

Section 6- Schedule of supply

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1. List of Goods and Related Services

Package Name: Supply of Electrical and Electronics related items for Industrial Training Institutes to enhance technical and vocational skills among the youth of Himachal Pradesh (DOTE/08)

Lot No : Not Applicable							
Lot Name: Not Applicable							
Item No	Name of Goods or Related Services	Description	Unit of Measurement	Quantity	Specification by the supplier (To be filled by the supplier)	Detailed information brochure attached at Page No.	Pass/Fail (By Purchaser)
1.	0-30 V, 2 Amp, Regulated DC Power Supply	Regulated DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-30volts, 2 Amps • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits	No.	21			
2.	20 MHz Dual Trace Oscilloscope	Oscilloscope Dual Trace 20 MHz <ul style="list-style-type: none"> • DC - 20MHz Bandwidth • 1mV/div Sensitivity on Both Channels or better • X-Y Operation • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD/TFT or better Display 	No.	6			

		<ul style="list-style-type: none"> • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220VV \pm 10%, 50Hz					
3.	3- Point D.C. Starter	Starter, 3- point D.C. For 2.5 KW DC motor 3-point DC Starter. 3 Point D.C. Motor starter suitable to work on 2.5 KW. D.C. motor, Voltage 230/250 with a maximum 15% full load current the starting period shall not exceed 30 seconds with under voltage and an intensions (Magnetic) over load release device.	No.	2			
4.	4- Point D.C. Starter	Starter, 4- point D.C. For 2.5 KW DC motor 4-point DC Starter :- 4 Point D.C. Motor starter suitable to work on 2.5 KW. D.C. motor, Voltage 230/250 with a maximum 15% full load current the starting period do shall not exceed 30 seconds with under voltage and an intensions (Magnetic) over load release device.	No.	2			
5.	Electric Induction plate	Electric Induction plate with min 1500 Watt, 240V having Ceramic cook top. •ISI mark product	No.	3			
6.	A.C. Energy Meter	A.C. Energy Meter- induction type Single Phase,10 A, 240 V • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	No.	5			
7.	A.C. Energy Meter	AC energy meter Three Phase, 15 A , 440 V induction portable type AC Energy Meter Housed in Bakelite case	No.	6			
8.	A.C. Series type Motor	AC Series type Motor with Mechanical Loading arrangement and Electric Control Panel as given below: AC Series Motor :- Rating: 1 HP, 240 V, 50 Hz with terminals are brought out on terminal box. Insulation : Class 'B', or better Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting	No.	2			

		<p>arrangement.</p> <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J 					
9.	A.C. Voltmeter M.I. Analog	<p>A.C. Voltmeter</p> <p>M.I. analog, Multi Range</p> <p>A.C. Voltmeter M.I. 75V - 150 V - 300 V – 600V</p> <p>A.C</p> <p>Confirming to BS 89, IEC 51 & IS 1248</p>	No.	8			
10.	Air Conditioner unit split 2 Ton capacity with Stabilizer	<ul style="list-style-type: none"> • Type - Split AC complete in all aspects • Capacity in Tons- 2 Ton • Star Rating- Min. 3 Star BEE Rating • BEE Rating Year- 2019 • Power Requirement AC 230 V, 50 Hz • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Refrigerant -R-410A or better • Condenser Coil -Copper 	No.	5			
11.	Air conditioner split type 1.5 tons	<ul style="list-style-type: none"> • Type -Split type AC complete in all aspects • Capacity in Tons- 1.5 Ton • Star Rating- Min. 3 Star BEE Rating • BEE Rating Year- 2019 • Power Requirement AC 230 V, 50 Hz • Color -White • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Condenser Coil -Copper 	No.	3			
12.	Ac Ammeter Mi, Analog	<p>AC Ammeter MI, analog, 0-1 A range with Moving iron spring-mounted jewel bearing suspension</p>	No.	5			
13.	Ac Ammeter Mi, Analog	<p>AC Ammeter MI, analog, (0-5 A MI) with Moving iron spring-mounted jewel bearing suspension</p>	No.	5			

14.	Ac Ammeter Mi, Analog	AC Ammeter MI, analog, (0-25A MI) with Moving iron spring-mounted jewel bearing suspension	No.	5			
15.	AC Motor Trainer Kit ¼ HP motor, Single Phase Contactors, Relays, MCB, DOL Starter	<p>AC Motor MOTOR : Single Phase, Capacity 1/4 HP, 230 volts A.C., 50 Hz, TEFC or better, Insulation: class 'B' or better , horizontal foot mounted.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iitems/component as given ELECTRICAL PANEL BOARD given in Appendix-J</p>	No.	2			
16.	AC phase-wound slip ring Motor along with control panel.	<p>AC PHASE-WOUND SLIP RING MOTOR WITH ROTOR RESISTANCE TYPE STARTER SWITCH Motor :- 5 HP, 440 volts, 3-phase, 50 Hz - 440 volts, slip ring Induction Motor, horizontal foot mounted. Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine.</p>	No.	3			

		Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-G					
17.	AC Squirrel Cage Motor with Mechanical Load along with control panel.	<p>A.C. SQUIRREL CAGE INDUCTION MOTOR 5 HP WITH Automatic STAR DELTA STARTER with Mechanical Load -</p> <p>AC MOTOR :- It should be A.C. 3 Phase 5 HP 415 volts, 50 Hz, Squirrel cage Induction Motor, horizontal foot mounted. Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-F</p>	No.	3			
18.	Resistance type AC starter	AC Starters: - Resistance type starter For A.C Motors of 2 to 5 H.P.	No.	2			
19.	DOL AC Starters	<p>Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 2 to 5 HP motor</p> <ul style="list-style-type: none"> • Conforms to IS 13947 or IEC 60947-4-1 & IEC 60947-4-1. • Sheet steel enclosures with IP 54 protection. • Wide range of relay settings and coil voltages. 	No.	2			
20.	Manual Star-Delta type AC starter	Star Delta Starter- Manual Manual Star Delta starter for 3 phase AC motors of min. 5 HP ratings complete in all aspects. Sheet steel enclosures with IP 54 protection. with Standardized accessories and spares .	No.	3			
21.	Semi-Automatic Star-Delta type AC starter	Star Delta Starter – Semi automatic in Sheet-Steel Enclosure (Motor Rating min 5 HP AC-3 Duty, 415V, 50Hz, 3-Ph	No.	3			

		Sheet steel enclosures with IP 54 protection. with Standardized accessories and spares.					
22.	Fully Automatic Star-Delta type AC starter	Fully Automatic Star-Delta Starters Suitable for motor starting upto 2 to 5 HP AC-3 Duty, 415V, 50Hz, 3-Ph Sheet steel enclosures with IP 54 protection.	No.	3			
23.	Star Delta AC Soft Starter	Star Delta Starter - Soft starter Star Delta soft Starter complying IEC 60947 in Enclosure with IP 20 protection class for Motor Rating 2-5 HP AC-3 Duty, 415V, 50Hz, 3-Ph	No.	2			
24.	Auto Transformer starter	Auto Transformer starter suitable for Motor starting upto 2-5 HP Motors. Shall conform to IEC 60947-4-1 Starter enclosure to conform IP 53	No.	2			
25.	Air blow gun with standard accessories	Air blow gun Copper body with jet operating lever and suitable hose/connector	No.	1			
26.	Ammeter (0-10 mA), (0-50mA), (0-100mA) (table model)	Table model Analog Ammeter with range 0-10 mA : • Range: Current (A): 0 – 10 m A Table model Analog Ammeter with range 0-50 mA : • Range: Current (A): 0 – 50 m A Table model Analog Ammeter with range 0-100mA : • Range: Current (A): 0 – 100 m A	No.	2			
27.	Ammeter 300A/ 60A DC with external shunt	Analog type portable Ammeter Min 300 A/60 A DC with external shunt with probe Fitted in Box Shall conform to I.S. 1248 / I.E.C. 60051 (Part 2)	No.	4			
28.	Ammeter Mc Analog	Ammeter MC analog - (0 - 500mA) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	No.	5			
29.	Ammeter Mc Analog	Ammeter MC analog - (0-5 A- MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it	No.	5			

		should be moving coil type					
30.	Ammeter Mc Analog	Ammeter MC analog- (0-25 A- MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	No.	5			
31.	Analog multimeter	Analog Multimeter AC Voltage (Volts) 10-1000 V AC Voltage Accuracy $\pm 4\%$ DC Voltage Accuracy $\pm 3\%$ DC Current (Amp) 50 μ A-10 A DC Voltage 0.1mV-1000 V DC Current Accuracy $\pm 3\%$ Resistance (ohm) 0.2 Ω -20 M Ω Resistance Accuracy $\pm 3\%$	No.	21			
32.	Application kits for Microcontrollers 6 different applications	Application kits for Microcontrollers 6 different applications: 1. Input Interface : 4x4 Matrix Keypad, ASCII Key PAD, Four Input Switch 2. Display Module 16X2 LCD, Seven Segment, LED Bar Graph 3. ADC/DAC Module with most popular DC/DAC0808 4. PC Interface: RS232 & USB 5. Motor Drive: DC, Servo, Stepper 6. DAQ: Data Acquisition to sense different sensors signals	No.	2			
33.	Auto Electrical test bench	Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo, alternator, regulators and starter motors with following specifications: Instrumentation Installed • Alternator output current - Digital Panel meter 0-100 Amps DC • Alternator output current - Digital Panel meter 0-100 V DC Drive • 220V single phase, 2HP, 1440 RPM	No.	1			

		induction motor Protected with circuit breakers Field Supply • 12V/24V fixed Protection • Circuit breakers incase of sudden surges in voltage <ul style="list-style-type: none"> • Fuses provided for protection of rectifiers, battery etc Power Requirements • 220V single phase, 15 Amperes Vice • Heavy duty, fast mounting for alternators and starters <ul style="list-style-type: none"> • latest ISO 9001 Certified factory product 					
34.	Autotransformer	Single Phase Variable Auto Transformer 0 - 270 V, 15 Amp (Air cooled) Specification:- Type :Single Phase Auto Transformer Amperage 15 Amp input voltage 0-270 V with safety fuses and line indicators	No.	2			
35.	Electric Kettle	Electric Kettle Min. 1500 Watts, 240V with 1.7 Litre capacity.	No.	3			
36.	Basic Analogue Electronics Trainer	Basic Analogue Electronics Trainer with following specifications: <ul style="list-style-type: none"> • Bread Board : Unique solder-less large size, spring loaded breadboard consisting of two Terminal Strips • Regulated DC Power Supply of suitable rating • AC Supply of suitable rating • Function Generator : Sine / Square / Triangular waveforms frequency. Variable in between steps. Sine / Square / Triangular waveform • Modulation Generator : Sine / Square / Triangular wave forms frequency. Variable in between (100 KHz) steps. Sine / Square / Triangular waveform • Digital Meter (3½Digit) : Dual range DC voltmeter / Ammeter • Continuity Tester : For testing the continuity. Provided with Beeper Sound • Potentiometers : 3 Potentiometers (1K, 100K and 100K) with terminals • On Board Switches : 2 Switches Single pole double through • Power : 230 V \pm 10%, 50 Hz 	No.	5			

