ELECTRICIAN

Tender Inviting Organization	**EDCIL (INDIA) LIMITED**
NIT No:	**EdCIL/EIS & EPS/PROC/2021/06 Dated: 23/07/2021**
Name of Work	**Supply, Installation & Commissioning of Electrician trade items of ITI for NLC India Limited, Neyveli (TN)**
Name of Bidder/Firm/ company	

List of Tools & Equipment (for batch of 2x20candidates)

BOQ S. No.	Name of the Tools and Equipment	Specification	Make	QTY	Unit	Unit Price (Rs.)	Amount (Exclusive of Tax) (Rs.)	Taxes. (%)	Taxes in (Rs.)	Amount (Inclusive of Tax) (Rs.)
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-12 is required additionally)										
E1	Measuring Steel Tape	5 meter	Freeman	42	No.		0		0	0
E2	Combination Pliers Insulated	200 mm	Venus/Pye	42	No.		0		0	0
E3	Screw driver Insulated	4mm X 150 mm, Diamond Head	Venus/Pye	42	No.		0		0	0
E4	Screw driver Insulated	6mm X 150 mm	Venus/Pye	42	No.		0		0	0
E5	Electrician screw driver thin stem insulated handle	4mm X 100 mm	Venus/Pye	42	No.		0		0	0
E6	Heavy Duty Screwdriver insulated	5mm X 200 mm	Venus/Pye	42	No.		0		0	0
E7	Electrician Screwdriver thin stem insulated handle	4mm X 250 mm	Venus/Pye	42	No.		0		0	0
E8	Punch Centre	9mm X 150 mm	Bharat/Sagar	42	No.		0		0	0
E9	Knife Double Bladed Electrician	100 mm	Standard Quality	42	No.		0		0	0
E10	Neon Tester	500 V	Pye/Taparia	42	No.		0		0	0
E11	Steel Rule Graduated both in Metric and English Unit	300 mm with precision of 1/4th mm	Omega/Sharp	42	No.		0		0	0
E12	Hammer, cross peen with handle	250 grams	Venus/Pye	42	No.		0		0	0
B. SHOP TOOLS & EQUIPMENT – For 2 (1+1) units no additional items are required										
(i) List of Tools & Accessories										
E13	Hammer, ball peen With handle	500 grams	Venus/Pye	4	Nos		0		0	0
E14	Pincer	150 mm	Standard Quality	4	Nos		0		0	0
E15	C- Clamp	200 mm and 100 mm	Taparia/BST	2	Each		0		0	0
E16	Spanner Adjustable drop forged, SS	150 mm & 300mm	Venus/ANT	2	Each		0		0	0
E17	Blow lamp brass	0.5 ltr	Prabhat	1	No		0		0	0
E18	Chisel Cold	25 mm X 200 mm	Taparia/Venus	2	Nos		0		0	0
E19	Chisel firmer with wooden Handle	6 mm X 200 mm	Natraj/Bharat	2	Nos		0		0	0
E20	Allen Key alloy steel	1.5-10 mm (set of 9)	Taparia/Venus	1	Set		0		0	0
E21	Grease Gun	0.5 ltr. Capacity	Kapson/prima	1	No		0		0	0
E22	Bradawl		Standard Quality	2	Nos		0		0	0
E23	Pully Puller with 3 legs	150 mm & 300mm	Taparia/Ambika	1	Each		0		0	0
E24	Bearing Puller (inside and outside)	200 mm	Taparia/Ambika	1	Each		0		0	0
E25	Pipe vice Cast Iron with hardened jaw open type	100 mm	Humma/BST	2	Nos		0		0	0
E26	Scissors blade, SS	200mm	Standard Quality	4	Nos		0		0	0
E27	Scissors blade, SS	150 mm	Standard Quality	2	Nos		0		0	0
E28	Crimping Tool	1.5 sq mm to 16 sq mm	Jaipson	2	Nos		0		0	0
E29	Crimping Tool	16 sq mm to 95 sq mm	Jaipson	2	Nos		0		0	0
E30	Wire Cutter and Stripper	150 mm	Venus/Pye	4	Nos		0		0	0
E31	Mallet hard wood	0.50 kg	Standard Quality	4	Nos		0		0	0
E32	Hammer Extractor type	250 grams	Venus/Pye	4	Nos		0		0	0
E33	Hacksaw frame	Adjustable 300 mm, Fixed 150 mm	Jolly/Hira	2	Each		0		0	0
E34	Try Square	150 mm blade	Kundan/Kranti	4	Nos		0		0	0
E35	Outside Calliper	150 mm spring type	Bharat/Sagar	2	Nos		0		0	0
E36	Inside Calliper	150 mm spring type	Bharat/Sagar	2	Nos		0		0	0
E37	Divider	150 mm spring type	Bharat/Sagar	2	Nos		0		0	0
E38	Pliers long nose insulated	150 mm	Venus/Pye	4	Nos		0		0	0
E39	Pliers flat nose insulated	200 mm	Venus/Pye	4	Nos		0		0	0
E40	Pliers round nose insulated	100 mm	Venus/Pye	4	Nos		0		0	0
E41	Tweezers	150 mm	Standard Quality	4	Nos		0		0	0
E42	Snip Straight and Bent heavy duty	250	Standard Quality	2	each		0		0	0
E43	D.E. metric Spanner Double Ended	6 - 32 mm	Venus/Ambika	2	Set		0		0	0
E44	Drill hand brace	0-100mm	Standard Quality	4	Nos		0		0	0
E45	Drill S.S. Twist block	2 mm, 5 mm and 6 mm set of 3	JK/Mirinda	4	Set		0		0	0
E46	Plane cutters	50 mm X 200mm	BST/STD	2	Nos		0		0	0
E47	Smoothing cutters	50 mm X 200mm	BST/STD	2	Nos		0		0	0
E48	Gauge, wire imperial stainlees steel marked in SWG & mm	Wire Gauge - Metric	Omega/Crystle	4	Nos		0		0	0
E49	File flat	200 mm 2nd cut with handle	JK/Taparia	8	Nos		0		0	0
E50	File half round	200 mm 2nd cut with handle	JK/Taparia	4	Nos		0		0	0
E51	File round	200 mm 2nd cut with handle	JK/Taparia	4	Nos		0		0	0
E52	File flat rough	150 mm with handle	JK/Taparia	4	Nos		0		0	0
E53	File flat bastard	250 mm with handle	JK/Taparia	4	Nos		0		0	0
E54	File flat smooth	250 mm with handle	JK/Taparia	4	Nos		0		0	0
E55	File Rasp, half round	200 mm bastard with handle	JK/Taparia	4	Nos		0		0	0
E56	Copper bit soldering iron.	0.25 kg	Standard Quality	2	Nos		0		0	0
E57	De soldering Gun	Heat proof nozzle, PVC type, 250mm	Tony/Soldron	4	Nos		0		0	0
E58	Hand Vice	50 mm jaw	Lion/Apex	4	Nos		0		0	0
E59	Table Vice	100 mm jaw	Lion/Apex	8	Nos		0		0	0
E60	Oil Can	250 ml	Prima/Kapson	2	Nos		0		0	0
E61	Contactor & auxiliary contacts	3 phase, 415 Volt, 25 Amp with 2 NO and 2 NC	Standard Quality	2	Each		0		0	0
E62	Contactor & auxiliary contacts.	3 phase, 415 volt, 32 Amp with 2 NO and 2 NC	Standard Quality	2	Each		0		0	0
E63	Limit Switch	Limit Switch, Liver operated 2A 500v, 2-contacts	Standard Quality	2	Nos		0		0	0
E64	Rotary Switch	16 A/440v	Standard Quality	2	Nos		0		0	0
E65	Relay- a. Cut out Relays b. Reverse current c. Over current d. Under voltage	a. 16A, 440V b. 16A, 440V c. 16A, 440V d. 360V-440V	Standard Quality	2	each		0		0	0
E66	Pin Type, shackle type, egg type & suspension type insulators including hardware fitting	Each	Standard Quality	2	each		0		0	0
E67	Hydrometer		Standard Quality	2	Nos		0		0	0

E68	Hand Drill Machine	0-6 mm capacity	Standard Quality	2	Nos		0		0	0
E69	Portable Electric Drill Machine	0-12 mm capacity 750w, 240v with chuck and key	Bosch/Black & Deccar	1	Nos		0		0	0
E70	Load Bank (Lamp / heater Type)	6 KW, 3Ph	Standard Quality	1	Nos		0		0	0
