are provided on all four legs</p> <p>Technical Specifications :</p> <p>Oscilloscope : 20MHz Analog Oscilloscope with Frequency Counter Dual Trace - 1no</p> <p>Function Generator:Function Generator - 1no</p> <p>DC Power Supply :0 ~ +30V/2A Single Output - 1no</p> <p>Multimeter :3.5 Digit Digital Multimeter - 1no</p> <p>Multimeter :Analog Multimeter - 1no</p> <p>Soldering Station :Soldering Station - 1no</p> <p>Dimer stat :0-270V / 2 Amp - 1 No.</p> <p>Components Tray :1 No</p> <p>Power Switches:2 nos (220VAC)</p> <p>Overload Protection: MCB provided</p> <p>Pull out drawer with Lock :2 nos</p> <p>Writing Pad Desk :1no</p> <p>Power requirement: 220 VAC +10% , 50 Hz</p>	

	<p>Standard Accessories : Power cable, Probes, Instruction manual</p>
34	<p>Dimmer state, 3 Amps Technical Specifications: s Variable Auto Transformer 0-270VAC s Input Single Phase 230V s Output Voltage 0-270VAC s Output Current 3 Amps</p>
35	<p>Analog Component Trainer Technical Specification : DC REGULATED POWER SUPPLIES Output Voltages : Two Variable DC Regulated Power Supply of 0-3V & 0-30V/250mA. :One fixed DC Regulated Power Supply of +5V/250mA. :Two fixed DC Regulated Power Supply of +15V/250mA. AC SUPPLY : Output Voltage:10 - 0 - 10V/500mA DPM (DIGITAL PANEL METER) : 01No. of Voltmeter 20VDC & 01No. of Current Meter 2AMP.DC Power requirement : 230V ac +10%, 50Hz List of Experiments : PN Junction Diode V-I Characteristics Zener Diode V-I Characteristics Voltage Stabilization of Zener Diode LED Characteristics Resistance in Series & Parallel LCR Resonance Circuit Clipping & Clamping Half Wave, Full Wave & Bridge Rectifier Common Base Transistor Amplifier Common Emitter Transistor Amplifier Common Collector Transistor Amplifier Basic Logic Gates RC Passive Filter Circuits Operational amplifier as Inverting Amplifier. Operational amplifier as Non-Inverting Amplifier. Operational amplifier as Differentiator. Operational amplifier as Square to Triangular Wave Convertor. Operational amplifier as Unity Gain Amplifier.</p>
36	<p>Op Amp trainer Technical Specifications : Inbuilt Fixed DC Regulated Power Supplies Output Voltages : 0-5VDC (2Nos.) : +12VDC IC's, Transistor & Components Provided IC : 741 Transistor : CL 100 (NPN) Resistances Capacitors High quality Aluminum used as front panel of 270 mm x 170mm & mounted on light weight shock proof plastic cabinet Circuit diagram printed on Aluminum Front Panel & all important test Points</p>

	<p>are brought out on front panel</p> <p>Power requirement : 230 VAC 10%, 50Hz.</p> <p>Weight : 1.0Kg Approx.</p> <p>Dimensions (mm) : 300(L) x 175(B) x 75(H)</p> <p>Standard Accessories :</p> <p>Power chord, Patch chords & Instruction manual.</p>
37	<p>Digital IC Trainer</p> <p>Technical Specification:</p> <p>Fixed output DC Regulated Power supply of 5V/0.5Amp for the complete instrument.</p> <p>Ten Green led Logic inputs logic '0' & logic '1' selectable using SPDT switches are provided on the L.H.S.of front panel.</p> <p>Ten Red led output indicators are also provided on the R.H.S of front panel.</p> <p>1 Hz monoshot clock pulse output with pulser switch provided on the front panel near "ON-OFF" power indicator.</p> <p>Four NAND Gates(IC 7400), Four NOR Gates(IC 7402), Two AND Gates(IC 7408), Two NOT Gates(IC 7404)- with input & output on sockets are provided on the front panel.</p> <p>One RS & D Flip Flop (IC 7400 & IC 7410) are provided inside the front panel & important connections are brought out on sockets.</p> <p>Four Bit Counter using IC 7493 provided inside the front panel & important connections are brought out on sockets.</p> <p>4:1 Multiplexer using IC 74153 placed inside the front panel and important connections are brought out on sockets.</p> <p>1:4 De-multiplexer using IC 74139 placed inside the front panel and important connections are brought out on sockets.</p> <p>Shift Register using IC 74194 placed inside the front panel and important connections are brought out on sockets.</p> <p>Power requirement: 220V ac +10%, 50Hz</p>
38	<p>Digital IC Tester</p> <p>Features :</p> <ul style="list-style-type: none"> Tests most of the 6 to 40 pin ICs in DIP package as per give in Test Library Automatic testing of variety of Ics Potential free 40 pin universal ZIF socket Six Seven Segment/16x2 LCD Display It has 16/12 keys for its operation Audio alarm to user whenever it is required <p>Power requirement : 220 VAC +10% , 50 Hz</p> <p>Weight : 1.0Kg Approx.</p>
39	<p>Digital and Analog Bread Board Trainer</p> <p>Technical Specification:</p> <p>Size of Breadboard : 172.5mm x 128.5mm</p> <p>Connection on Breadboard :1685</p> <p>DC Power Supplies : +5V/1A (Fixed), +15V/500mA (Fixed), -15V/500mA (Fixed), Two variable Power Supplies of 0-5V</p> <p>AC Supply : 12V-0-12V,9V-0-9V can be used as 9V,12V,18V,27V & also as center tap.</p> <p>Sine Wave Generator : Frequency Range 100Hz to 100KHz in 3 Coarse :Steps(X100, X1K, X10K) & FINE Control knob. Variable in Between steps.</p> <p>Output : Sine Wave with variable amplitude output with set amplitude Potentiometer.</p> <p>Logic Input : 4 Nos.</p> <p>Logic Indicator : 4 Nos (LED)</p> <p>Power Requirement : 220Vac ±10%, 50Hz.</p>
40	<p>Rheostats various values and ratings</p> <p>0 -1 Ohm, 5 Amp</p>