37.	Battery Charger	Battery Charger of Capacity-30amps(High) The charger is for automotive, SMF, VRLA, Tubular and stationary batteries. It shall be possible to recharge 20Ah to 200Ah batteries. These charger should be able to select 12V/24V/36V and 48V respectively with low and High current selector to choose current level for low Ah battery and High Ah battery. Power on indication, reverse mcb and Thermal trip with connecting probes. It shall use full wave rectifier coupled copper transformer combination . An ammeter for indication charging current.	No.	12			
38.	Battery storage lead acid 6V & 12 V	*Voltage :12 V Capacity (Ah): 50 AH Battery Type: Sealed Acid Lead Battery *Voltage :6 V Capacity (Ah):4.5 AH Battery Type: Sealed Acid Lead Battery	No.	5			
39.	Brake Test arrangement	Brake Test arrangement with two spring balance rating Brake Test arrangement with two spring balance 0 to 25 kg rating friction brake dynamometer set having two nos. six inches dial type spring balances should be provided with fixed on motor base plate.	No.	2			
40.	Bus bar with brackets	200 Amps,1 Meter each, four buses of RYBN of Copper material with extension assembly. All hardware shall be copper. Housed in enclosure with locking arrangement.	No.	9			
41.	Electric Iron	Electric Iron Automatic - 750 W, 240 V.	No.	2			
42.	Steam iron automatic	Electric Steam Iron Automatic - 750 W, 240 V.	No.	1			
43.	C.R.O Dual trace/ Double beam	C.R.O Dual trace/ Double beam 60 MHz <ul style="list-style-type: none"> • DC - 60MHz Bandwidth • X-Y Operation • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD/TFT or better Display • TV Triggering Frame (V) & Line (H) • Line Trigger 	No.	4			

		<ul style="list-style-type: none"> • Component Tester Power Supply : AC 220VV \pm 10%, 50Hz					
44.	Calculator Desk Type	Desk Type Calculator with Min. specifications as: <ul style="list-style-type: none"> • Shall have memory • Dual power (Battery and solar) • LR44 Battery • 12 Digits Display • mini desktop Type • Upright Angled LCD Display with Angled Display • Calculation Command Sign Display • Thousand separator Digit Comma Separator 	No.	1			
45.	Ceiling fan coil Winding Machine	Ceiling fan coil Winding Machine with following specifications: <ul style="list-style-type: none"> • Winding Gauge: 27 SWG to 37 SWG • Size of fan :600 mm to 1400 mm • Starting coil winding :4 slots to 20 slots • Running coil winding: 4 slots to 20 slots • Motor AC 1/ 10 H.P, 1350 R.P.M • Power requirement: 220V AC, 50 HZ Single Phase • Fill counter:4-Digit, Preset, LED Display through controller • Winding Speed: Continuously variable Max. 1000 R.P.M to 1350 R.P.M 	No.	3			
46.	Clamp meter	Tong Tester / Clamp Meter 0 – 10 amp.(Min) <ul style="list-style-type: none"> • Dial (aka rotary switch). • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and frequency modes. • Zero button (yellow): Removes dc offset from dc current measurements. Also serves as dial's shift button to select yellow functions scattered around the dial. Shall comply to Safety standard IEC 1010 or IEC 61010	No.	4			
47.	Contactors & auxiliary contacts-25Amps	Contactors & Auxiliary contacts 3 phase, 415 Volt, 25 Amp with 2 NO and 2 NC	No.	2			

48.	Contactor & auxiliary contacts- 32 Amps	Contactor & Auxiliary contacts 3 phase, 415 Volt, 32 Amp with 2 NO and 2 NC	No.	2			
49.	Current Transformer	<p>Current Transformer Test Set - should have secondary rated for 5 Amp. which are intended to be used on 50 Hz. The measurement is on principal of comparison and null indication on magnetic balance bridge.</p> <p>Specification-</p> <p>C.T.BURDEN BOX 5A, 30VA , 0.8 PF STANDARD C.T. Primary ranges-100-75-50-25-10/ 5amp. Secondary range- 5 amp Burden- 2.5VA, Class of Accuracy-0.2, single ph.</p> <p>C.T. Under Test Primary ranges-100-75-50-25-10/ 5amp. Secondary range- 5 amp Burden- 15VA, Class of Accuracy-0.5, single ph.</p> <p>Variable Current Source Model 0-4V@100A, 400VA, single ph. Complete with control panel B) Phase Ratio Error : 0-1000 Minutes C) Input Current : 0.05A to 7.5A AC D) Accuracy : + 1% of reading</p> <p>Indications : a) Reverse Polarity : b) 'Std' C.T. Sec. open : c) 'X' C.T. Sec. Open : d) Difference Ratios of 'Std' & 'X' CT Hi-imbalance : e) Over Current : f) Ratio Error Polarity : g) Phase lag-lead : h) Phase Error Over Range</p>	No.	4			
50.	Cut out Relays	<p>16A, 440V</p> <p>·Relay Type : Instantaneous Cut Out Relay (Electromechanical)</p> <p>·Terminals :Terminals for Trip, Current Output and Input</p> <p>·Meters (Digital) : 1No. AC Current Meter 0 – 20Amps & 1 No. Digital Timer .0001sec. to 9999sec. (Auto)</p>	No.	4			

		<ul style="list-style-type: none"> ·Current Injector : Inbuilt variable current injector Amps 20Amps to create Phantom Fault Current ·Indicators : Provided on front panel for Mains, Current, Trip and Alarm ·Power Requirement : 440VAC +10%, 50Hz 					
51.	Immersion Heater	Immersion Heater 1500 Watt, 240V.	No.	7			
52.	D.C. Compound Generator with AC Motor along with control panel	<p>Specifications for above shall as follows:</p> <p>DC Compound Generator: 2.5 KW, 220V,. Self-Excited with variac,. Standard ISI Product., Horizontal foot mounted</p> <p>3 phase 5HP 440V foot mounted Squirrel cage AC Induction Motor:</p> <p>Motor Performance conforms to IS:325 and dimensions conform to IS:1231, IS:8223.</p> <p>Degree of Protection:- Motors are designed for degree of protection IP 55 according to IS:4691</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-A</p>	No.	3			
53.	D.C. Shunt Generator with AC Motor along with control panel	<p>Specifications for above shall as follows:</p> <p>1. DC Shunt Generator: 2.5 KW, 220V, Self-Excited with variac, 4 Pole. Standard ISI Product., Horizontal foot mounted</p> <p>2. 3 phase 5HP 440V foot mounted Squirrel cage AC Induction Motor:</p> <p>Motor Performance conforms to IS:325 and dimensions conform to IS:1231, IS:8223.</p> <p>Degree of Protection:- Motors are designed for degree of protection IP 55 according to IS:4691</p>	No.	2			

		<p>Class F insulation class.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iiitems/component as given ELECTRICAL PANEL BOARD given in Appendix-A</p>					
54.	DC compound Motor with starter along with control panel	<p>DC Compound Motor of 2.5 KW 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled.</p> <p>Motor should be Strictly copper wound & confirmed to IS 4722 with 4 point D.C. starter of suitable capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iiitems/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	No.	2			
55.	Dc Power Supply	<p>DC Power supply- 0 to 30V</p> <p>Table Top and Portable type</p> <p>Outputs:</p> <p>0 to 30V DC continuously Variable</p>	No.	6			

		+ 15 V and -15 V Volts DC constant output + 5 V DC Constant output Current capacity : 5 Amps					
56.	DC regulated power supply (5 volts and 12 volts)	DC Power supply- 0 to 5V Table Top and Portable type Outputs: 0 to 5V DC continuously Variable DC Power supply- 0 to 12V Table Top and Portable type Outputs: 0 to 5V DC continuously Variable	No.	10			
57.	DC Regulated Variable Programmable DC Power Supply 0 - 30V / 3A	Regulated DC Power Supply with following specifications: • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-30volts, 3 Amps • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Ripple: Less than 3mv RMS • Protections: Fuse protection will be provided Outputs are protected against over loads & short circuits	No.	4			
58.	DC Series Motor coupled with spring balance load fitted with control panel	DC series Motor of 2.5 KW 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 2 point D.C. starter of suitable capacity having no volt & over load protective devices Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary	No.	2			

		electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iitems/component as given ELECTRICAL PANEL BOARD given in Appendix-C					
59.	DC Shunt Motor	<p>DC Shunt Motor of 2.5 KW 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled.</p> <p>Motor should be Strictly copper wound & confirmed to IS 4722 with 4 point D.C. starter or equivalent starter of suitable capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iitems/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	No.	2			
60.	DC & AC ammeter 0-1 A(table model for lab experiments)	<ul style="list-style-type: none"> ● AC Ammeter MI, analog, 0-1 A range with Moving iron spring-mounted jewel bearing suspension ● DC Ammeter MC analog- (0 - 1 A MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror 	No.	5			
61.	Ammeter MC analog- (0 - 1 mA MC)	<ul style="list-style-type: none"> ● AC Ammeter MI, analog, 0-1 mA range with Moving iron spring-mounted jewel bearing suspension ● Ammeter MC analog- (0 - 1 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should 	No.	5			

		have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror					
62.	DC & AC ammeter 0-50 mA (table model for lab experiments)	<ul style="list-style-type: none"> ● AC Ammeter MI, analog, 0-50 mA range with Moving iron spring-mounted jewel bearing suspension ● Ammeter MC analog- (0 - 50 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror 	No.	5			
63.	DC & AC ammeter 0-500 mA(table model for lab experiments)	<ul style="list-style-type: none"> ● AC Ammeter MI, analog, 0-500 mA range with Moving iron spring-mounted jewel bearing suspension ● Ammeter MC analog- (0-500 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror 	No.	5			
64.	Desoldering pump	Manual, suction type. With static free Teflon nozzle. Type: Manual Hot Solder Sucker De-soldering Pump Tool. Operation: Hand operated. Body: Metal or Moulded. Non Static Teflon Nozzle	No.	31			
65.	De-soldering pump electrical heated	Electric Vacuum Desoldering Pump Wattage: 40 Watt Power Supply: 220-240 Volts AC 50 Hz	No.	10			
66.	De-soldering pump/gun	Manual, suction type. With static free Teflon nozzle. Type: Manual Hot Solder Sucker De-soldering Pump Tool. Operation: Hand operated. Body: Metal or Moulded. Non Static Teflon Nozzle	No.	21			
67.	Diesel Generator Set	Diesel Generator set of Power (kVA): 7.5 KVA complete in all aspects with following key specifications. Engine	No.	3			