E71	Brake Test arrangement with two spring balance rating	0 to 25 kg	Standard Quality	1	Nos		0		0	0
E72	Laboratory Type Induction Coil	1000 W	Standard Quality	2	Nos		0		0	0
E73	Out Side Micrometer	0 - 25 mm least count 0.01mm	Insize/Precision	2	Nos		0		0	0
E74	Thermometer Digital	0° C - 150° C	Standard Quality	1	Nos		0		0	0
E75	Series Test Lamp	230V, 60W	Standard Quality	4	Nos		0		0	0
E76	Knife Switch DPDT fitted with fuse terminals	16 Amp	Standard Quality	4	Nos		0		0	0
E77	Knife Switch TPDT fitted with fuse terminals	16 Amp/ 440 V	Standard Quality	4	Nos		0		0	0
E78	Miniature Breaker	16 amp	Standard Quality	2	Nos		0		0	0
E79	Earth Plate	60cm X 60cm X 3.15mm Copper Plate 60cm X 60cm X 6mm GI Plate	Standard Quality	1	Each		0		0	0
E80	Earth Electrode	Primary Electrode 2100x28x3.25mm Secondary Cu Strip 20x5mm	Standard Quality	1	Nos		0		0	0
E81	MCCB	100Amps, Triple pole	Standard Quality	1	Nos		0		0	0
E82	ELCB and RCCB	25Amps, double pole and 25Amps, double pole, IΔn 30 mA	Standard Quality	1	Each		0		0	0
E83	Fuses	HRC Glass Rewire Type	Standard Quality	4	Each		0		0	0
E84	Rheostat (Sliding type)	0-25 Ohm,2Amp 0-30 Ohm,2Amp 0-1 Ohm,10Amp 0-10 Ohm,5Amp	Standard Quality	1	Each		0		0	0
E85	Capacitors	Electrolytic Ceramic Polyester film Variable Dual run	Standard Quality	2	Each		0		0	0
E86	Various Electronic components	Resistors, Diode, Transistor, UJT, FET, SCR, DIAC, TRAIC, IGBT, Small transformer etc.	Standard Quality	1	1 Set		0		0	0
E87	Various Lamps	Halogen Incandescent Lamp Fluorescent tube HP mercury vapor Lamp High-pressure sodium Lamp Low-pressure sodium Lamp LED	Standard Quality	1	Each		0		0	0
E88	Plug socket Piano Switch Lamp Holder	230 V, 5 A	Standard Quality	2	Each		0		0	0
E89	Cables: Twisted Pair Non-Metallic Sheathed Cable Underground Feeder Cable Ribbon Cable Metallic Sheathed Cable Multi-Conductor Cable Coaxial Cable Direct-Buried Cable	1 mtr each	Standard Quality	1	Each		0		0	0
E90	Bus bar with brackets	1 mtr each	Standard Quality	3	Nos		0		0	0
E91	Rubber mat	2′ x 4′ x 1″	Standard Quality	2	Nos		0		0	0
E92	Electrician Helmet	Yellow Colour	Standard Quality	2	Nos		0		0	0
E93	Safety Belt	Standard quality	Standard Quality	2	Nos		0		0	0
E94	Ohm Meter; Series Type & Shunt Type, portable box type	50/2000-ohm analog Ohm Meter; Series Type & Shunt Type Technical Specification Measuring range:200mohm, 2ohm, 20ohm, 200ohm, 2kohm, 20kohm 200kohm Output current : 100mA at 200mohm, 2ohm : 10mA at 20ohm : 1mA at 200ohm : 100microA at 2kohm, 20kohm : 10microA at 200kohm Resolution : 10micro ohm at 200mohm , 2ohm : 0.1micro ohm at 20ohm : 1mohm at 200ohm : 10mohmat 2kohm : 100mohmat 20kohm : 1ohmat 200kohm Open circuit voltage : <1.0Vat 200mohm, 2ohm, 20ohm : <4.0V at 200ohm, 2kohm, 20kohm, 200kohm Power requirement: 220 VAC +10% , 50 Hz Weight : 3.0Kg Approx. Dimensions (mm): 280(L) x 220(B) x 90(H) Standard Accessories : Power cable, Instruction manual	Standard Quality	2	Each		0		0	0
E95	Digital Multi Meter	DC 200mv -1000v,0 – 10A & AC 200mv- 750v , 0-10A, resistance 0-20 MΩ and 3 1/2 digit Digital Multi Meter Technical Specifications: DC Voltage range :200mV, 2V, 20V, 200V, 600V Accuracy : +(0.5% + 4 Digit) DC Current range : 200mA, 2mA, 20mA, 200mA, 10A Accuracy : +(1.5% + 3 Digit) AC Voltage range : 200V , 600V Accuracy : +(1.2% + 10 Digit) Resistance range : 200ohm, 2Kohm, 20Kohm, 200Kohm, 20Mohm Accuracy : +(0.8% + 5 Digit) Input impedance : 1M ohm Sampling Rate : 3s AC Frequency Response : 40 ~ 200Hz Power requirement : Battery 9V (Included) Standard Accessories : Probes, Batteries, Instruction manual	Standard Quality	12	Nos		0		0	0
E96	A.C. Voltmeter M.I. analog, portable box type housed in Bakelite case	Multi range 75 V - 150V - 300V - 600V	Standard Quality	3	Nos		0		0	0
E97	Milli Voltmeter centre zero analog, portable box type housed in Bakelite case	100 – 0 – 100 mV	Standard Quality	2	Nos		0		0	0
E98	Ammeter MC analog, portable box type housed in Bakelite case	0 - 500 mA, 0-5 A, 0-25 A Each	Standard Quality	2	Each		0		0	0
E99	AC Ammeter MI, analog, portable box type housed in Bakelite case	0 - 1 A, 0-5 A, 0-25 A Each	Standard Quality	2	Each		0		0	0
E100	Kilo Wattmeter Analog	0-1.5-3KW, pressure coil rating- 240v/440v, current rating-5A/10A Analoge, portable type Housed in Bakelite case	Standard Quality	2	Nos		0		0	0
E101	Digital Wattmeter	230 V, 1 KW, 50 Hz	Standard Quality	2	Nos		0		0	0
E102	A.C. Energy Meter	Single Phase, 10 A, 240 V induction type	Standard Quality	2	Nos		0		0	0
E103	A.C. Energy Meter	Three Phase, 15 A , 440 V induction type	Standard Quality	2	Nos		0		0	0
E104	Power Factor Meter Digital	440 V, 20 A, Three Phase portable box type	Standard Quality	2	Nos		0		0	0
E105	Frequency Meter	45 to 55 Hz	Standard Quality	2	Nos		0		0	0
E106	Magnetic Flux Meter	0-500 tesla	Standard Quality	2	Nos		0		0	0
E107	Lux meter	lux meter LCD read out 0.05 to 7000 lumens with battery.	Standard Quality	2	Nos		0		0	0
E108	Tachometer Analog	Analog Type - 10000 RPM	Standard Quality	1	Nos		0		0	0
E109	Tachometer Digital	Digital Photo Sensor Type - RPM 10000 Tachometer Technical Specification : 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)	Standard Quality	1	Nos		0		0	0
E110	Tong Tester / Clamp Meter	0 - 100 A (Digital Type) Tong Tester / Clamp 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)	Standard Quality	2	Nos		0		0	0
E111	Megger	Analog - 500 V	Standard Quality	2	Nos		0		0	0

E112	3- point D.C. Starter	For 2.5 KW DC motor 3-point D.C. starters Technical Specifications: 3 Point DC motor starter is essential for over load protection, no volt protection, starting huge current protection Type : 3 Point Terminals : (L,A,F)are available from starter. These 3 terminal L(line),A(armature),F(field) must b connected to supply Terminal, motor armature terminal, and shunt field terminal Protection : Coil for overload protection and switch for over current protection Starting : Through Handle	Standard Quality	1	Nos		0		0	0