	0 -10 Ohm, 5 Amp 0- 25 Ohm, 1 Amp 0- 300 Ohm, 1 Amp
41	<p>POWER ELECTRONICS TRAINER with at least 6 no's of onboard applications</p> <p>Objectives:-</p> <p>To study dc fan speed control using PWM & MOSFET. To study light intensity control using PWM & IGBT. To study ac fan speed control using TRIAC & DIAC. To study Temperature control using comparator & BJT. To study light intensity control using SCR & DIAC. To study Light activated solid switch TRIAC, DIAC & LDR</p> <p>Technical Specification:</p> <p>Inbuilt power supplies: +12Vdc. Inbuilt signal conditioning circuits as per Thyristors. Oven provided on front panel. Dc fan (12V dc operated) provided on front panel. 4mm shrouded sockets provided for interconnection. 220V AC power supply input with ' ON/OFF ' switch to drive circuit on front panel . Circuits for different experiments are printed separately in blocks on front panel. Bakelite front panel for isolation. Two pin socket provided on front panel to connect load. 220V dc power supply input with' ON/OFF' switch to drive IGBT Circuit provided on front panel. Complete circuit diagram in different blocks. Power requirement: 220V ac +10%, 50Hz.</p>
42	Computers in the assembled form (including cabinet, motherboards, HDD, DVD, SMPS, Monitor, KB, Mouse, LAN card, Blu-Ray drive and player), MS Office education version.
43	Laptops latest configuration
44	Laser jet Printer
45	INTERNET BROADBAND CONNECTION
46	<p>Electronic circuit simulation software with 6 user licenses</p> <p>\ SPECIFICATIONS</p> <ul style="list-style-type: none"> <input type="checkbox"/> More than 25,000 analog, digital and mixed-signal parts including realistic behavioral models for resistors, inductors and capacitors <input type="checkbox"/> A large selection of active device models (diode, BJTs, FETs, MOSFETs, MESFETS, operational amplifiers, etc.) with no less than six distinct MOSFET models including BSIM3 and BSIM4 <input type="checkbox"/> A large number of "black box" virtual blocks performing signal processing and conditioning functions such as summer, multiplier, divider, limiter, differentiation, integrator, etc. <input type="checkbox"/> One-click generation of Net list file from any schematic <p>APPLICATIONS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Equipped with the Berkeley Spice 3F5 and Georgia Tech XSpice simulation engines, B2.Spice A/D can analyze a large variety of analog, digital, and mixed-mode circuits in both time and frequency domains including nonlinear devices and complex waveforms. <input type="checkbox"/> Many powerful analysis/test types : Transient, DC bias, AC Sweep, Sensitivity analysis, Distortion, Noise, Network analysis, etc. <input type="checkbox"/> Event-driven digital simulations with manual stepping and continuous clocking
47	Different types of electronic and electrical cables, connectors, sockets, terminations.
48	Different types of Analog electronic components, digital ICs, power electronic components, general purpose PCBs, bread board, MCB, ELCB
49	Crimping tools as necessary for performing terminations mentioned week no 17-21 of SEMSTER-1
	C.WORKSHOP FURNITURE:
1	Instructor's table
2	Instructor's chair