		<p>Reference Standard Engine - BS: 5514, ISO: 3046, IS: 10000, Genset - ISO: 8528 Type of cooling: Air/water Cooled Lub oil Sump capacity (with filters) 5 Engine Electrical System 12 Volts DC Electronic Governor, Class A1 Governing Alternator Phase 3Phase, brushless alternator, Self-excited, AVR/Capacitor-regulated - Class 'H' insulation - Salient pole revolving field - Single bearing Voltage 415 V AC Power Alternator Type Single Bearing, Brushless, Insulation Class H Power Factor 0.8 lag, Efficiency of Alternator as per standards IS 4722 Canopy: Bolted type made of CRCA sheet with fire retardant insulation having noise level of less than 75 dBA at 1 meter in line with CBCP norms. Acoustic Insulation PU FR- Acoustic Foam Control Panel shall have following functions: Measurement: Microprocessor based controller with DG parameters display such as Volts line to line & line to neutral, Amps, Hz, Hour, KW,KWH,kVA,PF</p>					
68.	Digital and Analog Bread Board Trainer	<p>Digital and Analog Bread Board Trainer with following components: • DC Power Supply +5V, 1A (fixed) ,+15V, 1A (fixed),-15V, 1A (fixed),+15V, 200 mA (variable),-15V, 200 mA (variable) AC Power Supply 5V-0V-5V, 10V-0V-10V , Sine/ square/ TTL Generator 10Hz to 1MHz Data Switches 8Nos, LED indication 8Nos, Logic level indicator H/L for TTL level (7 segment display), Potentiometers 6Nos, Bread Board 172.5 mm x 128.5mm with 1685 points , Simulation/ Teaching Content through software</p>	No.	6			
69.	Digital I.C. Trainer	Digital IC Trainer	No.	2			

		<ul style="list-style-type: none"> • DC Power Supply 5 V, 500 mA (IC based regulated output). • Clock Generators (TTL, 5V)- Fixed and Variable • Manual Pulser • Logic probe with Low, High & pulse indicator • Independent buffered logic level inputs to select High I Low TTL levels, each with a LED to indicate high flow status and termination. <ul style="list-style-type: none"> • Independent buffered logic level indicators for High / Low status indication of digital outputs. • Potentiometer (ILOOK) with terminations. • Power ON switch with indicator for mains on indication and fuse for protection. • Set of assorted coloured multi-strand wires with 2 mm termination at both ends • Working Voltage: 230V 10% single phase AC • Latest ISO 9001 Certified factory product 					
70.	Digital IC tester	<ul style="list-style-type: none"> • Digital IC Tester (Portable) with following Specifications: • Power Supply: 220 V+-10%, 50 Hz • Automatic testing of variety of ICs. • Potential free 40 pin universal ZIF socket. • Six Seven Segment Display to show IC number, PASS & FAIL Status, Operations display. • Audio alarm to user whenever it is required. 	No.	4			
71.	Digital IC Trainer	<p>Digital IC Trainer</p> <ul style="list-style-type: none"> • DC Power Supply 5 V, 500 mA (IC based regulated output). • Clock Generators (TTL, 5V)- Fixed and Variable • Manual Pulser • Logic probe with Low, High & pulse indicator • Independent buffered logic level inputs to select High I Low TTL levels, each with a LED to indicate high flow status and termination. <ul style="list-style-type: none"> • Independent buffered logic level indicators for High / Low status indication of digital outputs. • Potentiometer (look) with terminations. • Power ON switch with indicator for mains on indication and fuse for protection. 	No.	8			

		<ul style="list-style-type: none"> Set of assorted coloured multi-strand wires with 2 mm termination at both ends Working Voltage: 230V 10% single phase AC 					
72.	Digital LCR Meter	Digital LCR meter with following specifications: <ul style="list-style-type: none"> RESISTANCE: 600/6k/60k/600k/6M $\Omega \pm 1.0\%$, 60M $\Omega \pm 1.5\%$ CAPACITANCE: 6nF $\pm 2.0\%$, 60n/600n/6 Ω F $\pm 1.0\%$, 60 Ω /600Ω /6mF $\pm 1.5\%$ INDUCTANCE: 600 Ω H $\pm 2.5\%$; 6m/60m/600mH $\pm 1.5\%$; 6H: <4H $\pm 2.8\%$ >4H $\pm 5.0\%$; 60H: <40H $\pm 3.5\%$ >40H Unspecified POWER: 6 (1.5V) (AAA Type) 	No.	3			
73.	Digital Multimeters	Multimeter Digital Specifications :- Voltage between any Terminal and Earth Ground: 1000V Min Display: Digital: 4000 count updates 3/sec Operating Altitude: 0 to 2000 meters Specification: DC voltage: 200m/2V/20V/200V $\pm 0.5\%$, 1000V $\pm 0.8\%$ AC voltage: 2V/20V/200V $\pm 0.8\%$, 750V $\pm 1.2\%$ Resistance: 200/2k/20k/200k/2M? $\pm 0.8\%$, 20M? $\pm 1.0\%$ DC current: 200mA $\pm 1.5\%$, 10A $\pm 2.0\%$ AC current: 200mA $\pm 1.8\%$, 10A $\pm 3.0\%$ Capacitance: 20nF/200nF/2 μ F/20 μ F/200 μ F $\pm 4.0\%$ Temperature: -20 ° C ~ 1000 ° C Inductance: 20mH/200mH/2H/20H $\pm 3.0\%$ Transistor hFE: 1 ~ 1000 Power supply: (9V) Battery Life: Alkaline: 500 Hours Safety Compliance: IEC 61010-1, 2000 CAT I 1000 V, CAT II 600 V, and CAT III 300 V overvoltage standards	No.	80			
74.	Digital trainer kit	Digital trainer kit to study different types of logic gates and digital circuits using breadboard with min. Specifications as: <ul style="list-style-type: none"> On board 8 TTL Input switches with Dual colour LEDs to indicate low or High 	No.	4			

		<ul style="list-style-type: none"> • On board 8 Output LEDs • On board Four seven segment Displays • On board Two Displays also have segment wise controls • On board Manual Pulsing • On board Logic Probe • Bread Board with 1240 Tie Points • On board Micro Processor Interface • Bare board Tested Glass Epoxy SMOBC PCB is used. • Block Description Screen printed on glassy epoxy PCB • All interconnections are made using 2mm banana Patch cords • ON/OFF switch for power indication. • With built-in power supply • Enclosed in a wooden/plastic box 					
75.	Digital Wattmeter	Digital Wattmeter which calculate and displays power of single phase 230 V, Min. 1 KW Measurement, 50 Hz on a seven segment display. 600 V CAT IV/1000V CAT III as per International Safety standard IEC61010-1- 2010	No.	7			
76.	Dimmer starter	Dimmer Starter 0 - 270 V, 3Amp (Air cooled) Specification:- Type :Single Phase Auto Transformer Amperage 3 Amp input voltage 0-270 V with safety fuses and line indicators	No.	4			
77.	Discrete Component Trainer	Discrete Component Trainer Discrete Component Training Board should be cater for the study of Discrete Electronic Components. The Trainer should also have the capability of adding more exercises based on requirement. Should Consist of suitable voltage and Current rating regulated/stabilized A.C. & D.C. Power Supplies with Overvoltage and short circuit protection. <ul style="list-style-type: none"> • Regulated DC Power Supply: +5V at 1 Amp, - 5V at 1Amp, +12V 500ma , -12V 500ma, 0 to 20V ,500 ma - Continuously Variable. • AC Supply: 5-0-5V, 10-0-10V at 100mA 	No.	4			

		<ul style="list-style-type: none"> • Function Generator: Sine/Square/Triangular waveforms frequency 1 Hz to 110 KHz in 5 Steps. • Modulation Generator: Sine/Square/Triangular wave forms frequency 1 Hz to 110 KHz in 5 Steps. • Digital Meter (3½Digit): Dual range DC voltmeter 0-20 V/Ammeter 0-200ma • Operating Voltage: 230V ±10% at 50Hz A.C. Mains. 					
78.	DOL starter	Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 1/2 HP AC motor <ul style="list-style-type: none"> • Conforms to IS 13947 or IEC 60947-4-1 & IEC 60947-4-1. • Sheet steel enclosures with IP 54 protection. • Wide range of relay settings and coil voltages. 	No.	3			
79.	DSO (colour)	Color DSO with 4 Channel , 50MHz Real Time Sampling 1G Samples/Sec, 12 Mpts Memory with PC Interface USB, LAN and math function includes +, -, FFT, differential, integral, abs, log etc	No.	2			
80.	Dual DC regulated power supply	Regulated DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 30-0-30volts, 2 Amps • Line & load regulation: ±0.05% for variations in input and load variations • Ripple: Less than 3mv RMS • Protections: Fuse protection will be provided Outputs are protected against over loads & short circuits	No.	8			
81.	A.C. Ceiling Fan and AC Table Fan	A.C. Ceiling Fan :min 1200mm 68-Watt 230 V with handing arrangement and regulator AC Table Fan: Min. 68 Watt, 230 V with oscillation mechanism	No.	3			
82.	Earth Electrode	Primary Electrode 2100x28x3.25mm Secondary Cu Strip 20x5mm	No.	3			

83.	Earth Plate	60cm X 60cm X 3.15mm Copper Plate	No.	3			
84.	Earth Plate	60cm X 60cm X 6mm GI Plate	No.	3			
85.	ELCB and RCCB	Earth Leakage Circuit Breaker- (ELCB) 25Amps, double pole and 25Amps, double pole, IΔn 30 mA(Rated Short circuit capacity) Specification: shall comply to IEC 61008-1/IS 12640-1:2008/EN 61008-1 Residual Current Circuit Breaker (RCCB) 25 Amps, Double pole , IΔn 30 mA (Rated Short circuit capacity) Specification: IEC 61008-1/IS 12640-1:2008/EN 61008-1	No.	3			
86.	Electric Automatic steam press	<ul style="list-style-type: none"> • Steam 30g/min;100g steam boost • Non-stick soleplate/ Ceramic Soleplate • Anti-calc • 2100 Watts • Water tank capacity with min. 200 ml • Power supply: 220 V AC Single phase 50 Hz 	No.	3			
87.	Electric pump	Electric Pump of 1 HP with min. desired specifications as Follows: <ul style="list-style-type: none"> • Head :10-40 M • Discharge : 3960 - 360 LPM • Rating :1.00HP • Voltage Range : 170 - 230 V single Phase MATERIAL OF CONSTRUCTION <ul style="list-style-type: none"> • Pump Housing : Cast Iron • Impeller : H T Brass/bronze • Shaft : Carbon Steel • Motor Body : Extruded Aluminium 	No.	1			
88.	Electric Soldering Iron	Soldering iron 25 Watts: <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. Soldering Iron 60 Watts: <ul style="list-style-type: none"> • Type: Non-temperature controlled 	No.	2			

		<ul style="list-style-type: none"> • Wattage: Min 60W Temperature: 850° F / 440° C • Cord length: 5 feet • Tip: Short length, Taper, Chisel type, 0.15" , Replaceable Soldering Pencil type • Peg hook for hanging the Soldering Iron • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 					
89.	Electrical Machine Trainer	<p>Electrical Machine Trainer: Suitable for demonstrating the construction and functioning of different type of DC Machines and AC Machines (single phase & three phase) Should be fitted with friction brake arrangement, AC/DC meters, instrument panel and power supply unit with internal panel duly wired. Completed with work bench that already equipped with galvanic isolated power supply and a cupboard to store the motors and other modules with emergency stop button. All inputs and outputs on each panel are equipped with safety socket and safety connecting cross 4mm. Ratings and qty. of machines etc. are mentioned in Appendix-K</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-K</p>	No.	2			
90.	Electronic circuit simulation software with	Circuit Design, Simulation, Analysis and PCB Design Software	No.	2			