E113	4- point D.C. Starter	For 2.5 KW DC motor 4-point D.C. starters Technical Specifications: 4 Point DC motor starter is essential for over load protection, no volt protection, starting huge current protection Type : 4 Point Terminals : (L,A,F)are available from starter. These 3 terminal L(line),A(armature),F(field) must b connected to supply Terminal, motor armature terminal, and shunt field terminal Protection : Coil for overload protection and switch for over current protection Starting : Through Handle	Standard Quality	1	Nos		0		0	0
E114	Wheat Stone Bridge with galvanometer and battery	Wheat Stone Bridge with galvanometer & battery Technical Specification Series Arm : Four decade dial in steps of 1000W, 100W, 10W , 1W . Ratio Arm : The ratio arm of bridge are capable of Selecting multiplying factor of 0.001, 0.01, 0.1, 1, 10, 100,1000 for resistance measurement & varley loop test & ratio M10, M100, M1000 for Murray loop test. One selectable switch with option for Murray (M) loop & For resistance/Varley (VR) loop test. One galvanometer fitted inside the box with option of external or internal galvanometer with terminal . Two press keys provided marked as initial & final. Two toggle switches are provided one for internal or external battery and other for direct or shunted sensitivity of galvanometer.	Standard Quality	2	Nos		0		0	0
E115	Single Phase Variable Auto Transformer	0 - 270 V, 10Amp (Air cooled) Variable Auto Transformer Technical Specifications: Variable Auto Transformer 0-270VAC Input Single Phase 230V Output Voltage 0-270VAC Output Current 10Amps	Standard Quality	2	Nos		0		0	0
E116	Phase Sequence Indicator	3 Phase, 415 V	Standard Quality	2	Nos		0		0	0
E117	Growler	230 V, 50 Hz, Single Phase, Adjustable jaws, Testing armature with ampere meter and testing probes.	Standard Quality	1	Nos		0		0	0
E118	AC Starters: - a. Resistance type starter b. Direct online Starter c. Star Delta Starter- Manual d. Star Delta Starter – Semi automatic e. Star Delta Starter – Fully automatic f. Star Delta Starter - Soft starter g. Auto Transformer type	For A.C Motors of 2 to 5 H.P.	Standard Quality	1	each		0		0	0
E119	Oscilloscope Dual Trace	• DC ~ 30MHz • Inbuilt 6 Digit seven segment display frequency counter (30MHz) • Dual channel, X Y mode • 6" display cathode ray tube, sensitivity triggering up to 1mV/divison • TV synchronous separation circuit to observe stable TV signal • Polarity reversal, CH 1Sync output Technical Specifications: • CRT : 6" Rectangular screen with internal graticule,8 x 10 Div (1Div=1cm) Vertical Deflection • Vertical Operation Mode : CH1, CH2, ADD, ALT, CHOP (CH1, CH2) • Sensitivity : 5mV/div to 5V/div +3%, 1mV/div to 1V/div +5% (x5),10 steps • Rise time : <17.2ns Input impedance : 1Mohm • Max. Input voltage : 250V (DC+AC peak value) at 1kHz (250V, DC+AC) • Input coupling : AC, DC, GND • Polarity selection : +(CH2 only) • Display mode : 1, 10, X-Y Horizontal Deflection • Sweep time : 0.2micros/div to 0.2s/div • Sweep expansion : x10 • Accuracy : 3% Trigger System • Triggering mode : Auto, NORM, TV-V, TV-H • Trigger source : VERT,CH1, LINE, EXT	Standard Quality	1	No		0		0	0
E120	Function Generator	2 to 200 KHz, Sine, Square, Triangular 220 V, 50 Hz, Single Phase DDS Function (Arbitrary) Generator Features : -Two same function output -Using Direct Digital Synthesis (DDS) Technology -Upto 25MHz frequency range for main waveforms -High accuracy frequency counter -Arbitrary Setting of start and stop of frequency sweep output -15 Different type output waveform -16 x 2 LCD display -PC interface using Software -USB Host / Device Technical Specification : CH1, CH2 Output Frequency -Sine wave : 0Hz~25MHz -Square wave : 0Hz~1MHz -Triangle wave : 0Hz~1MHz -Sawtooth : 0Hz~1MHz -Arbitrary Waveform : 0Hz~1MHz -TTLDigital signal wave : 0Hz~1MHz -No. of Channels : 2 -Output wave : Sine, Square, Pulse, Ramp, Noise, Arb, TTL Digital signal waveform -Wavelength : 1024 bit -Sampling Rate : 200MSa/s -Vertical Resolution : 8 Bits -Frequency Min Resolution : 10mHz -Frequency Error : 10ppm -Frequency Stability : +1x10-6 -Output Impedance : 50 Ohm +10%	Standard Quality	1	No		0		0	0
E121	Soldering Iron	25-Watt, 65 Watt and 120-Watt, 230 Volt Each	Standard Quality	2	Each		0		0	0
E122	Temperature controlled Soldering Iron	50-Watt, 230 Volt	Standard Quality	2	Nos		0		0	0
E123	Discrete Component Trainer	Discrete Component (for diode and transistor circuit) with regulated power supply +5,0- 5 V,+12 ,0-12 V Discrete Component Trainer Technical Specifications : Inbuilt Variable / Fixed DC Regulated Power Supplies Output voltages : 0-3VDC : 0-30VDC : +5VDC Inbuilt AC Power Supplies Output voltages : 10 - 0 - 10VAC/ 500mA Glass Epoxt PCB used as front panel of 270 mm x 170 mm & mounted on light weight shock proof plastic cabinet Symbol diagram printed on Glass Epoxt PCB & all important test Points are brought out on front panel Power requirement : 230 VAC 10%, 50Hz. Weight : 2.2 Kg Approx. Dimensions (mm) : 300(L) x 175(B) x 75(H) List of Experiments under above Topics : PN Junction Diode V-I Characteristics Zener Diode V-I Characteristics Voltage Stabilization of Zener Diode LED Characteristics Resistance in Series & Parallel Charging & Dischrging of Condensor LCR Resosnace Circuit Clipping & Clamping Half Wave, Full Wave & Bridge Rectifier Common Base Transistor Amplifier Common Emitter Transistor Amplifier Common Collector Transistor Amplifier RC Coupled Amplifier Basic Logic Gates RC Passive Filter Circuits Standard Accessories : Power cable, Patch Chord & Instruction manual	Standard Quality	2	Nos		0		0	0