3	Metal Rack, 100cm x 150cm x 45cm																																		
4	Lockers with 16 drawers standard size																																		
5	Steel Almirah, 2.5 m x 1.20 m x 0.5 m																																		
6	Black board/white board																																		
Tools & Equipments for the trade of Technician Power Electronics Systems for Third Semester																																			
1	<p>DSO (colour)</p> <p>Features:</p> <ul style="list-style-type: none"> ·Slim design, compact and easy to carry ·500M Sa/s real time sampling rate, 50G Sa/s equivalent sampling rate ·Bandwidth : 25MHz ·TFT-LCD 8x18 div color display ·3 kinds of cursor modes,32 kinds of automation measurements ·Trigger types:Edge,Pulse,Video,Slope,Alternative ·6 digits hardware frequency counter, real time counting display ·Pop-up menu,friendly design ·2 groups of reference waveform, 20 groups of setting, 10 groups of waveform ·Independent channel control ·Standard interfaces: USB Host: support USB storage and FW upgrade; USB Device: support remote control and PictBridge print ; RS232 and Pass/Fail 																																		
2	<p>Soldering & De soldering Station</p> <p>Technical Specifications :</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">Main Unit</td> </tr> <tr> <td>Power consumption</td> <td>: 60W + 80W</td> </tr> <tr> <td>Main fuse</td> <td>: 3Amp</td> </tr> <tr> <td>Function display</td> <td>: LCD</td> </tr> <tr> <td colspan="2">Soldering Section:</td> </tr> <tr> <td>Voltage</td> <td>: 24V AC</td> </tr> <tr> <td>Power</td> <td>: 60W heat up rating 130W</td> </tr> <tr> <td>Temperature</td> <td>: 160OC - 480OC</td> </tr> <tr> <td>Heating element</td> <td>: Ceramic Heater</td> </tr> <tr> <td colspan="2">Desoldering Section:</td> </tr> <tr> <td>Voltage</td> <td>: 24V AC</td> </tr> <tr> <td>Vaccum pressure</td> <td>: 600mm Hg</td> </tr> <tr> <td>Power</td> <td>: 80W</td> </tr> <tr> <td>Temperature</td> <td>: 160OC - 480OC</td> </tr> <tr> <td>Power requirement</td> <td>: 220 VAC +10% , 50 Hz</td> </tr> <tr> <td>Weight</td> <td>: 6.0Kg Approx.</td> </tr> <tr> <td>Dimensions (mm)</td> <td>: 220(L) x 225(B) x 160(H)</td> </tr> </table> <p>Standard Accessories : Power cable, Soldering iron, Desoldering gun, Instruction manual</p>	Main Unit		Power consumption	: 60W + 80W	Main fuse	: 3Amp	Function display	: LCD	Soldering Section:		Voltage	: 24V AC	Power	: 60W heat up rating 130W	Temperature	: 160OC - 480OC	Heating element	: Ceramic Heater	Desoldering Section:		Voltage	: 24V AC	Vaccum pressure	: 600mm Hg	Power	: 80W	Temperature	: 160OC - 480OC	Power requirement	: 220 VAC +10% , 50 Hz	Weight	: 6.0Kg Approx.	Dimensions (mm)	: 220(L) x 225(B) x 160(H)
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Dimensions (mm)	: 220(L) x 225(B) x 160(H)																																		
3	<p>SMD Soldering & De soldering Station with necessary accessories</p> <p>Technical Specifications :</p> <p>Power consumption 250W High quality heating element Diaphragm air pump Air flow 23e/min (maximum) Supply with Air Nozzle Power requirement: 220 VAC +10% , 50 Hz</p>																																		