	6 user licenses	The software should have facility of circuit simulation and PCB design with analysing, designing and real time testing of analog, digital, Verilog-AMS, VHDL, MCU and mixed electronic circuits and their PCB layouts. It should also have facility to analyze SMPS, RF, Communication and optoelectronic circuits. It should have features to generate and debug MCU code using the integrated flow chart tool and test microcontroller applications in a mixed circuit environment.					
91.	Geyser (Storage type)	Capacity 10 litres 3 KW Heating Element Min. 3 Star rated from BEE ISI Mark Product	No.	4			
92.	Fiber optic communication trainer	<ul style="list-style-type: none"> •The Fiber optic Communication Trainer should provide the learning platforms to carryout practical to learn Basic Optical fiber communication Technology. •The Trainer kit should be able to demonstrate Full Duplex method of transmitting information from one place to another by sending pulses of light through an Optical fiber. •Using the trainer it should be possible to demonstrate;- properties of Fiber Optics Transmitter & Receiver - Characteristics of Fiber Optics Cable - Different types of Modulation / Demodulation techniques and - PC to PC communication via fiber link using RS232 interface. •Full Duplex Analog & Digital Trans-receiver. •Single Module covering large number of experiments including experiments with Optical Power Meter. •660 nm & 950 nm Optional Laser Source channel with Transmitter & Receiver. • AM-FM-PWM modulation / demodulation. • PC-PC comm. with RS232 ports & software. •On board Function Generator. Crystal Controlled Clock. • Functional Blocks indicated on-board mimic 	No.	4			

		<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 					
93.	Clamp Meter	Fluke Meter Tong Tester / Clamp Meter 0 – 100 amp.(Min) Shall comply to Safety standard IEC 1010 or IEC 61010	No.	2			
94.	Frequency Meter	Frequency Meter AC frequency meter analog with range 45 to 55hz , installation category 300 V CAT III IS : 1248 / IEC 51	No.	4			
95.	Frequency modulator and Demodulator trainer kit	Frequency modulator and Demodulator trainer kit with following specifications: FM Modulator Type : Reactance Modulator, Varactor Modulator, VCO Based Modulator FM Demodulator type, All 5 demodulation techniques Detailed teaching and learning contents through software. <ul style="list-style-type: none"> • Frequency modulation should be using Voltage Controlled Oscillator • Demodulation should be through Phase locked Loop circuit. 	No.	2			
96.	Function Generator	2 -200 KHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator with DDS Technology <ul style="list-style-type: none"> • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified factory product 	No.	2			
97.	Function Generator (Sine, Square, Triangle, Ramp, Pulse, Serial Data, TTL and Modulation.)	1 mHz- 10 MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator with DDS Technology	No.	12			
98.	Mixture & Grinder	Mixture & Grinder with Min. 750 W, 240 V.	No.	5			
99.	Growler	Growler 230 V, 50 Hz, Single Phase, <ul style="list-style-type: none"> • ISO 9001 of latest version certified Factory product 	No.	3			
100.	Washing Machine Semi-Automatic	Washing Machine Semi-Automatic 5 Kg,	No.	3			
101.	Washing Machine Automatic	Washing Machine Automatic 5 Kg,	No.	1			
102.	Hand blower	Hand blower with following Min. Specifications: <ul style="list-style-type: none"> • Supply voltage: 230 V AC 	No.	1			

		<ul style="list-style-type: none"> • Motor Power: 500watts • RPM: Min. 14000 r/min • Air Flow: Min. 3.5l/min 					
103.	Home theatre system	Home theatre system <ul style="list-style-type: none"> • 5.1 Channel FM Radio • Remote controlled, 100w, USB, HDMI, AUX, With blue ray/ DVD Player. Bluetooth connectivity • 5 Speakers 	No.	1			
104.	Hydrometer	Hydrometer <ul style="list-style-type: none"> - Range: 1.100 - 1.300 Specific Gravity at 27°C - Complete with Glass Barrel 	No.	8			
105.	Motor Pump set	Electric Pump of 1 HP with min. desired specifications as Follows: Head :10-40 M Discharge : 3960 - 360 LPM Rating :1.00HP Voltage Range : 170 - 230 V single Phase MATERIAL OF CONSTRUCTION Pump Housing : Cast Iron Impeller : H T Brass/bronze Shaft : Carbon Steel Motor Body : Extruded Aluminium Mechanical Steel : Carbon Ceramic	No.	3			
106.	Inverter with Battery	Inverter with Battery 12 V Heavy Duty , Battery Input- 12 volt DC, Output- 220 volt AC Technology should have:-Inverters should be IGBT based . It should provide a uniform output of 230V . Power Output: 1.1 KVA at an input voltage of 12 volts. WaveForm: Square Wave	No.	4			
107.	Kilo Wattmeter	Kilo Wattmeter Analog 0-1.5-3KW, pressure coil rating- 240v/440v, current rating-5A/10A(min) Analog, portable type Housed in Bakelite case Conforming to IS 1248	No.	6			
108.	Knife Switch DPDT fitted with fuse terminals	Knife Switch DPDT fitted with fuse of Min. 16 Amps. The arrangement shall be enclosed in the MS box	No.	24			
109.	Laboratory Type	Laboratory Type Induction Coil 1000 Watt	No.	4			

	Induction Coil	Laboratory type induction coil 6 volt to 800-1000 volt					
110.	LCD PROJECTOR	<p>LCD PROJECTOR with following specifications:</p> <ul style="list-style-type: none"> • Lamp Type: 190W P-VIP • Zoom Magnification and Control: 1.0x Fixed • Focus Control: Manual • Brightness: 3000 lumens (2200 Lumens Eco mode) • Contrast Ratio: 2300:1 (with lamp control) • Screen Size: Min. 70" - 120" (151 x 94cm - 258 x 162cm) • 4000h lamp life (6000h in Eco Mode) • Power Source: 100V - 240V AC, 50/60Hz • Noise Level: Normal Mode: 36dBA / Eco Mode: 29dBA • Operating Environment: 0°C to +40°C 	No.	1			
111.	LCD TV (21")	<ul style="list-style-type: none"> • Superior quality 21-inch full HD LED Color Television/ PC Monitor. • PAL/ NTSC video formats Std AV/RF Inputs, PC Audio In: 1, PC D-sub: 1, RF Connectivity Input: 1, HDMI-CEC, RF Capable and USB. 	No.	2			
112.	LCD TV (Trainer kit)	<p>21-inch full HD LCD Color Television should support PAL/ NTSC video formats with Complete block diagram of a LCD TV system, Study board indicating various sections of LCD TV along with the test points and switch faults</p> <ul style="list-style-type: none"> • Display Type :LCD • Screen Size : 21 Inch or above • Connectivity – Input : HDMI/VGA • Supported Image Type : JPEG • Audio Interface : RCA Left & Right • Audio Output Power : 5W X 2 • Receiving System : PAL BG/I/DK and NTSC • On board Control : Volume, Brightness, Contrast, Color, Channel, Tuning. • Channel Coverage : VHF-2-12; UHF21-69 • Antenna Impedance : 75 ohms Unbalanced • Fault Switches: 5 No. • Test Point: 10 No. • Operating Power supply: 230V + 15% AC, 50 Hz. 	No.	1			

113.	LCR meter	Digital LCR meter with following specifications: <ul style="list-style-type: none"> • RESISTANCE: 600/6k/60k/600k/6M $\Omega \pm 1.0\%$, 60M $\Omega \pm 1.5\%$ • CAPACITANCE: 6nF $\pm 2.0\%$, 60n/600n/6 Ω F $\pm 1.0\%$, 60 Ω /600Ω /6mF $\pm 1.5\%$ INDUCTANCE: 600 Ω H $\pm 2.5\%$; 6m/60m/600mH $\pm 1.5\%$; 6H: <4H $\pm 2.8\%$ >4H $\pm 5.0\%$; 60H: <40H $\pm 3.5\%$ >40H Unspecified • POWER: 6 (1.5V) (AAA Type) 	No.	5			
114.	LCR meter (Digital) Handheld	Digital LCR meter with following specifications: <ul style="list-style-type: none"> • RESISTANCE: 600/6k/60k/600k/6M $\Omega \pm 1.0\%$, 60M $\Omega \pm 1.5\%$ • CAPACITANCE: 6nF $\pm 2.0\%$, 60n/600n/6 Ω F $\pm 1.0\%$, 60 Ω /600Ω /6mF $\pm 1.5\%$ INDUCTANCE: 600 Ω H $\pm 2.5\%$; 6m/60m/600mH $\pm 1.5\%$; 6H: <4H $\pm 2.8\%$ >4H $\pm 5.0\%$; 60H: <40H $\pm 3.5\%$ >40H Unspecified • POWER: 6 (1.5V) (AAA Type) 	No.	2			
115.	LED lighting system	LED lighting system with Measurement of Power, Voltage, Current, Power Factor and Light output performance of different lighting products like LED, CFL at variable input voltages 0 to 245V variable AC	No.	4			
116.	LED TV (21")	• Superior quality 21-inch full HD LED Color Television/ PC Monitor. PAL/ NTSC video formats Std AV/RF Inputs, PC Audio In: 1, PC D-sub: 1, RF Connectivity Input: 1, HDMI-CEC, RF Capable and USB.	No.	2			
117.	LED TV (Trainer kit)	LED TV (Trainer kit) with following specifications: <ul style="list-style-type: none"> • Display Type :Full HD LED • Screen Size : 21 Inch or above • Connectivity – Input : HDMI/VGA • Supported Image Type : JPEG • Audio Interface : RCA Left & Right • Audio Output Power : 5W X 2 • Receiving System : PAL BG/I/DK and NTSC • On board Control : Volume, Brightness, Contrast, Color, Channel, Tuning. • Channel Coverage : VHF-2-12; UHF21-69 • Antenna Impedance : 75 ohms Unbalanced 	No.	1			

		<ul style="list-style-type: none"> Fault Switches: 5 No. Test Point: 10 No. Operating Power supply: 230V + 15% AC, 50 Hz. 					
118.	Limit Switch	Limit Switch, Liver operated 2A 500v, 2-contacts	No.	4			
119.	Linear I.C. Trainer	Linear I.C. Trainer with built in regulated power supply 1.2V to 15V PIC socket 16pin and 20 pin with bread board Built-in relay, speaker & other related active/passive components Supply DC : +5V, 1A (fixed) +12V, 500 mA (fixed) -12V, 500 mA (fixed) +12V, 500 mA (variable) -12V, 500 mA (variable) , AC Supply 9V-0V-9V, 500mA Bread Board 172.5 mm x 128.5mm with 1685 tie points , Function Generator Sine, Square, and Triangular functions Frequency range:10Hz to 100KHz , Meter to measure Voltage(-DC 10V to +10V) , Current (DC 0 to 400mA) Frequency (DC to 100KHz)with respect to Ground. <ul style="list-style-type: none"> Latest ISO 9001 Certified factory product 	No.	2			
120.	Load Bank (Lamp / heater Type)	Load Bank - (heater Type) 6 KW,3Phase,440 volt, Current: 5A to 50A, Frequency: 50Hz	No.	2			
121.	Logic Probes/Logic Pulser	Logic Probe with Pulser having min. specifications as : <ul style="list-style-type: none"> Input impedance 120 kilo-ohm Pulse Width Min. 10µS Power Supply Range ...5 - 15V DC Maximum Input Signal Frequency ..50MHz Operating supply range ... 4V DC Minimum, 18V DC Maximum 	No.	4			
122.	Lux Meter	Lux Meter - <ul style="list-style-type: none"> Display -3½ digit ,LCD , Ranges - 0-70,000 Lux .(3 ranges) , Accuracy - + (5% rdg. +2 dgts) , Operating Temperature - 0° to 50 °(32° to 122° F) Operating Humidity - Less than 80% R.H. 	No.	7			