E124	Linear I.C. Trainer	Linear I.C. Trainer with regulated power supply 1.2V to 15V PIC socket 16pin and 20 pins with bread board Linear I.C.Trainer Technical Specifications : Inbuilt Variable / Fixed DC Regulated Power Supplies Output voltages : 0-2.5VDC (2 Nos.) : +15VDC : -15VDC : +5VDC. On Board Digital Panel Meter Voltmeter : 0-2VDC / 0-20VDC (Duel Range) Glass Epoxt PCB used as front panel of 270 mm x 170mm & mounted on light weight shock proof plastic cabinet Symbol diagram printed on Glass Epoxt PCB & all important test Points are Brought out on front panel Power requirement : 230 VAC 10%, 50Hz. Weight : 2.3 Kg Approx. Dimensions (mm) : 300(L) x 175(B) x 75(H)	Standard Quality	1	No		0		0	0

E125	Digital I.C. Trainer	Digital I.C. Trainer 7 segment display and bread board Digital I.C.Trainer Technical Specifications : Inbuilt Fixed DC Regulated Power Supplies Output voltages : + 5VDC On Board Inputs, Switch, Indicators & Clock Logic Inputs : 8 Nos. logic '0' & logic '1' (Through SPDT Switches) Output indicators : 8 Nos. Clock : 1Hz, 100Hz, 1KHz Gates & Flip Flops NAND Gates : 4Nos. NOR Gates : 4 Nos. OR Gates : 4 Nos. AND Gates : 4 Nos. EX-OR Gates : 4 Nos. NOT Gates : 6 Nos. JK Flip Flop : 2 Nos. RS Flip Flop : 1 No. D Flip Flop : 1 No. Glass Epoxt PCB used as front panel of 400 mm x 225 mm & mounted on light weight shock proof plastic cabinet Symbol diagram printed on Glass Epoxt PCB & all important test Points are Brought out on front panel Power requirement : 230 VAC 10%, 50Hz. Weight : 1.7Kg Approx. Dimensions (mm) : 430(L) x 230(B) x 90(H) Standard Accessories : Power cable, Patch Chord & Instruction manual	Standard Quality	1	No		0		0	0
E126	Domestic Appliances –									
	a. Electric Induction plate	a. 1500 Watt, 240V	Standard Quality	1	Each		0		0	0
	b. Electric Kettle	b. 1500 Watts, 240V	Standard Quality	1	Each		0		0	0
	c. Electric Iron	c. Automatic - 750 W, 240 V	Standard Quality	1	Each		0		0	0
	d. Immersion Heater	d. 1500 Watt, 240V	Standard Quality	1	Each		0		0	0
	e. A.C. Ceiling Fan and AC Table Fan	e. 68-Watt, 230 V	Standard Quality	1	Each		0		0	0
	f. Geyser (Storage type)	f. 10 litre	Standard Quality	1	Each		0		0	0
	g. Mixture & Grinder	g. 750 W, 240 V	Standard Quality	1	Each		0		0	0
	h. Washing Machine Semi-Automatic	h. 5 Kg,	Standard Quality	1	Each		0		0	0
	i. Motor Pump set	i. 1 HP, 1 Phase, 240 V	Standard Quality	1	Each		0		0	0
E127	Oil Testing Kit	Oil Testing Kit 230 V, single phase 50 Hz, 60VA output 0-60 KV Variable	Standard Quality	1	Nos		0		0	0
E128	Inverter with Battery	1 KVA with 12 V Battery Input- 12 volt DC, Output- 220 volt AC	Standard Quality	1	Nos		0		0	0
E129	Voltage Stabilizer	AC Input - 150 - 250 V, 600 VA AC Output - 240 V, 10 A	Standard Quality	1	Nos		0		0	0
E130	DC Power Supply	0 - 30 V, 5 A DC Power Supply Technical Specifications: Output Voltage : 0 ~ 110VDC Output Current : 100mA ~ 5A Digital Display : 3 digit display for voltage & current Power requirement : 220 VAC +10% , 50 Hz Weight : 10Kg Approx. Standard Accessories : Power cable, Instruction manual	Standard Quality	2	Nos		0		0	0
E131	Battery Charger	0 - 6 - 9 - 12 - 24 - 48 V, 30amp	Standard Quality	1	Nos		0		0	0
E132	Current Transformer	415 V, 50Hz, CT Ratio 25 / 5 A, 5VA Current Transformer Test Set secondary rated for 5Amp. Which are intended to be used on 50 Hz. Technical Specification : The Current Transformer Test set provides the following components- 1. Separate terminals to connect standard C.T. and Test C.T. secondaries. 2 Ratio error and phase angle error display 3 Range selecting Switch 4 Polarity check indicator 5 Ammeter to measure current injected in percentage 6 Null detector with sensitivity control 7 Terminals to connect burden box on both std. & under test 8 Aux. power supply to energies electronic null detector 9 High permeability magnetic core 10. Secondary current selector 1A . or 5A Current Transformer Test Set Scope of Experimentation: Draw Magnetising Curve for a Protective CTs, and Check knee Point Voltage	Standard Quality	2	Nos		0		0	0
E133	Potential Transformer	415 V, 50Hz, PT Ratio, 440V/110V, 10VA	Standard Quality	2	Nos		0		0	0
E134	Solar panel with Battery	18 Watt	Standard Quality	1	Set		0		0	0
C. Shop Machinery - For 4 (2+2) units no additional items are required										
E135	D.C. Shunt Generator with control panel	D.C. Shunt Generator with control panel,2.5 KW, 220V &3phase Squirrel cage Induction Motor, 5HP, 440V with control panel & star delta starter D.C. Shunt Generator, 2.5 KW, 220V with control panel A laboratory type model for conducting various experiments. TECHNICAL SPECIFICATION : GENERATOR D.C. Shunt Generator 2.5 kw, 230 volts, 1500 R.P.M., 4 Pole with interpoleself excited, continuous rating, Insulation Class "B", Horizontal foot mounted, All the terminals are broughtout to the terminal box. 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite insulated banana terminals provided for supply and generator connection. Circuit diagram of panel provided inside the panel. All accessories connected with internal wiring ferrules etc. The Instrument Panel consist of following accessories : 1) Voltmeter M.C. type 0-300 volts, 96 x 96 mm : 1 no. 2) Ammeter M.C. type 0-15 Amp., 96 x 96 mm : 1 no. 3) Ammeter M.C. type 0-1.5 Amp., 96 x 96 mm : 1 no. 4) Field regulator disc type suitable to decrease field current upto min. Amp : 1 no. 5) DPST Knife Switch- 20 Amps., it mounted on the Panel Board : 1 no. 6) Indicating lamp LED type Red, colour 12mm size : 1 no.	Standard Quality	1	No		-		-	-