	<p>Weight: 3.0Kg Approx. Dimensions (mm): 190(L) x 250(B) x 130(H) Standard Accessories : Power cable, Desoldering gun, Instruction manual</p>
4	DOL starter
5	AC motor ¼ HP
6	<p>OR ELECTRICAL TRAINER FITTED WITH RESOURCES MENTIONED AT SL NO (DOL starter, contactors, relays, MCB, Motor suitable for electrical control circuit exercises)</p>
7	Seven segment DPM 0-20V DC
8	LCD based DPM 0-2A DC
9	<p>Power Electronics Trainer along with triggering circuit Objectives:- To study dc fan speed control using PWM & MOSFET. To study light intensity control using PWM & IGBT. To study ac fan speed control using TRIAC & DIAC. To study Temperature control using comparator & BJT. To study light intensity control using SCR & DIAC. To study Light activated solid switch TRIAC, DIAC & LDR Technical Specification: Inbuilt power supplies: +12Vdc. Inbuilt signal conditioning circuits as per Thyristors. Oven provided on front panel. Dc fan (12V dc operated) provided on front panel. 4mm shrouded sockets provided for interconnection. 220V AC power supply input with ' ON/OFF ' switch to drive circuit on front panel . Circuits for different experiments are printed separately in blocks on front panel. Bakelite front panel for isolation. Two pin socket provided on front panel to connect load. 220V dc power supply input with' ON/OFF' switch to drive IGBT Circuit provided on front panel. Complete circuit diagram in different blocks. Power requirement: 220V ac +10%, 50Hz.</p>
10	<p>Isolation Transformer Technical Specifications: Capacity : 1KVA Output voltage : 230VAC Tapping : 50% & 86.6% (Primary Turns 0-132-229-264 & Secondary turns 0-132-229-264) Ratio : 1:1 Operating temp :0 - 45 Deg Power requirement:220~240V AC , 50Hz, Single Phase</p>
	<p>Three phase variac Variable Auto Transformer Technical Specifications: Three Phase Variable Auto Transformer (Variac) is housed in a steel cabinet (Air cooled close type) with knob. Input and output connection provided on rear side of cabinet with connection diagram printed on plate. Fitted on wheel for easy movement. Output voltage :0-470V AC, 50Hz, 3Phase Maximum current: 10Amps in each phase Continuous current: 9Amps Maximum wattage: 8.1KW Approx.</p>

	<p>Operating temp. :0 - 45 Deg Power requirement:415~440V AC , 50Hz, 3 Phase</p>
	<p>Power supplies (fixed, variable, dual at least 5A) Technical Specifications: Variable Output Dual Output Voltage : 0 ~ +30VDC Dual Output Current : 0 ~ 5A Fixed Output : 5VDC/2A Stability : 0 to nominal value continuously variable : Voltage: <0.01% +2mV : Load: < 0.01% +2mV Recovery Time : < 100ms Ripple & Noise : < 1mV rms (efficient value) Temperature Factor : < 300 PPM / oC 0 to nominal value Continuously Current Load Stability : < 0.2% +3mA Source Regulation : < 0.05% +10mV Load Regulation : < 0.05% +10mV Digital Display : 3 Digit voltage & current display Accuracy : +1%, +1 Digit Mode : Independent, Series and Parallel modes Power requirement : 220 VAC +10% , 50 Hz</p>
	<p>Programmable power supply 0-30 V, 2 A</p>
	<p>SMPS trainer Technical Specifications <ul style="list-style-type: none"> • Rotary switch for selections of different input voltage & linearity coil for AC filtrations • Bridge rectifier to convert AC into DC • DC filtrations circuit is given to filter the impurities i.e. AC components. • High frequency transformer and high frequency transistor (BU 508) for switching action. • Feed back/ comparator circuit to maintain output voltage constant i.e. +10 % on load. • Two meters are provided on the front panel to measure the DC voltage & current. • Two bulb holder are mounted on the front panel to connect resistive (Bulb) load across the output. • Block diagram printed on front panel & test points brought out on front panel. • Power requirement: 230 VAC +10%, 50Hz. Standard Accessories Patch Chords & Instruction Manual.</p>
	<p>SMPS (used in Computer, PLC , TV)</p>
	<p>Single phase Inverter 1 KVA,3KVA with batteries</p>
	<p>Clip On meter Technical Specification : DC Voltage range : 400, 600V Accuracy : +1.0% AC Voltage range : 400, 600V Accuracy : + 1.5% AC Current range : 40, 400A Accuracy : + 2.0% Resistance : 400ohms Accuracy : + 1.0% Clamp size : 28mm (max.) Battery : 1.5V x 2 (Included)</p>
	<p>Microcontroller trainer kits (8051) along with programming software and applications Technical Specifications :</p>