		• Power Supply - min 9V battery (6F 22) ,					
123.	Magnetic Flux	Magnetic Flux Meter portable type Housed in Bakelite case Technical Specifications : Range : 0-500 tesla Accuracy : ± 0.5% Display : 3 ½ digit 7 seg. (DPM) Detector : Hall probe with an imported hall element Power : 220V, 50 Hz	No.	8			
124.	Maintenance Free Battery	VRLA Maintenance Free Battery with following Specifications: Voltage: 12 Volt Capacity: 9 AH	No.	4			
125.	Manual Motor coil Winding Machine	Manual Motor coil Winding Machine with min. six numbers of Straight and Step Arbors, suitable for 1/8 H.P. to 40 H.P. Motor coil. durable and efficient, with capacity of winding both-Single and Three Phase Motor's coil of Straight and Step winding.	No.	3			
126.	MCCB	MCCB of Min. 100 Amps Triple pole 440 V with enclosure.	No.	3			
127.	Megger	Megger - (500 Volt) insulation Tester Nominal test voltages Dust & Water protection: IP54 Protected against dust and splashing water Safety Protection Meets EN 61010-1 (1995) to 600 V phase to earth, Category IV Designed to Generally Conform to IS 10656-1983	No.	6			
128.	Microcontroller kits (8051) along with programming software (Assembly level Programming)	Microcontroller kits (8051) along with programming software (Assembly level Programming) •With Core 8051, ready to run programmer for AT89C51/52 & 55, programming modes Key Pad and PC circuits. • Detailed learning content through simulation Software. •Full featured development system for 8051 microcontrollers. • It should be an ideal platform to implement and test the designs both for the beginners and	No.	8			

		carryout Projects. •Should be with Hex keypad and LCD Display for user programming. • On board LCD for both programming mode and run mode. • Latest ISO 9001 Certified factory product/ CE Mark Product					
129.	Milli Ammeter (AC)	AC Ammeter MI, analog, 0-200mA range with Moving iron spring-mounted jewel bearing suspension	No.	4			
130.	Milli Ammeter (DC)	Ammeter MC analog- (0 - 500 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension p It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	No.	4			
131.	Milli Voltmeter	Milli Voltmeter centre - zero analog, Milli Voltmeter centre zero 100 – 0 – 100 m volt Confirming to BS 89, IEC 51 & IS 1248	No.	5			
132.	Miniature Breaker	MCB 16 Amps.	No.	6			
133.	Generator(DC to AC) set	Specifications for above shall as follows: 1 MOTOR :- It should be 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 I.S. 4722-1992. lifting bolt & earthling terminal shall be provided. 2. ALTERNATOR:- 3.5 K.V.A., 440/230 Volts, 50 H.Z., 0.8 power factor, 3 phase 4 wires 0.8 P.F. self-static field exciter, self-regulation, insulation class 'H', Horizontal foot mounting. Alternator is provided lifting bolt & earthling terminal. Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement:	No.	2			

		<ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-E1 					
134.	Motor-Generator (AC to DC) along with Control Panel	<p>Specifications for above shall as follows:</p> <p>1. DC Shunt Generator: 5 KW, 440V. Separately Excited with variac, output voltage to vary from 110V to 440 V, 4 Pole. Standard ISI Product. Horizontal foot mounted</p> <p>2. 3 phase 7.5 HP 415V foot mounted Squirrel cage AC Induction Motor: Motor Performance conforms to IS:325 and dimensions conform to IS:1231, Degree of Protection:- Motors are designed for degree of protection IP 55.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-B 	No.	2			
135.	Digital Multimeter	<p>Multimeter Digital Specifications :-</p> <p>Voltage between any Terminal and Earth Ground:1000V Min</p> <p>Display: Digital: 4000 count updates 3/sec</p> <p>Operating Altitude: 0 to 2000 meters</p> <p>Specification:</p> <p>DC voltage: 200m/2V/20V/200V \pm 0.5%, 1000V</p>	No.	6			

		$\pm 0.8\%$ AC voltage: 2V/20V/200V $\pm 0.8\%$, 750V $\pm 1.2\%$ Resistance: 200/2k/20k/200k/2M? $\pm 0.8\%$, 20M? $\pm 1.0\%$ DC current: 200mA $\pm 1.5\%$, 10A $\pm 2.0\%$ AC current: 200mA $\pm 1.8\%$, 10A $\pm 3.0\%$ Capacitance: 20nF/200nF/2 μ F/20 μ F/200 μ F $\pm 4.0\%$ Temperature: -20 ° C ~ 1000 ° C Inductance: 20mH/200mH/2H/20H $\pm 3.0\%$ Transistor hFE: 1 ~ 1000 Power supply: (9V) Battery Life: Alkaline: 500 Hours Safety Compliance: IEC 61010-1, 2000 CAT I 1000 V, CAT II 600 V, and CAT III 300 V overvoltage standards					
136.	Ohm Meter; Portable box type	Ohm Meter- Shunt Type - Specification :- Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. Range : 0-2000 ohm . Accuracy : +/- 5 % of the indicating value at centre zero	No.	6			
137.	Ohm Meter; Series Type	Ohm Meter- Series Type - Specification :- Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. Range : 0-2000 ohm . Accuracy : +/- 5 % of the indicating value at centre zero	No.	6			
138.	Ohm Meter; Shunt Type	Ohm Meter- Shunt Type - Specification :- Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. Range : 0-2000 ohm . Accuracy : +/- 5 % of the indicating value at centre zero	No.	6			
139.	Oil Testing Kit	The technical characteristics of our High Voltage Oil Test Sets are as follows: • NMC : Oil Test set is ideal for speedy and accurate testing of DI-i-electric strength of transformer and circuit breaker oil under test	No.	2			

		room condition in accordance with IS:6792-1972 for oil testing <ul style="list-style-type: none"> • Input : 230 Volts, Single Phase, 50 Hz, AC. • Output : Continuously variable from 0 to 60 Kv • Capacity: Min. 600 VA • Nature of cooling: The transformer will be epoxy resin cast type air-cooled type • The instrument should have step-less/continuous voltage incrementing ability from 0 to 100kV. User should be able to use as a breakdown test set or as withstand test set. • The instrument should have a 60-0-60 kV Vacuum Epoxy moulded transformer for low-PD levels. • The instrument should have a large graphic backlit LCD display with membrane keypad or touch-screen display for user interface. • Test vessel: The test vessel (Oil Cell)fitted with two brass spheres on sides of test vessel made from non-absorbent insulating material • Cover: Sets shall be provided with transfer and high impact acrylic sheet cover for covering the H.T. side with suitable inter-locking device 					
140.	Op Amp Trainer	Op Amp Trainer with following specifications: Function Generators : Sine Wave : 10Hz - 100 KHz (10VPP) Square Wave : 10Hz - 100 KHz (10 VPP) Triangle Wave : 10Hz - 100 KHz (8 VPP) On board test Power : 0-5V (variable) Supplies Test Points : 28 (Gold plated) Power Supply : 230 V \pm 10%, 50/60 Hz Power Consumption : 4 VA approximately Operating Conditions : 0-40 C, 85% RH	No.	4			
141.	20 MHz Dual Trace Oscilloscope	Oscilloscope Dual Trace 20 MHz <ul style="list-style-type: none"> • DC - 20MHz Bandwidth • 1mV/div Sensitivity on Both Channels • X-Y Operation • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD/TFT or better Display • TV Triggering Frame (V) & Line (H) • Line Trigger 	No.	2			

		<ul style="list-style-type: none"> • Component Tester Power Supply : AC 220V \pm 10%, 50Hz					
142.	Over Current Relay	Over current relay of 16A, 440V Technical Specifications: ·Relay Type : Thermal Over Load Relay ·Terminals : 4mm Terminals for Trip, Current Output and Input ·Meters (Digital) : 1No. AC Current Meter 0 – 20Amps & 1 No. Digital Timer .0001sec. to 9999sec. (Auto) ·Current Injector : Inbuilt variable current injector 20Amps to create Phantom Fault Current ·Relay Circuit Diagram : Screen Printed on front panel ·Power Requirement : 440V AC +10%, 50Hz	No.	4			
143.	PAM, PPM,PWM trainer kit	PAM, PPM,PWM trainer kit with following specifications: Modulation & Demodulation Techniques : PAM,PWM, PPM , Line Coding Techniques Internal Signal Generator : Direct Digital Synthesizer Types of Signal : Sine, Square, Triangle, Arbitrary signals. Frequency : 500Hz, 1KHz, 2KHz, 3KHz Types of Signal : Sine, Square, Triangle, Arbitrary signals Frequency : 500Hz to 3.5KHz <ul style="list-style-type: none"> • SMD LED Indicators for: DDS signal selection, DDS signal frequency selection, Sampling selection, Technique Selection Interconnect path Crystal Frequency : 20MHz Selection Mode : Push switches Data Frequency : 500Hz, 1KHz, 2KHz, 3KHz Power Supply : 220-240V AC, 50Hz	No.	2			
144.	PCI slot Testing tool	<ul style="list-style-type: none"> • PCI-E slot tester shall be able to diagnose the open circuit or short circuit of motherboard PCI-E slot quickly. It shall find the error easily without knowing the resistance value. • Inbuilt Power Supply: 12V DC power supply • Standard PCI ISA interface 	No.	4			

		• 4-Digit error code display					
145.	Phase Sequence Indicator	Phase Sequence Indicator 3 Phase, 415 V , Working Voltage: 100 - 500 Volt Freq. : 25-60 Hz Shall comply to Safety standard IEC 1010 or IEC 61010 or EN 61010	No.	7			
146.	Insulators	PIN INSULATORS:- 11/22KV Brown Glazed pin insulators confirming to IS-731 to give rigid support to an over-head line and intended to be mounted vertically on supporting structure by GI Pin passing up inside this insulator with minimum failing loads 10 KN. Shackle type Insulator Standards to which insulators will conform IS: 1445/1977 Latest amendment. Dry Power freq. Withstand voltage (KV) : 12 KV Wet Power freq. Withstand voltage (KV) : 06 KV Minimum failing Load (KN): 7.7 KN Egg type Insulator 11 KV Egg Type Insulator conforming to relevant IS standard. Suspension type insulators 11KV Brown Glazed 'Disc' insulators conforming to IS-731/71 for suspension or tension strings, ball and socket type having ball shank dia.16mm and minimum failing load of 70 KN along with phosphor bronze 'W' clips.	No.	4			
147.	Portable electric drill Machine	Portable hand Drill (Electric) with min. 2 to 20mm Capacity Input Voltage: 1 Phase 230 V AC For drilling into masonry, concrete, wood and metal.	No.	1			
148.	Post error debugging card	Post error debugging card	No.	4			
149.	Potential Transformer	Potential Transformer Test Set with 415 V, 50Hz, PT Ratio, 440V/110V, Burden: 10VA	No.	4			