E136	Motor-Generator (AC to DC)	Squirrel Cage Induction Motor with star delta starter and directly coupled to DC shunt generator and switch board mounted with regulator, air breaker, ammeter, voltmeter, knife blade switches and fuses, set complete with case iron and plate, fixing bolts, foundation bolts and flexible coupling. Induction Motor rating: 7.5 HP, 415V, 50 cycles, 3 phases. DC Shunt Generator rating: 5 KW, 440V (Output voltage varies 110-440v) Motor-Generator (AC to DC) consisting of : A laboratory type model for conducting various experiments. Technical Specification : MOTOR : Squirrel cage Induction motor 7 H.P.415 volts,3 phase 50 Hz 1440 R.P.M. type TEFC cont. rating. Insulation class 'F' frame size 132,Horizontal foot mounted. 6 terminals brought out in the terminal box for connection. GENERATOR :- D.C.shunt generator : 5 K.W. 440 V. S Self excited : 1440 R.P.M. 4 pole with interpole S.P.D.P. type continuous rating Insulation class 'F'. Horizontal. 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. 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 ply woodfitted with 3 mm Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. Educational type backelite insulated banana terminals provided for supply and motor generator connection. Circuit diagram of panel provided inside the panel. All accessories connected with internal wiring ferrules etc.	Standard Quality	1	No		-		-	-
E137	D.C. Compound Generator with control panel including fitted rheostat, voltmeter, ammeter and breaker	D.C. Compound Generator with control panel including fitted rheostat, voltmeter, ammeter and breaker, 2.5 KW, 220V &3phase Squirrel cage Induction Motor, 5HP, 440V, with control panel & star delta starter D.C. Compound Generator 2.5 KW A laboratory type model for conducting various experiments. TECHNICAL SPECIFICATION : GENERATOR D. C. Compound Generator 2.5 kw, 230 volts, 1500 R.P.M., 4 Pole, self excited, continuous rating, Insulation Class "B", Horizontal foot mounted, All the terminals are brought out to the terminal box. 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite insulated banana terminals provided for supply and generator connection. Circuit diagram of panel provided inside the panel. All accessories connected with internal wiring ferrules etc The Instrument Panel consist of following accessories : Voltmeter M.C. type 0-300 volts, 96 x 96 mm Standard Quality Make : 1 no.	Standard Quality	1	No		0		0	-

E138	DC Series Motor coupled with spring balance load	2.5 KW, 220 Volts Motor series DC, 220 Volt, 0.5 to 2 HP, coupled with mechanical load A laboratory type model for conducting various experiments. TECHNICAL SPECIFICATION : MOTOR : 2 HP,220 volts,1500 RPM coupled with mechanical on load, „F' class insulation, continuous rating S.P.D.P.type, horizontal foot mounted. Educational type Suitable friction brake Dynamometer set having 2 Nos. 6 dial type spring balances & belt provided with fixed with motor base plate 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite 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.	Standard Quality	1	No		0		-	-
		The Instrument Panel consist of following accessories : 1) Two point starter suitable foe series D.C. motor flush mounted. 2) Indicating lamp, LED type 12mm size for incoming & outgoing supply. 3) DPST knife Switch, 20 A, 4) D.C.M.C. Ammeter 0-10A,96 x 96 mm sq.type, flush type Standard Quality make 5) D.C.M.C. voltmeter 0-300 v, 96 x 96 mm sq.type, flush type Standard Quality make 6) Fuses kitkat 16 A, 500 v inside the pannel								
E139	DC Shunt Motor	2.5 KW, 220 V Motor shunt DC 220 Volt, 2 to 3 HP TECHNICAL SPECIFICATION : MOTOR : D.C. Shunt motor 3 H.P., 220 volts,1500 R.P.M., continuous rating class of insulation 'B' S.P.D.P. Type, Horizontal foot mounted, confirming to , All the terminals are broughtout to the terminal box. 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite 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. The Instrument Panel consist of following accessories : 1) Three point D.C. starter suitable for above motor, flush mounted : 1 no. 2) D.P.S.T. Knife Switch. suitable for above motor : 1 no. 3) Indicating lamp LED type 12 mm size for incoming and outgoing supply of the pannel board : 2 nos.	Standard Quality	1	No		0		0	-
		4) Voltmeter M.C. 0-300 volts D.C. size 96 x 96 mm Standard Quality Make : 1 no. 5) Ammeter M.C. 0-15 Amp. D.C. size 96 x 96 mm Standard Quality Make : 1 no. 6) Ammeter M.C. 0-1.5 Amp. D.C. size 96 x 96 mm Standard Quality Make : 1 no. 7) Field regulator suitable to keep constant rated R.P.M. of the motor at full load. : 1 no								
E140	DC compound Motor with starter and switch	2.5 KW ,220 volts Motor DC compound wound 220 volt 2 to 3 HP with starter and switch A Laboratory Type Model For Conducting Various Experiments. TECHNICAL SPECIFICATION : MOTOR : D.C. compound motor 3 H.P., 220 volts,1500 R.P.M., continuous rating class of insulation 'F' S.P.D.P. type, Horizontal foot mounted, Confirming to I.S. 4722-1992, All the terminals are broughtout to the terminal box. 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite 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.	Standard Quality	1	No		0		0	-
		The Instrument Panel consist of following accessories : 1) Four point D.C. starter suitable for above motor, flush mounted : 1 no. 2) D.P.S./T. Knife Switch. suitable for above motor : 1 no. 3) Indicating lamp LED type 12 mm size for incoming and outgoing supply of the pannel board : 2 nos. 4) Voltmeter M.C. 0-300 volts D.C. 96x96mm size Standard Quality Make : 1 no. 5) Ammeter M.C. 0-15 Amp. D.C. 96x96mm size Standard Quality Make : 1 no. 6) Ammeter M.C. 0-1.5 Amp. D.C. 96x96mm size Standard Quality Make : 1 no. 7) Field regulator suitable to keep constant rated R.P.M. of the motor at full load. : 1 no.								