	<p>CPU : 8031/8051/89C51 Memory : Total on board capacity of 128K bytes RAM : 32K bytes and space for further expansion ROM : 32K bytes of EPROM loaded with powerful program Timer : 16bit programmable timer/counter using 8253 I/O : 48 I/O lines using 8255 PPI Keyboard : 10 keys for command 16 key for hexadecimal data entry 1 key for vector interrupt & 1key for reset LED Display : 6 seven segment display (4 for address field& 2 for datafield) Bus : All data, address and control signals (TTL compatible available at FRC connector) Interface : RS-232-C through 8251 Power requirement: 220 VAC +10%, 50Hz Standard Accessories : Power Chord & Instruction Manual</p> <p>Application kits for Microcontrollers 6 different applications</p>
	3 phase inverter 2 KVA
	Discharge tester
	<p>Inverter trainer 500VA</p> <ul style="list-style-type: none"> • Power mosfet in bridge configuration 4No. Of power MOSFET's are connected to the DC source (built in) and necessary circuitry is provided to get a square wave AC source with variable frequency. • Selection of low frequency and high frequency can be made. • Low frequency AC. O/P is stepped up by an O/P transformer, to drive a 40W,230V lamp load. • For higher frequency operation only resistive load is provided, • All the required test points are provided. • The system is laid out on a neatly labeled poly carbonate panel with clear marketing of the various components .Model size 60x40x15 cms approx. <p>Standard Accessories</p> <ul style="list-style-type: none"> • 230 Volt / 15W Bulb, Power Chord, Patch Chords & Instruction Manual.
	<p>Auto transformer</p> <p>Technical Specifications: s Variable Auto Transformer 0-270VAC s Input Single Phase 230V s Output Voltage 0-270VAC s Output Current 4 Amps</p>
	1 phase UPS Online 3 KVA, 1 KVA
	<p>UPS trainer 500VA</p> <p>Technical Specifications :</p> <p>On board controller PCB On board input/output transformer & chargeable battery Digital panel meter for current reading 5 Test points provided on front panel only for observations 5 Fault switch provided on front panel for fault creation LED Indicators for status mode Power Requirement: 220VAC+10%,50Hz Standard Accessories : Power Chord & Instruction Manual</p>
	3 phase UPS 2 KVA
	<p>MOSFET chopper trainer</p> <p>Technical Specification</p> <ul style="list-style-type: none"> • In built power supply of range +15V DC / 200mA. • One number of Digital Panel Meter for voltage measurement of range 0-20V.

	<ul style="list-style-type: none"> • One number of Digital Panel Meter for current measurement of range 0-2A. • Selector Switch for selecting capacitance of different values i.e. 10mF, 20mF and 30mF. • Selector switch for selecting inductance of different values i.e. 10mH, 15mH and 20mH. • Variable load 50 Ohm to 550 Ohm . • On board frequency controls. • Circuit diagram printed on front panel & test points brought out on front panel. • Power requirement: 230 VAC +10%, 50Hz. <p>Standard Accessories</p> <ul style="list-style-type: none"> • Power Chord, Patch Chords & Instruction Manual
	<p>Step up chopper trainer kit Technical Specifications Stepping up voltage up to 10 times of input voltage. In built fixed power supply of +20VDC/ 5A. In built IC based DC regulated power supply +12VDC/300mA and +5VDC/300mA for the driving circuit. Op-amp.(OP 07) and power transistor (2N 6292) based driver circuit. On board frequency and duty cycle control of triggering pulse On board lamp holder. Circuit diagram printed, Mosfet 'IRFP 250N' & test points brought out on front panel. Power requirement: 230 VAC +10%, 50Hz. Standard Accessories 230 Volt / 40W Bulb, Power Chord, Patch Chords & Instruction Manual.</p>
	<p>Fiber optic Trainer kit Technical Specifications : In built IC based Fixed DC regulated power supply +6VDC & 3VDC Pre amplifier stages consists of MIC (Microphone), Photodetector, Transistors (548) and biasing network of Resistance and Capacitors Power amplifier stages consists of impedance matching transformers (Driver Transformers), Transistors (8550) & biasing network of Resistance and Capacitors Output section having LEDs and speaker, Fiber optic cable for transmission of Signal Circuit diagram printed on Glass Epoxy PCB & different combination of Resistance & test points are brought out on front panel Glass Epoxy PCB used as front panel of 300mm x 220mm & mounted on light weight shock proof plastic cabinet Power requirement: 220 VAC +10% , 50 Hz Weight : 3.0Kg Approx. Dimensions (mm): 330 (L) x225(B) x 75(H) Standard Accessories : Optical Fiber Cable (1mtr), Mic & Speaker, assembly to hold Fiber Cable, Graph Paper, Power Chord, Patch Chords & Instruction Manual</p>
	<p>Tools & Equipments for the trade of Technician Power Electronics Systems for Fourth Semester</p>
	<p>DC shunt motor 1HP with 3 point starter The Panel Instrument comprises of :</p> <p>Two Nos. of Voltmeters of Range 0-300V DC of size 96 * 96mm provided with input terminals. Two Nos. of Ammeters of Range 0-1A DC of size 96*96mm provided with input terminals. One No of Variac 4Amp with knob for variableDC source (Armature control) provided with terminals. One No of Variac 2Amp with Knob for variable DC source (field Control) provided with terminals One No of Miniature Circuit Breaker of Range 10A (MCB/DP). One No. of Digital RPM meter of size 48 * 96mm provided with 3 pin Connector .</p>