		Complete with control panel					
150.	Power electronics Trainer kit	<p>The instrument comprises of the following:-</p> <ul style="list-style-type: none"> • AC Power Supply on Board: 18V-0V-18V, 0V-15V • DC Power Supply on board: +5 V, -5 V 500 mA, +12V, -12 V 500 mA, +15 V, 250 mA, +35V, -35V, 250 mA • Triggering Circuit on Board : 5 gate signal output. PWM control of G1, G2, G3 and G4 Duty cycle control of "Gate" Signal is 0 to 100% • Single Phase Rectifier: Firing angle control 0 °-180 ° variables • Firing Circuit on Board: Four gate signal output with isolation. • SCR Assembly: 4 SCRs 2P4M, 600V, 2A • Power Devices: IGBT-G4BC20S, MOSFET-IRF Z44N, SCR TYN 616, UJT-2N2646, DIAC-DB3, TRIAC-BT136, PUT- 2N6027 	No.	4			
151.	POWER ELECTRONICS TRAINER	<p>The instrument comprises of the following:-</p> <ul style="list-style-type: none"> • AC Power Supply on Board: 18V-0V-18V, 0V-15V • DC Power Supply on board: +5 V, -5 V 500 mA, +12V, -12 V 500 mA, +15 V, 250 mA, +35V, -35V, 250 mA • Triggering Circuit on Board : 5 gate signal output. PWM control of G1, G2, G3 and G4 Duty cycle control of "Gate" Signal is 0 to 100% • Single Phase Rectifier: Firing angle control 0 °-180 ° variables • Firing Circuit on Board: Four gate signal output with isolation. • SCR Assembly: 4 SCRs 2P4M, 600V, 2A • Power Devices: IGBT-G4BC20S, MOSFET-IRF Z44N, SCR TYN 616, UJT-2N2646, DIAC-DB3, TRIAC-BT136, PUT- 2N6027 	No.	8			
152.	Power Factor Meter	<p>415 V, 20 A, Three Phase portable type Power Factor Meter</p> <ul style="list-style-type: none"> • Accuracy Class Class1.0 • Frequency 50Hz ± 5 % • System Voltage 415V AC • Mounting flush <p>Display parameters:</p>	No.	7			

		E.B Energy (6.3 format),Line voltages (Vr, Vy, and Vb with respect to Neutral),Line currents (Ir, Iy, and Ib),Line Frequency, Average power factor lag or lead, Active power- R ph, Y ph, B ph & summation, EB On hour					
153.	Power Meter	Digital Wattmeter which calculate and displays power of single phase 230 V, Min. 1 KW Measurement, 50 Hz on a seven segment display. 600 V CAT IV/1000V CAT III as per International Safety standard IEC61010-1- 2010	No.	4			
154.	Primary current injection set	<ul style="list-style-type: none"> • Output current: 0-200A • Accuracy: $\pm 1.5\%$ of Reading ± 2 digits • Resolution: 1A • Mains supply: 230Vac,50Hz ± 10 • Operation: manual • Display: LED • Indication: Bright LED for Test ON and Power ON operation • Protected by MCB, HRC fuse, Zero start interlock 	No.	3			
155.	Pulse Generator	20 Hz - 20MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator <ul style="list-style-type: none"> • Wide Frequency Range: 20 Hz - 20MHz • Pulse duration 20 ns to 20 s or better • Fast rise/fall time of >10ns or better • LCD Readout for frequency & mode • Output Impedance: 50 Ohms or better • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified Factory Product 	No.	4			
156.	Pulse Generator	20 Hz - 20MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator <ul style="list-style-type: none"> • Wide Frequency Range: 20 Hz - 20MHz • Pulse duration 20 ns to 20 s • Fast rise/fall time of >10ns • LCD Readout for frequency & mode • Output Impedance: 50 Ohms • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified Factory Product 	No.	4			
157.	Reverse current Relay	Reverse current relay of 16A, 440V	No.	4			

		The Experimental Setup consists of the following parts: • 2nos. of Reverse Power Relay provided on the Front Panel. • 2 Nos. of Digital Current meter (0-20A) provided on the Front Panel. • 2 Nos. of Digital Timer provided on the Front Panel. • Power Requirement: 440V/50Hz .					
158.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 - 25 Ohm, 2 Amp Standard ISI Product	No.	2			
159.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 - 300 Ohm, 2 Amp	No.	2			
160.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -1 Ohm, 10Amp	No.	2			
161.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -10 Ohm, 5 Amp	No.	2			
162.	Rheostat variable values	0-1 ohm, 5 A 0-10 ohm, 5 A 0-25 ohm, 1 A 0-300 ohm, 1 A	No.	13			
163.	Room temperature thermometer	Spirit-filled glass thermometer mounted on a rust-proof aluminium plate with dual scale -20° to 230°F x 1°F and -30 to 110 C x 1°C division.	No.	1			
164.	Rotary Switch	Rotary Switch of 16 A/440v	No.	4			
165.	Rubber mat	Rubber Mat of Min 2' x 4' x 1" dimension conforming to IS 15652	No.	4			
166.	SC Couplers	Fiber optic cable adaptor coupler SC-SC Duplex single mode.	No.	12			
167.	Sensor Trainer Kit	Sensor Trainer Kit Containing following Sensors of suitable ratings:- 1. Thermocouple 2. RTD 3. Load Cell/ Strain Gauge 4. LVDT 5. Smoke Detector Sensors 6. Speed Sensor 7. Limit Switch 8. Photo sensors 9. Optocoupler 10. Proximity Sensor On Board DC Regulated Power Supplies	No.	4			
168.	Seven segment DPM trainer	Seven segment DPM trainer •Input – AC or DC selectable.	No.	12			

		<ul style="list-style-type: none"> • Multiple Input ranges in single DPM 200mV., 2 Volt and 20 Volt. • Option to connect binary input through Switches. • Colour – RED / GREEN / AMBER. • Size – 1" LED seven segment digits, Digits: 4 ½ 					
169.	Shaded Pole Motor	Fractional HP, with Min. 25 Watt Shaded pole motor 240 V, 50 Hz	No.	2			
170.	Signal Generator with Digital Display for Frequency Amplitude	10Hz - 100kHz, Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator <ul style="list-style-type: none"> • Pulse duration 20 ns to 20 s • Fast rise/fall time of 3ns • LCD Readout for frequency & mode • Output Impedance: 50 / 600 Ohms 	No.	4			
171.	Single Phase 220 V Capacitor type AC Meter squirrel cage Induction motor	Single Phase Capacitor Motor of 1 HP 240 VOLT WITH STARTER/SWITCH 1. MOTOR : A.C. Single Phase Capacitor Start Induction Motor 1 HP 230volts AC, 50 Hz, horizontal foot mounted. Educational type Bakelite banana type terminals 30 Amps provided on terminal box. Starting winding, running winding with capacitor terminals brought out on terminal box Control Panel Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J	No.	2			
172.	Single phase	SINGLE PHASE TRANSFORMER, CORE TYPE, AIR	No.	8			

	Transformer, core type, air cooled	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. Bakelite sheet and the terminals of primary & secondary will be brought out with Educational type Bakelite banana type terminals 30 Amps and proper marking.					
173.	Single Phase Variable Auto Transfer	Single Phase Variable Auto Transformer 0 - 270 V, 10Amp (Air cooled) Specification:- Type :Single Phase Auto Transformer Amperage 10 Amp input voltage 0-270 V with safety fuses and line indicators Standard ISI product	No.	3			
174.	SMD Soldering & De soldering Station with necessary accessories	SMD soldering/desoldering station with following specifications: Pump Type: Diaphragm pump Air flow rate: 22L/min(Min) Temperature: 200° C - 500° C (hot air) • Latest ISO 9001 Certified Factory Product • CE Mark Product	No.	4			
175.	SMD soldering/desoldering station	SMD soldering/desoldering station with following specifications: Pump Type: Diaphragm pump Air flow rate: 22L/min(Min) Temperature: 200° C - 500° C (hot air) • Latest ISO 9001 Certified Factory Product/ CE Mark Product • Temperature and air flow can be adjusted to suit the task you are doing	No.	4			
176.	SMPS of different make	SMPS •Input power: 200-300V AC. •Output Voltage: 12V. •Power Rating: 450 Watt.	No.	8			
177.	SMPS of PC	Input power: 200-300V AC. Output power: 12V.	No.	10			

		Power Rating: 450 Watt.					
178.	SMPS Trainer	SMPS Trainer with following specifications: • Isolation Transformer: Input of Transformer: 230V AC, 50/60 Hz, Output of Transformer: 230V AC, 50/60 Hz • AC Mains: 230V AC, 50/60Hz or through variac 80VAC to 230VAC • DC Outputs: +12V DC regulated -12V DC regulated +5V DC regulated • Input of Switching Transformer: 320V Switching DC at 132 KHz • Fuse :500mA On-board test points to observe different voltages.	No.	4			
179.	Solar panel with Battery	Solar panel with Battery 12 volts solar panel charging at 12 volt battery with a traditional 12 volt Pulse Width Modulation (PWM) charge controller It should be a 12 volt solar panel with a 12 volt charge controller, 12 volt battery bank and a 12 volt inverter Battery Bank Specification - 18 Watt battery, 12 volt rechargeable 8 Amp Nos. of cells - 36 Open circuit Voltage - 22 volt Maximum Power Volt - 18 Volt	No.	3			
180.	Solar Training Kit/ Simulator	Solar Training Kit complete in all aspects to study fundamentals of PV System at Laboratory with following equipments: Solar Module of suitable size MPPT Charge Controller PV Module Input Voltage : 24–50V Max Current : 25A Battery voltage : 24V Technology : MPPT/PWM Display type : LCD or better Charging Stage : Bulk, Absorptions and Float Battery: Solar Tubular, Capacity : Min. 100Ah Meters: DC Voltmeter : Suitable rating DC Ammeter : Suitable rating AC Multi-Function Meter : suitable rating for Voltage, Current ,Watt, Frequency measurement	No.	2			

		Structure for Solar Panel Material : MS Tracking Type : Manual, Dual Axis Seasonal and day wise Assembly : Detachable and easy to install Safety and Protection MCB (DC) : suitable rating MCB (AC) : suitable rating AC output load protection & Grid Charging Fuse : suitable rating Banana Terminals : suitable rating (shock proof connections)					
181.	Soldering & De soldering Station	Temperature controlled soldering/ desoldering station with min. specifications as: • Input Voltage : 180-240VAC,50Hz Fuse : Suitable rating • DEsolder pump :Suitable rating • Vacuum Pressure :Suitable rating • Min. Temp Range : 180 to 480°C • Temperature control accuracy +/- 1°C • Tip Leakage Current : < 2 mA • Temperature control Stability +/- 1°C • Tip to Ground Resistance : < 2 Ohms • Tip to Ground Leakage Voltage : < 2 mV	No.	2			
182.	Soldering iron	Soldering iron 25 Watt 240 V • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning.	No.	21			
183.	Soldering iron 25 W. 240 V.	Soldering iron 25 Watt 240 V • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning.	No.	21			
184.	Soldering Iron Changeable bits 15 W	Soldering iron with changeable bits 15 Watt 240 V • Type: Non-temperature controlled	No.	33			