E141	Motor Generator(DC to AC) set consisting of - Shunt Motor with starting compensator and switch directly coupled to AC generator with exciter and switch board mounted with regulator, breaker, ammeter, voltmeter frequency meter, knife blade switch and fuses etc. Set complete with cast iron bed plate, fixing bolts, foundation bolts and flexible coupling.	Shunt Motor rating: 5 HP, 440V AC Generator rating : 3-Phase, 4 wire, 3.5 KVA, 400/230 Volts, 0.8 pf, 50cycles Motor Generator(DC to AC) set consisting of - A Laboratory Type Model for Conducting Various Experiments. Technical Specification : MOTOR 5 H.P., 440 volts, 4 poles with inter poles, 1500 R.P.M., S.P.D.P. type continuous rating class of insulation 'F'. Horizontal foot mounted, Dynamically balanced. All the terminals are brought out to terminal box. Confirming to provided lifting bolt & earthling terminal. ALTERNATOR : 3.5 K.V.A.,415/240 Volts, 50 H.Z., 3 phase 4 wires 0.8 P.F.1500 R.P.M., S.P.D.P. type continuous rating with self static field exciter, self regulation, insulation class 'H' frame size 160, Horizontal foot mounting confirming to Alternator is provided lifting bolt & earthling terminal. 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 Ivory colour edhylam sheet on top.	Standard Quality	1	No		0		0	-
		The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite insulated banana terminals provided for supply and motor gen.Connection. Circuit diagram of panel provided inside the panel. All accessories connected with internal wiring ferrules etc. The Instrument Panel consist of following accessories :								
E142	AC Squirrel Cage Motor with star delta starter and triple pole iron clad switch fuse with Mechanical Load.	5 HP, 3-Phase, 415 V, 50 Hz Motor AC phase wound slip ring type 5 HP 400 volts, 30phase, 50 cycles with starter and switch. Technical Specification : Motor : A.C. 3 Phase 5 HP 415 volts, 50 Hz, slip ring Induction Motor 1440 RPM, TEFC, class 'B' insulation, frame 100, horizontal foot mounted. Educational type Backelite banana type terminals 30 Amps is provided on terminal box. Six terminals are brought out on terminal box. Rugged construction, core of high grade CRGO silicon steel and coil of 99.9% pure copper. 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 is 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 Ivory coloured hylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite 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.	Standard Quality	1	No		0		0	-
		The Instrument Panel consist of following accessories : (1)Voltmeter M.I. Type 96 mm x 96 mm Sq. 0-500V with: 1No.selector switch Off/RY/YB/BR (2) Ammeter M.I. type 96 mm x 96 mm Sq. 0-20A: 1 No. (3) Suitable D.O.L. Starter & Rotor Resistance : 1 No. (4) TP MCB 16 Amp 415 V. ISI Marked is mounted on panel board -1No. (5) Indicating lamp LED type 12 mm size for incoming & outgoing in colour code- 6Nos. (6) HRC fuses Backelite type base with top 16 Amp 440 V -3Nos								
E143	AC phase-wound slip ring Motor with starter switch	5 HP, 440 V, 3 Phase, 50 Hz Motor universal 230 volt, 50cycles 1/4 HP with starter/switch A Laboratory Type Model For Conducting Various Experiments. TECHNICAL SPECIFICATION : MOTOR : Universal Motor Single Phase, Capacity 750 Watts, 230 volts A.C. / D.C. 1500 RPM (O.L.) 50 Hz, TEFC, class 'B' insulation, frame 100, horizontal foot mounted. Educational type Backelite Insulated banana type terminals 30 Amps provided on terminal box. Four terminals armature and field brought out on terminal box with marking. 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite 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.	Standard Quality	1	No		0		0	-
		The Instrument Panel consist of following accessories : Voltmeter M.I. type Standard Quality Make 96 mm x 96 mm Sq. 0-300V : 1 No. Ammeter M.I. Type Standard Quality Make 96 mm x 96 mm Sq. 0-5A : 1 No. Suitable D.O.L. Starter Standard Quality Make : 1 No. DP MCB 16 Amp 230 V mounted on panel board : 1 No. Indicating lamp for incoming & outgoing, LED type, 12 mm size : 2 Nos. HRC fuses 10 Amp, 230 V Backelite type base : 2 Nos. Change over switch for AC and DC output : 1 No. Suitable Stand by DC Supply provided inside the panel. : 1 No								

E144	Universal Motor with starter/switch	240 V, 50 Hz, 1 HP Motor universal 230 volt, 50cycles 1/4 HP with starter/switch A Laboratory Type Model For Conducting Various Experiments. TECHNICAL SPECIFICATION : MOTOR : Universal Motor Single Phase, Capacity 750 Watts, 230 volts A.C. / D.C. 1500 RPM (O.L.) 50 Hz, TEFC, class 'B' insulation, frame 100, horizontal foot mounted. Educational type Backelite Insulated banana type terminals 30 Amps provided on terminal box. Four terminals armature and field brought out on terminal box with marking. 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 Ivory colour edhylam sheet on top. The three sides of the working top lipped using 22mm x 6mm teakwood lipping patti. 30 A. Educational type backelite 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. The Instrument Panel consist of following accessories : Voltmeter M.I. type Standard Quality Make 96 mm x 96 mm Sq. 0-300V : 1 No. Ammeter M.I. Type Standard Quality Make 96 mm x 96 mm Sq. 0-5A : 1 No. Suitable D.O.L. Starter Standard Quality Make : 1 No. DP MCB 16 Amp 230 V mounted on panel board : 1 No. Indicating lamp for incoming & outgoing, LED type, 12 mm size : 2 Nos. HRC fuses 10 Amp, 230 V Backelite type base : 2 Nos. Change over switch for AC and DC output : 1 No. Suitable Stand by DC Supply provided inside the panel. : 1 No	Standard Quality	1	No		0		0	-