	<p>Circuit Diagram printed on Bakelite Sheet front panel With Instruments Connecting Terminals. Panel board of portable wooden panel box is in Tapered shape for better view angle. Dimension (mm): 470(L) x 460(B) x 620(H) Power Requirement :Single Phase 220V AC.</p>																														
	<p>Tachometer Technical Specification :</p> <table border="0"> <tr> <td>Measuring range</td> <td>: Photo/Laser</td> <td>: 5-99,999 RPM</td> </tr> <tr> <td></td> <td>: Contact</td> <td>: 5-19,999 RPM,</td> </tr> <tr> <td></td> <td></td> <td>0.05-999.9m/min (0.2-6,560ft/min)</td> </tr> <tr> <td>Measuring distance</td> <td>: Photo/Laser</td> <td>: max.2.0 meters</td> </tr> <tr> <td>Measuring angle</td> <td>: Photo/Laser</td> <td>: 600</td> </tr> <tr> <td></td> <td>: Contact</td> <td>: 1200</td> </tr> <tr> <td>Resolution</td> <td>: 0.1 RPM (< 1000 RPM), 1.0RPM (>1000 RPM)</td> <td></td> </tr> <tr> <td>Accuracy</td> <td>: ±0.05% +1 digit</td> <td></td> </tr> <tr> <td>Laser output</td> <td>: <1mW, Class II</td> <td></td> </tr> <tr> <td>Sampling time</td> <td>: 1 secretary. (over 6 RPM)</td> <td></td> </tr> </table>	Measuring range	: Photo/Laser	: 5-99,999 RPM		: Contact	: 5-19,999 RPM,			0.05-999.9m/min (0.2-6,560ft/min)	Measuring distance	: Photo/Laser	: max.2.0 meters	Measuring angle	: Photo/Laser	: 600		: Contact	: 1200	Resolution	: 0.1 RPM (< 1000 RPM), 1.0RPM (>1000 RPM)		Accuracy	: ±0.05% +1 digit		Laser output	: <1mW, Class II		Sampling time	: 1 secretary. (over 6 RPM)	
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	<p>3 phase induction motor 1Hp with DOL starter</p> <p><u>The Experimental Setup consists of the following parts:</u></p> <p>Three nos.of Moving Coil Ammeters of Range 5A AC of size 96*96mm provided with Input terminals. One no.of Moving Coil Voltmeter of Range 500V AC of size 96*96mm provided with Input Terminals. One no.of Single Phase Wattmeters of Range 2000W of size 96*96mm provided with Input Terminals. One no.of Single Phase Wattmeters of Range 500W of size 96*96mm provided with Input Terminals. One no. of RPM meter of size 48*96mm is also provided on the front panel to note down the RPM of the motor.</p> <p>One No of Direct On line Air Break Starter suitable Upto 1HP,3-phase. One No of Miniature Circuit Breaker of Range 400V/10Amps provided on the Input Side. Circuit Diagram printed on Bakelite Sheet front panel with instruments connecting terminal. Panel board of portable wooden panel box is in Tapered shape for better view angle. Dimension:470 x 460 x 620 mm (L x B x H). Power Requirement:Three Phase 415V AC.</p>																														
	<p>5 hp squirrel cage induction motor with star-delta starter</p> <p><i>The Experimental Setup consists of the following parts :</i></p> <p>One No. of Moving Coil Voltmeter of Range 0-500V AC of size 96*96mm provided with Input Terminals. Three Nos. of Moving Coil Ammeter of Range 0-5A AC of size 96*96mm provided with Input Terminals. One No. of Frequency Meter of Range 45-55Hz of size 96*96mm provided with Input Terminals. One No. of Miniature Circuit Breaker of Range 415V/ 25 Amps (MCB/ TP) Provided on the Input Side. One No. of Star Delta Starter manually operated suitable upto 5HP provided on the front panel. One No. of L.T. Control Reversing Switch of range 415V/ 25A provided on the front panel. Panel board of portable wooden panel box is in Tapered shape for better view angle. Dimension (mm): 787(L) x 254(B) x 560(H) Power Requirement: Three Phase 415V AC. Weight (In Kg): 18.9 Kg.</p>																														
	<p>DC drive trainer with 1hp motor using phase control method</p>																														