		<ul style="list-style-type: none"> • Wattage: 15W • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 					
185.	Soldering iron, 20/25watts	Soldering iron 25 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	No.	21			
186.	Solenoid with core	Educational Solenoid and Electromagnet with Iron Core	No.	10			
187.	Stepper Motor with Digital Controller	4 wire bipolar Stepper Motor with stepper drive along with Digital controller: Stepper Motor: Configuration: 4 wire bipolar Step Angle : 1.8 deg Stepper Drive: Suitable for Stepper motor Digital Controller: Micro Controller based Stepper controller for above stepper drive and motor that allows to control the speed and direction of the motor along with display system. Front Panel programmable SET values, which generates necessary control output through Relays for any Process Application	No.	2			
188.	Synchronous motor along with control panel.	SYNCHRONOUS MOTOR 3 PHASE, 3 HP, 440V, 50HZ, 4 POLE, WITH ACCESSORIES and starting/ prime mover arrangement , excitation arrangements. 1. MOTOR : SYNCHRONOUS MOTOR 3 PHASE, 3 HP, 440V, 50HZ, 4 POLE, WITH ACCESSORIES and starting/ prime mover arrangement , excitation arrangements. Machine Control Panel & Operating Table:	No.	2			

		<p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-I</p>					
189.	Analog Tachometer	Tachometer - Analog type Analog Type - 10000 RPM	No.	3			
190.	Digital Tachometer	Tachometer Digital Digital Photo Sensor Type - 10000 RPM (Tachometer - 5 Digit bright LED display of 10 mm height with memories of last ,highest and lowest readings , 60 to 10000 RPM for rotational speeds, Auto - ranging ,Resolution 0.1 RPM from 60 to 1000 RPM ,1 RPM from 1000 to 50000 RPM. 6 to 1000 MPM (meters per minute) for surface speeds with resolution of 0.1 RPM ,Choice of battery operation with 4 pen cells of 1.5 volts ,or mains voltage 230 + 10 % volts AC ,50/60 Hertz with the help of battery adaptor supplied , Auto power off facility.	No.	5			
191.	Temperature controlled Soldering Iron	<ul style="list-style-type: none"> • Type: Temperature controlled • Wattage: 50W at 230 Volts Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	No.	8			
192.	Temperature controlled soldering/ desoldering station	Temperature controlled soldering/ desoldering station with min. specifications as: <ul style="list-style-type: none"> • Input Voltage : 180-240VAC,50Hz Fuse : 	No.	9			

		Suitable rating • DEsold pump :Suitable rating • Vacuum Pressure :Suitable rating • Min. Temp Range : 180 to 480°C • Temperature control accuracy +/- 1°C • Tip Leakage Current : < 2 mA • Temperature control Stability +/- 1°C • Tip to Ground Resistance : < 2 Ohms • Tip to Ground Leakage Voltage : < 2 mV					
193.	Thermometer Digital	0° C - 150° C Industrial-grade digital thermometer with stainless steel probe for use with all hot and cold fluids and solids, including aquariums and hydroponics, ovens, refrigerators and freezers, ventilation systems, and heating systems Dual-reading display has -58 to +482 degree F/ - 50 to +250 degree C temperature range and 0.1 degree resolution 2-1/2" stainless steel probe with 20" cable Includes wallet-style case	No.	4			
194.	Three Phase 50 Hz, 5 HP AC squirrel cage induction motor with star delta starter	A.C. SQUIRREL CAGE INDUCTION MOTOR 5 HP WITH Automatic STAR DELTA STARTER with Mechanical Load - AC MOTOR :- It should be A.C. 3 Phase 5 HP 415 volts, 50 Hz, Squirrel cage Induction Motor horizontal foot mounted. Six terminals are brought out on terminal box. Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iitems/component as given ELECTRICAL PANEL BOARD given in Appendix-F	No.	1			

195.	Three phase transformer, shell type oil cooled with Delta/ Star	THREE PHASE TRANSFORMER, SHELL TYPE OIL COOLED Working Model For Conducting Various Experiments. TECHNICAL SPECIFICATIONS:- 1) Capacity 3 phase, 3 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 Bakelite insulated banana terminals 30 Amp. With color code provided on the top of the transformer and on 6mm Bakelite sheet 9) The tank will be provided oil filling Hole with cap, oil level indicator, drain plug and earthing terminal, Conservator, Bucholz relay with alarm and tripping arrangement, Explosion vent, Breather , Bushings for Primary and secondary etc. 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 liters required) 13) Input and output terminals brought to the control panel with voltmeters, Wattmeter, Power factor meter, Frequency meter, ammeters, MCBs etc. for measuring and protection.	No.	4			
196.	Thyristor /IGBT controlled D.C. motor drive with tachogenerator feedback arrangement	THYRISTOR /IGBT CONTROLLED D.C. MOTOR DRIVE WITH TACHO-GENERATOR FEEDBACK ARRANGEMENT. Motor : DC Motor rating 1 HP, 220 V. 4 Amp, 2 Pole. Drive Rating: 1 HP, 4 Amp Tacho-Generator	No.	2			

		<p>Output Voltage : 1 volt A.C. / 100 RPM (20V) Linearity : within +/- 0.5% Output Current : 20 mA Max. Internal Resistance : 45 ohm. Shaft : 8mm dia 30mm length Techo generator flexible coupled to D.C. Motor having Digital RPM meter suitable for operation upto 3000 RPM</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of iitems/component as given ELECTRICAL PANEL BOARD given in Appendix-L1</p>					
197.	Thyristor/IGBT controlled A.C. motor drive with VVVF control 3 Phase, 2 HP	<p>Objective: Thyristor/IGBT Controlled AC Motor With VVVF Control has been designed to start & control of AC motor. AC Induction Motor 3 Phase 3HP with Sensor Arrangement (Induction Motor): Capacity :2HP Cage :Steel Body Terminal :6 IGBT : Suitable Thyristor/IGBT AC Drive, Mounted on Control panel Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p>	No.	2			

		- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-M					
198.	Tong Tester	Digital Type Tong Tester / Clamp Meter 0 – 100 Amp. • Dial (aka rotary switch). • Backlight button. • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and frequency modes. Shall comply to Safety standard IEC 1010 or IEC 61010	No.	3			
199.	Transformer 0-12 V, 6-0-6 V, 1 Amp	Transformer 0-12 V, 6-0-6 V, 1 Amp	No.	4			
200.	Under Voltage Relay	Under voltage Relay 360V-440V Technical Specifications: •Relay Type : Over / Under Voltage Relay (Static Type) •Terminals : 4mm Terminals for Trip, Voltage Output and Input •Meters (Digital) : 1No. AC Voltmeter Meter 0 – 220V & 1 No. Digital Timer ..0001sec. to 9999sec. (Auto) •Voltage Injector : Inbuilt variable voltage injector 220V to create Fault Voltage •Indicators : Provided on front panel for Mains, Voltage, Trip and Alarm •Power Requirement : 440VAC +10%, 50Hz	No.	4			
201.	Universal Motor along with control panel.	MOTOR UNIVERSAL 230 VOLT, 50CYCLES 1 HP WITH STARTER/SWITCH UNIVERSAL MOTOR : Universal Motor Single Phase, Capacity :1 HP, 230 volts A.C. / D.C. 1500 RPM (O.L.) 50 Hz, TEFC, class 'B' insulation, horizontal foot	No.	2			

		<p>mounted.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-H</p>					
202.	UPS trainer	<p>UPS trainer with PWM switching technology, Test points to measures the voltages of different sections Overall functioning of UPS Trainer, AVR transformer, UPS with load condition</p> <ul style="list-style-type: none"> •The trainer kit should be a versatile training system to explain frequently used switching based power supply in UPS. •With Provision of Various test point to easily measure the voltages of different sections. •With Provision of safety standards. <p>Input Voltage : 190 to 260V AC 10%, 50Hz (Single Phase)</p> <p>Output Voltage : 230V AC, 10%</p> <p>Transformer</p> <p>Input : 12-0-12V AC</p> <p>Outputs : 0, 190, 220, 240, 260V AC</p> <p>18 - 0V AC for battery charging</p> <p>Battery</p> <p>Rating : 12V DC / 7.5 AH</p> <p>Type : SMF Rechargeable Battery</p> <p>Technology : MOSFET-PWM</p> <p>Output Power Capacity : 500VA</p> <ul style="list-style-type: none"> • Latest ISO 9001 certified factory product 	No.	2			
203.	Vacuum Cleaner	<p>Portable Vacuum Cleaner with Min. Desired specifications as :</p> <ul style="list-style-type: none"> • Power Supply: Single Phase 220 V, AC 50 Hz 	No.	5			

		<ul style="list-style-type: none"> • Vacuum Pressure: 22kpa -34 kpa • Noise (dB): <= 82dB (A) • Power Cord Length: 5m (min) • Airflow: > 1.8m³/min or > 30 L/s • Power: 1200 W(min.) • Dry type filtration system with mi. capacity of 1.5 L Action Radius: 8 Meter (min.)					
204.	Vacuum cleaner -Hand Held	Hand Held Vacuum Cleaner with Min. Desired specifications as : <ul style="list-style-type: none"> • Power Supply: Single Phase 220 V, AC 50 Hz • Vacuum Pressure: 15kpa -22 kpa • Noise (dB): ≤ 86dB • Power Cord Length: 5m (min) • Power: 850 W(min.) • Dry type filtration system with mi. capacity of 0.4 L 	No.	1			
205.	Variable resistance /potentiometer	Variable resistance boxes/varioc of Following Ohm Values each: 220Ω, 150Ω, 1kΩ, 33Ω, 100Ω, 1.2Ω	No.	5			
206.	Various Lamps	1. Halogen Incandescent Lamp: 100 Watts with fixture anal accessories. The applicable standard for lamp shall be as IEC 432 2. Fluorescent tube: Min 40 Watt with fixture fitted with choke(copper), starter and holder. 3. HP mercury vapour Lamp : Min. 150 Watt with fixture and all accessories 4. High-pressure sodium Lamp : Min. 150 Watt with fixture and all accessories 5. Low-pressure sodium Lamp LED: Min. 150 Watt with fixture and all accesories	No.	3			
207.	Voltage Stabilizer	Voltage Stabilizer with following specifications: <ul style="list-style-type: none"> • Type: Automatic Voltage Stabiliser, Single Phase • Type of Control: PWM Controlled AC to AC • Rating: 600 VA • Input : 150 – 260 volts Ac, 1-phase, 2 wire, 45 - 55Hz • Output : Stabilised 240 volt AC, 10 A 50 Hz • Output Regulation: Nominal +- 1% under 0 to 100% Load 	No.	2			
208.	Voltmeter (0-1V), (0-10V), (0-30V) (table model)	Table model Analog Voltmeter with range 0-1V : <ul style="list-style-type: none"> • Range: Voltage (V): 0 – 1 V 	No.	2			