E145	Synchronous motor with accessories like starter, excitation arrangements.	3 Phase, 3 HP, 440V, 50Hz, 4 Pole	Standard Quality	1	No		0		0	0
E146	Thyristor /IGBT controlled D.C. motor drive with tacho-generator feedback arrangement	1 HP Thyristor/IGBT controlled D.C. motor drive with tacho-generator feedback arrangement. Objective this setup has been designed to study the controlling the speed of DC Series Motor using DC Drive having Armature & Tacho Feedback controls. The instrument comprises of the following built in parts: 1. One no.of Digital DC Voltmeter(DPM) to indicate Voltage is provided on the front panel. 2. One no.of Digital DC Currentmeter(DPM) to indicate Current is also provided on the front panel. 3. One no.of Digital RPM meter to indicate RPM of the motor is also provided on the front panel. 4. Power Circuit consists of 2 Thyristor connected in Half Bridge configuration. 5. Feedback Controls: ,Tacho & Open Loop(No feedback).Desired mode of operation can be selected either by shorting the dotted lines on the vertical front panel with patchchords or by the "FEEDBACK SELECTOR" switch provided on horizontal front panel. 6. Controls:"SPEED CONTROL KNOB" for controlling the speed of the motor present on horizontal front panel, present,"FEEDBACK SELECTOR" switch(Without Feed Back & with Feedback & TECHO FEEDBACK) present on horizontal front panel. 7. Indicators:Drive ON indication present on front panel. 8. Power ON/OFF switch & power indicator is also provided on horizontal front panel. 9. Connecting Sockets:8 & 3 pin sockets-"TO MOTOR & TACHO" for connecting Motor & RPM sensor. 10. One No. of MG Set consisting of 1H.P. DC Shunt Motor & one tacho generator(220VAC/300W) & DC drive (fitted inside the panel) are also provided. Machines 1. MG set (DC Shunt motor (1HP) Coupled With Tacho Generator fitted on Base Plate. Tacho Generator 1HP, 220V, 05A Excitation : 110V , Volts Pulse Generator : 1/110 RPM : 0- 1500 2. Instruction manual - 01 No. 3. Single point(4mm) patch chords(electrical type) - 02 Nos. 4. Power chord - 01 No.	Standard Quality	1	No		-		0	-
E147	Thyristor/IGBT controlled A.C. motor drive with	VVVF control 3 Phase, 2 HP Thyrister / IGBT Controlled AC Motor Drive with VVVF controls \Objective: • To Study Thyristor/IGBT Controlled AC Motor With VVVF Control has been designed to start & control of AC motor. Technical Specification : • Meters : One No. of Digital Voltmeter of Range 0-300V AC of size 96*96mm provided on front panel. : One Nos. of Digital Ammeter of Range 0-10A AC of size 96*96mm provided on front panel. : One No. of Digital RPM Meter of size 96*96mm provided on front panel. : One No. of Miniature Circuit Breaker of Range 16 Amps (MCB/ DP) Provided on the Input Side. • One Nos. of Thyristor/IGBT AC Drive provided on front panel. • Panel board of portable wooden panel box is in Tappered shape for better view angle.	Standard Quality	1	No		0		0	0
E148	Single phase Transformer, core type, air cooled	1 KVA , 240/415 V, 50 Hz SINGLE PHASE TRANSFORMER, CORE TYPE, AIR COOLED TRANSFORMER SINGLE PHASE 1 KVA A Laboratory Type Model For Conducting Various Experiments. TECHNICAL SPECIFICATION : Transformer Single Phase air cooled capacity 1 KVA, Copper wound Primary 230 Volts, Secondary 0-110-115-120 Volts. The unit must be fitted in MS Box 20 SWG with side ventilation. Top of the box will be of 6mm. Backelite sheet and the terminals of primary & secondary will be brought out with Educational type backelite banana type terminals 30 Amps and proper marking	Standard Quality	3	No		0		0	0
E149	Three phase transformer, shell type oil cooled with Delta/ Star	3 KVA , 415/240 V, 50 Hz Three phase transformer, shell type oil cooled TECHNICAL SPECIFICATIONS 1) Capacity 3 phase, 5 KVA, 440 / 230 Volts, 50 Hz 2) Delta - star connection 3) Shell type - Oil cooled 4) Totally enclosed, maximum ambient temp 45° C 5) Insulation Class 'B' 6) Tapping on Secondary Side 50% and 86.6% 7) Copper Wound 8) Educational type Backelite insulated banana terminals 30 Amp. With colour code provided on the top ofthe transformer and on 6mm backelite sheet 9) The tank will be provided oil filling Hole with cap, oil level indicator, drain plug and earthing terminal 10) Plain unidirectional M.S. Roller will be fitted to the tank for movement 11) Electrical performance would confirm 12) The transformer provided with transformer oil. The oil confirm to (The tendered quote the grade and quantity in litters required)	Standard Quality	2	No		0		0	0
E150	Electrical Machine Trainer –	Suitable for demonstrating the construction and functioning of different types of DC machines and AC machines (single phase and three phase). Should be fitted with friction brake arrangement, dynamo meter, instrument panel and power supply unit Electrical Machine Trainer Experiment List: Open Circuit and Laod Char. of Separately Excited DC Shunt Generator Open Circuit and Load Characteristics of Self - Excited DC Shunt Generator, Hopkinsons Test & Swinburnes Test Speed and Load Test on DC Shunt Motor Load Test on DC Compound Motor/ DC Series Motor Load Characteristics of DC Compound Generator Block Rotor and Load Test on Squirrel Cage Induction Motor (1 & 3 Phase) V and Inverted V Curve Synchronous Motor Load test on 3 Phase Synchronous Motor Break Test on Slip Ring Induction Motor Load Test and Regulation of 3 Phase Alternator Load Test on a Single Phase Transformer Open Circuit and Short Circuit on a Single / Three Phase Transformer Separation of no Load Losses on a Single / Three Phase Transformer To Study No load Characteristics of Three phase synchronous Generator. Determination of Voltage Regulation of an alternator by Synchronous impedance method. Determination of losses and Efficiency of an Alternator. Determination of power sharing of parallel connected alternator and study of effect of Excitation and input power. Simulation in Dynamics of Electrical machine and effect of disturbance. To check the performance and characteristics of Generator at diffferent speed and different load conditions. To study the synchronization of the given synchronous generator with the main busbars by Three-Dark-lamp method. To study the effect of the change in input to the alternator (under constant excitation) on output power, power angle and power factor. To study the no load and full load performance of generator.