	DC drive trainer with 1hp motor using SCR chopper circuit
	Programmable DC drive with motor (Simoreg DC master) 6RA70
	Solar panel based Inverter 500VA
	VVVF drive trainer with 1 hp 3 phase motor Control Desk : The Control desk consist of an Instrument panel and working area. The control desk made of 30mm x 30mm x 1.6mm tubular mild steel and MS sheet of 1 mm thickness, Siemens Grey colour powder coated with wooden top on the working area. The overall dimensions W = 900 mm ; D = 625 mm ; H = 1500 mm. The Box type Instrument Panel above the working area and of size W = 900 mm ; D = 250 mm ; H = 750 mm & Front side of 6mm thick bakelite sheet of brown colour and fitted at inside of the tube structure. All other sides made of MS sheet, Two sides of the panel are to be perforated for air ventilation. Back side in the form of hinged door with suitable locking arrangement. The working area top fitted in front of the Instrument Panel at a height of 750 mm from bottom. The top of W = 900 mm x D = 375mm and made of 19mm marine plywood fitted with 3 mm Ivorycolour sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type bakelite insulated banana terminals provided for supply and motor connection. Circuit diagram of panel provided inside the panel. All accessories connected with internal wiring ferrules etc. Meters :1No. Digital Voltmeter Range 0-300V AC , Size 96X96mm :1Nos. Digital Ammeter Range 0-10A AC , Size 96X96mm :1No. Digital RPM Meter ,Size 96X96mm IGBT : Thyristor/IGBT AC Drive Protections :Triple pole & neutral isolator (TPN/MCB) 16Amps Power requirement:415~440V AC , 50Hz, 3 Phase Accessories: AC Induction Motor 3 Phase 3HP with Sensor Arrangement Technical Specifications (Induction Motor): Capacity :3HP Cage :Steel Body Class : E Class RPM : 1500 approx. Shaft :Single Current :6 Amps Max. Windings :Stator winding Input Terminal :6 Mounting :Foot Mounted arrangement Power requirement:415~440V AC , 50Hz, 3 Phase
	AC drive (Siemens Micro master 420) with AC motor 1hp
	PLC Systems with digital I/P, O/P modules and software PLC Trainer Features : Input switches (16) - 13 Nos. of toggle switches, and 3 Nos of push to on switches for input data to PLC. Output - 8 nos. of output shown by LED and terminals also provided. Connectors - Connector facilities is also given for Input and output data Technical Specification Description: Specification: Delta

<p>Power Supply Voltage 100-240V AC (-15%~10%), 50/60Hz</p> <p>Connector European standard removable terminal block (pin pitch:5mm)</p> <p>Operation DVP24ES2 start to run when the power rises to 95~100VAC and stops when the power drops to 70VAC. if the power is suddenly cut off,the MPU will continue running for 10ms.</p> <p>Power consumption 30VA</p> <p>DC 24V current output 500mA</p> <p>Power Supply Protection DC 24V output short circuit protection.</p> <p>Voltage withstand 1,500VAC (primary-secondary), 1,500VAC(primary-PE),500VAC (secondary-PE)</p> <p>Insulation resistance 5 M OHM.at 500VDC(between all I/O points and ground)</p> <p>NOISE IMMUNITY ESD: 8KV Air Discharge EFT: Power line: 2KV, Digital I/O: 1KV, Analog & communication I/O: 1KV RS: 26MHz~1GHz, 10V/m</p> <p>Grounding The diameter of grounding wire shall not be less than that of L, N terminal of the power supply.</p> <p>Environment Operation: 0 degree to 55 degree C (temperature), 50`95% (humidity), pollution degree 2 storage: -25 degree C to 70 degree C (temperature), 5~95% (humidity)</p> <p>Modules applications for above PLC Trainer</p> <p>ME PLC A Module for Traffic Light Control using PLC</p> <p>ME PLC D Module For Conveyer Belt Control</p> <p>ME PLC E Module for Motor start and stop operation using Timers , Counters and Motor Forward & Reverse direction control using PLC</p> <p>ME PLC F Module for DOL & Star Delta Starter using PLC</p> <p>ME PLC G Module for Water Level Control using PLC</p> <p>ME PLC H Module for Temperature Control using PLC</p> <p>ME PLC I Module for Sequence Control System using PLC</p> <p>ME PLC J Module for Elevator Control using PLC</p>
Solenoid 24 V AC
Lamp 24 V AC
AC power supply 24 V, 50 Hz, 2 A
DC power supply +12 V 2 A
DC power supply +5 V 2 A
<p>Electronic Pneumatics trainer</p> <p>Objective:</p> <p>Study of different type of pneumatic components & their application (Manual and Automatic Control)</p> <p>Study the extension and retraction of double acting pneumatic cylinder by different control valves</p> <p>To study the sequencing operation of double acting cylinders using 3/2 roller switch, timer operated valve & 5/2 pilot & spring control valve</p> <p>Solenoid control operation experiments for controlling the cylinder can be done using micro controller</p> <p>Technical Specification:</p> <p>Pneumatic Components</p> <ul style="list-style-type: none"> - Air compressors with following features <ul style="list-style-type: none"> - Displacement 3cfm - Working pressure 0- 10kg / cm² (10 bar) - Capacity of cylinder 180 Psi - 1HP Electric motor 230V, 50Hz, Auto cut facility - 0 -10 Bar Pressure Gauge & Shut off valve with suitable hose <p>and end connector</p>

- Filter regulator and lubricator (FRL) unit with pressure gauge
- Direction control valves of different configuration
 - 5/2 Double solenoid valve
 - 5/2 Single solenoid valve
 - 5/2 Single solenoid timer operated valve
 - 5/2 Pilot operated valve
 - 5/3 Hand lever operated valve
 - 3/2 Roller Switch
 - 4 Way manifold
- Pneumatic cylinders
 - Double acting cylinder (Stroke length 100mm & diameter 32mm)
 - Double acting cylinder (Stroke length 125mm & diameter 40mm)

Electronic Controller

- 220 V AC operated
- 8051 CPU
- Memory 64kB Flash
- Selection for Auto / Manual operation through SPST, SPDT &

DPDT switches

- System control manually through Push to ON switches
- Power Indicator LED
- Reset button for micro controller
- USB Connector type B

Power requirement: 220VAC +10%, 50Hz

Weight: - 30Kg Approx. (Main Control Unit)

- 10Kg Approx. (Air Compressor)

Dimensions (mm): 900(L) x 380(B) x 670(H)

Standard Accessories:

Air Compressor
 Instruction Manual
 USB Cable
 Program CD with Software

Servo Motor drive Trainer

Technical Specifications :

Control Unit

In built fixed AC power supply for AC servo motor:

- 100VAC/ mA for reference winding
- 0 ~ 60VAC/mA for control winding

RPM meter provide on board for speed measurement

Ammeter provided on board for load current measurement

Loading arrangement provided for Servo Motor

Front panel of 400mm x 225mm & mounted on light weight shock proof plastic cabinet

Circuit diagram printed on panel & all important test points are brought out on front panel

Power requirement : 220 VAC +10%, 50Hz

Weight : Kg Approx.

Dimensions (mm) : 430(L) x 230(B) x 90(H)

Motor Unit

AC Servo Motor with 2 phase windings having both side shaft coupled with loading arrangement on one end and 20 holes disc provided on other end. Photoelectric pickup and photo transistor act as a optocoupler in between disc for speed sensing

Standard Accessories :

Motor Unit, Power Chord, Patch Chords & Instruction Manual

	<p>Sensor trainer Kit – Objectives:- To study working principle of different types of Sensors (transducers). To study practical & Theoretical Aspects of different types Sensors (transducers). To study signal output & signal conditioning circuitry different types Sensors (transducers). Technical Specifications : DC Regulated Power Supplies +5VDC(fix) for LVDT, +5VDC(fix) for Thermocouple, +5VDC(fix) for RTD, +5VDC(fix) for Strain Gauge & Load Cell, +5VDC(fix) & 0-12VDC(variable) for Speed Sensor circuit & +9VDC(fix) & +5VDC(fix) for Smoke Sensor Circuit +5VDC(fix) for all DPMs. Separate mechanism for LVDT (LVDT Jig) with 5 pin connector, is provided, to be connected at "LVDT INPUT" connector provided in its signal conditioning circuit. Separate speed sensor, is provided, to be connected at "SPEED SENSOR INPUT" connector provided in "SPEED SENSOR "circuit. Separate smoke sensor, is provided, to be connected at "SMOKE SENSOR INPUT" connector provided in "SMOKE SENSOR ALARM" circuit. Separate Load Cell & Strain Gauge sensors, are provided, to be connected at "A,B,C & D" sockets provided in its circuit. Separate Thermocouple sensor (K-type) & RTD(PT-100) sensor along with their associated accessories, are provided, to be connected at "THERMOCOUPLE INPUT" & at "RTD INPUT" sockets respectively provided in their signal conditioning circuits. Three nos. of Digital Panel Meter (DPMs) are provided on front panel in their respective circuits for observing direct output of the respective experiments. One DPM fitted separately (provided with INPUT sockets "+" & "-") at top right corner can be used both for Thermocouple & RTD experiment with the help of "THERMOCOUPLE RTD" toggle switch. Circuit diagrams for different experiments are printed on front PCB panel & important Test Points (TPs) are extended to the front panel. Glass Epoxy PCB used as front panel of 458mm x 458mm & mounted on shock proof wooden box. Power requirement: 220V ac +10%, 50Hz</p>
	<p>Various field sensors and actuators(industrial grade switches, push buttons, pilot lamps, proximity sensors, Thermocouples, RTDs, load cells, strain gauge, LVDT, opto-switches, smoke detectors, level switches, solenoid valves, reed relays, Hall sensor, tacho-generator, low amp contactors etc.</p>