¬ Technical Specifications: Modular Control Panel Aluminum profile (45mm x 45mm) structure will accommodate different unique interchangeable modules Power Requirement: 440V AC , 50Hz, 3 Phase MT-E02: Power Supply Module (Three Phase Input) MT-E03: Digital Power Analysis Meter Module MT-E04: AC Drive Module 1 Phase(10~220 VAC) MT-E06: DC Drive Module (Thyristorized 0~230 VDC) MT-E07: AC Drive Module 3 Phase(10~440 VAC) MT-E08: Variable DC Voltage Module (10~250VDC) MT-E10: Variable Voltage Module - Single Phase Output MT-E20: Digital AC Voltmeter Module (0~300V AC) MT-E21: Digital DC Voltmeter Module (0~300VDC) MT-E27: Digital AC Ammeter Module (0~10A AC) MT-E28: Digital DC Ammeter Module (0~10A DC) MT-E32: Digital AC Wattmeter Module MT-E33: Power Factor Meter Module MT-E35: Resistive Load Module MT-E36: Rheostat Module (300ohm / 2Amps) MT-E38: Inductive Load Module MT-E39: Capacitive Load Module MT-E64: Three Point DC Starter MT-E65: DOL Starter Module MT-E66: Slip Ring Starter MT-E76: 1Phase Transformer Module (500VA) MT-E78: 3 Phase Transformer Module (1KVA) Supplied with AC/DC Machines DC Shunt Motor - 2HP DC Shunt Motor - 1HP DC Shunt Generator - 0.5KW, DC Compound Motor - 2HP DC Compound Generator - 0.5KW DC Series Motor - 1HP Induction Motor (3 Phase) - 3HP Induction Motor (1 Phase) - 1HP AC Synchronous Motor convertable AC Alternator - 500VA / 1HP AC Slip-Ring Induction Motor - 1HP Loading Arrangement with Water Cooled Drum	Standard Quality	1	1 for 8 (4+4) units		0		0	0
E151	Diesel Generator Set with changeover switch, over current breaker and water/ air-cooled with armature, star-delta connections AC 3 phase	7.5 KVA, 415 volt or higher rating	Standard Quality	1	No		0		0	0
E152	Used DC Generators-series, shunt and compound type for overhauling practice	Each	Standard Quality	1	Each		0		0	0
E153	Pillar Electric Drill Machine Motorized	12-20 mm Capacity, 1HP, 440V, 3 phase, Induction Motor with DOL starter, Bench Type	Standard Quality	1	No		0		0	0
E154	Motorised Bench Grinder	1 HP. 3 phase, 440V with DOL starter, Double side with smooth and rough wheel with Tool Base	Standard Quality	1	No		0		0	0
E155	A.C. Series type Motor	1 HP, 240 V, 50 Hz Motor A.C. series type 230V, 50 cycles 1/4 HP with mechanical load Technical Specification : AC Series Type Motor 230V, 50 cycles 1/4 HP with Mechanical Load, with Small Control Panel provided Starter Switch, MCB, Voltmeter, Ammeter, Frequency Meter and Terminals provided for Measurement and Easy Input and Output Connections. Panel fitted on good quality Wooden Box (for Safety), and Tapered Shape for better view Angle. Supplied with required Connection Leads and Instruction Manual.	Standard Quality	1	No		0		0	0
E156	Single Phase Capacitor Motor with starter switch	1 HP, 240 V, 50 Hz	Standard Quality	1	No		0		0	0
E157	Manual Motor coil Winding Machine	With step arbor	Standard Quality	1	No		0		0	0
E158	Ceiling fan coil Winding Machine	250V, 50 Hz, 1-Φ, with speed control	Standard Quality	1	No		0		0	0

E159	Primary current injection set	220V, 50 Hz, 1-Φ, output current - 200 A (min) with timer	Standard Quality	1	No		0		0	0
E160	Stepper Motor with Digital Controller	Stepper Motor with Digital Controller Microprocessor based stepper motor controller : with a bifilar 2 phase D.C. stepping motor. The stepping motor can be programmed in three parameters namely 1. Speed 2. No. of steps. 3. Direction. It is specially designed low cost yet sophisticated control lab kit the microprocessor system consist of 8085 A CPU 8155 scratch pad and 8279 key board display controller and EPROM The monitor programme in EPROM is used to enter application progra-mme forstepper motor controller. The unit which houses the stepper motor is designed to demonstrate the basic principles of stepper motor with manual switching. The same contains power amplifiers and Regulated power supply with Stepper motor Power amplifier alongwith regulated power driving the stepper motor. Arrangement for manual operation of stepper motor control.	Standard Quality	1	No		0		0	0
E161	Shaded Pole Motor	Fractional HP, 240 V, 50 Hz	Standard Quality	1	No		0		0	0
E162	Work Bench (Electrician)	2.5 m x 1.20 m x 0.75 m ,MS angle frame with top with seasoned wood plank	Standard Quality	4	Nos		0		0	0
E163	Wiring Board	3-meter x1 meter with 0.5 meter projection on the top	Standard Quality	1	No		0		0	0
E164	Fire Extinguisher CO2	2 KG	Standard Quality	2	Nos		0		0	0
E165	Fire Buckets	Standard size	Standard Quality	2	Nos		0		0	0
	Total (Rs.)			**838**			0		0	0

Note:

1.Unit price should include the cost of warranty for one year and freight and other charges such as loading/unloading, storage etc.
2.In case of discrepancy between unit price and total amount, the unit price shall prevail.
3.Bids shall be evaluated based on total amount with taxes.
4. The bidder quoting for the above items then the bidder has to comply with all the specifications as prescribed in the BOQ sheet.
5. All the tools and equipment should be as per BIS specification.