		Table model Analog Voltmeter with range 0-10V : • Range: Voltage (V): 0 – 1 0V Table model Analog Voltmeter with range 0-30V : • Range: Voltage (V): 0 – 130V					
209.	Wheat Stone Bridge	Wheat Stone Bridge with galvanometer and battery • Earth terminal to be provided for the connection of earth point • Range : 0.001 ohms to 11.11 Mohms • Multiplying factors of 0.001, 0.01, 1, 10, 100 and 1000 in the ratio arms for bridge and Varley circuit to be provided • For Murrey loop test, multiplying factor of 10, 100 and 1000 to be provided • 4 Decades in steps of thousands (1000), Hundreds (100), Tens (10) and units (1) of ohms to be provided to be used as a series resistance Box ISO 9001 of latest version certified Factory product	No.	5			
210.	Analog Component Trainer	Analog Component Trainer with following specifications: • Bread Board : Unique solder-less large size, spring loaded breadboard consisting of two Terminal Strips • Regulated DC Power Supply of suitable rating • AC Supply of suitable rating • Function Generator : Sine / Square / Triangular waveforms frequency. Variable in between steps. Sine / Square / Triangular waveform • Modulation Generator : Sine / Square / Triangular wave forms frequency. Variable in between (100 KHz) steps. Sine / Square / Triangular waveform • Digital Meter (3½Digit) : Dual range DC voltmeter / Ammeter • Continuity Tester : For testing the continuity. Provided with Beeper Sound • Potentiometers : 3 Potentiometers (1K, 100K and 100K) with terminals	No.	8			

		<ul style="list-style-type: none"> • On Board Switches : 2 Switches Single pole double through • Power : 230 V \pm 10%, 50 Hz 					
211.	Hammering drilling machine	<ul style="list-style-type: none"> • Portable Hammering Drill (Electric) with min. 2 to 20mm Capacity • Input Voltage: 1 Phase 230 V AC • Suitable for drilling into masonry, concrete, wood and metal. • Auxiliary handle with adjustable depth stop can be rotated 360° • CE Mark product 	No.	2			
212.	UPS 5 KV Online with 30 Minutes back up for 20 PC	UPS Type: Online double conversion Wave form: Pure sinewave Operating Voltage range: 150 V - 240V AC, Frequency: 50 Hz +/- 3 Hz Protection: Against Over Load / Short Circuit Indication (LED) : Low i/p voltage, UPS ON, UPS OFF, Nominal Battery voltage : Up to 96 V . Battery Backup: 01 Hr (Minimum) for 20 Computers Recharge time: approximately 08 Hr's	No.	2			
213.	UPS 3 KVA with backup time minimum 30 minutes	UPS Type: Online double conversion Wave form: Pure sinewave Operating Voltage range: 150 V - 240V AC, Frequency: 50 Hz +/- 3 Hz Protection: Against Over Load / Short Circuit Indication (LED) : Low i/p voltage, UPS ON, UPS OFF, Nominal Battery voltage : Up to 48 V . Battery Backup: 01 Hr (Minimum) for 10 Computers Recharge time: approximately 08 Hr's	No.	2			
214.	UPS - 650VA	UPS- 650 VA (Off Line) Wave form: Pure sinewave Operating Voltage range: 150 V - 240V AC, Frequency: 50 Hz +/- 3 Hz Battery Backup: 01 Hr (Minimum)	No.	25			
215.	UPS Trainer kit	AC Input : 190 to 260 V 10%, 50 Hz Load Output : 230 V / 2.5A Transformer Used	No.	2			

		<ul style="list-style-type: none"> - Input : 12 - 0 - 12 V - Outputs : 0, 190, 220, 240, 260 V - Battery charging: 0-18 V -12V DC Battery -Test points are provided to analyse signals at various points. - 5 no's of Fault Switches Provided - All ICS are mounted on IC Sockets. - Bare board Tested Glass Epoxy SMOBC PCB with Block Diagram. 					
216.	LED/LCD Projector	<ul style="list-style-type: none"> o Display Type: LCD o Input: Video input, Audio input, HDMI input, Computer Input, Mic input o Output: Audio output, Monitor Output, USB Output. o Resolution: 1280 X 800 o Contrast Ratio: 10000:1 o Light Output: 3000 Lumens or above o Life of Lamp: 5000 Hours (Full Usage) o Power Supply: AC 100-120/AC 220-240 V 50 Hz o Connectivity: Ethernet enable, Wireless enable, USB Compatible 	No.	5			
217.	Screen for Projector (Matte Material) antiglare	Motor: Tubular (with smooth and quieter operation) Control: Inline switches and wireless remote Material: White Anti-Glare (matte material) Size: - 6x4 Ft. Viewing angle: 145 degree or higher Double layer Fabric Wall Mountable / Stand mountable Mounting stand Auto lock (motorized)	No.	1			
218.	SMPS Tester	PC Power Supply Tester 20/24 Pin PSU ATX SATA HDD SMPS LED Display	No.	4			
219.	Digital SLR Camera with Video recording capability	Technology: SLR Sensor: Full-frame CMOS Megapixels: 24.3MP minimum Autofocus: 51-point AF, 15 cross-type Screen type: 3 inch minimum, tilting capability Connectivity: Wi-Fi	No.	4			

		Power: Rechargeable Li-ion batteries Video Recording: Yes, minimum 1080p					
220.	SMPS Trainer kit	Input: 80 to 230 VAC $\pm 10\%$, 50 / 60 Hz Outputs: +12 V DC regulated : -12 V DC regulated : +5 V DC regulated Switching Transformer Input: 320 V DC switching at 132 KHz Output: 30 VAC (approx) Fuse: 500 mA (Slow blow, spare fuse is given with mains socket)	No.	2			
221.	Electric PPR pipe welding machine	Electric PPR pipe welding machine with following specifications : • Welding Size 20, 25, 32, 40,50, 63 mm • Ambient humidity-20-80 degree Cen., • Voltage range: Ac-180-240 Voltage, 50Hz, • The heating head temperature-240 degree centigrade or higher. • Wattage - 600-1000 W.	No.	1			
222.	Digital Still SLR Camera	• Camera Technology: SLR • Sensor: Full-frame CMOS or better • Megapixels: 24MP minimum • Autofocus: 51-point AF, 15 cross-type or better • Screen type: 3 inch minimum • Connectivity: Wi-Fi • Power: Rechargeable Li-ion batteries • Video Recording: Yes, minimum 1080p	No.	1			
223.	Hot wire Ammeter	Hot Wire Ammeter of following Specification: Current Range: 0-15 Amps	No.	1			
224.	Voltmeter M.C.	Voltmeter- (0 - 300V) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	No.	1			
225.	Voltmeter M.C/ Multi range	Voltmeter M.C. Type, Voltage range 0.70,150,300 & 600 volts Confirming to BS 89, IEC 51 & IS 1248	No.	1			
226.	Voltmeter M.C. Multi range	Voltmeter M.C. Type,	No.	1			

		Voltage range 0-15,30,50 & 70 volts Confirming to BS 89, IEC 51 & IS 1248					
227.	Voltmeter centre zero	Voltmeter with centre zero Voltage range 15-0-15 volts Confirming to BS 89, IEC 51 & IS 1248	No.	1			
228.	Voltmeter M.I. multi-range	A.C. Voltmeter Multi range M.I. type A.C. Voltmeter M.I. 0-150,300,600 volts Confirming to BS 89, IEC 51 & IS 1248	No.	2			
229.	Voltmeter M.I multi-range	A.C. Voltmeter Multi range M.I. type A.C. Voltmeter M.I. : 0-50,75,150 volts Confirming to BS 89, IEC 51 & IS 1248	No.	1			
230.	Ammeter M.I	Ammeter M.I, panel board •0-30 Amp • IP Protection (Front): IP65	No.	2			
231.	Ammeter M.I	Ammeter M.I, panel board •0-5 Amp • IP Protection (Front): IP65	No.	2			
232.	Ammeter M.I	Ammeter M.I, panel board •0-10 Amp • IP Protection (Front): IP65	No.	1			
233.	Ammeter M.C. Centre zero	Ammeter with centre zero Current range 5-0-5 Amps Confirming to BS 89, IEC 51 & IS 1248	No.	1			
234.	Ammeter MC	Ammeter MC - (0 - 1A) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti-parallax mirror, it should be moving coil type	No.	1			
235.	Field regular	Field Regulator of 0-1000 Ohms and 2 Amps	No.	1			
236.	Single phase K.W.H meter digital	Single phase K.W.H meter digital 5 A, 250 V AC • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	No.	4			
237.	Single phase K.W.H meter analog	Single phase K.W.H meter Analog 5 A, 250 V AC • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	No.	4			

238.	Watt meter Dynamo meter type	Wattmeter which calculate and displays power of single phase 250 V, 5 Amps 1.25 KW Measurement 600 V CAT IV/1000V CAT III as per International Safety standard IEC61010-1- 2010	No.	1			
239.	Clamp on ammeter	Clamp on ammeter 0 – 25amp., 0-200 amps • Dial (aka rotary switch). • Backlight button. • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and frequency modes. Shall comply to Safety standard IEC 1010 or IEC 61010	No.	2			
240.	Three phase K.W.H meter analog	Three Phase KWH Analog Meter, 25 A , 415 V induction portable type AC Energy Meter Housed in Bakelite case	No.	4			
241.	Three phase K.W.H meter digital	Three phase K.W.H meter digital Three Phase, 25 A , 415 V AC Energy Meter Housed in Bakelite case	No.	4			
242.	D.C. compound motor	DC Compound Motor of 3 HP 250 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 4 point D.C. starter of suitable capacity having no volt & over load protective devices with field regulations Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of	No.	1			

		items/component as given ELECTRICAL PANEL BOARD given in Appendix-D					
243.	D.C. shunt motor	<p>DC Shunt Motor of 3 HP 250 V, Screen protected, Horizontal foot mounted, Internal fan cooled.</p> <p>Motor should be Strictly copper wound & confirmed to IS 4722 with 3 point D.C. starter of suitable capacity having no volt & over load protective devices with field regulation</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	No.	1			
244.	D.C. series motor with 2 point stater	<p>DC series Motor of 3 HP 250 V, Screen protected, Horizontal foot mounted, Internal fan cooled.</p> <p>Motor should be Strictly copper wound & confirmed to IS 4722 with 2 point D.C. starter of suitable capacity having no volt & over load protective devices with field regulator</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to</p>	No.	1			

		start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-C					
245.	DC Power supply	DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-250volts, 25 Amps • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits	No.	1			
246.	Capacitor motor	Single Phase Capacitor Motor of 1/2 HP 250 VOLT WITH STARTER/SWITCH 1. MOTOR : A.C. Single Phase Capacitor Start Induction Motor 1/2 HP 250 volts AC, 50 Hz, Starting winding, running winding with capacitor terminals brought out on terminal box Control Panel Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J	No.	1			
247.	Split phase motor	Split Phase Motor of 1/2 HP 250 VOLT WITH STARTER/SWITCH 1. MOTOR : A.C. Single Phase Capacitor Start Induction	No.	1			

		<p>Motor 1/2 HP 250 volts AC, 50 Hz, Starting winding, running winding with capacitor terminals brought out on terminal box Control Panel</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J</p>					
248.	Universal motor	<p>MOTOR UNIVERSAL 1/2 H.P AC/DC 250 V WITH STARTER/SWITCH UNIVERSAL MOTOR : Universal Motor Single Phase, Capacity :1/2 HP, 250 volts A.C. / D.C. 50 Hz, TEFC or better , class 'B' insulation, horizontal foot mounted.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL</p>	No.	1			

		BOARD given in Appendix-H					
249.	M.G. Set consisting of squirrel cage induction motor 5 H.P. 400 V cycle with directly coupled compound generator 3 K.W. 250 V with built In panel board consisting of:	<p>M.G. Set consisting of squirrel cage induction motor 5 H.P. 400 V cycle with directly coupled compound generator 3 K.W. 250 V with built In panel board with following:</p> <p>1. DC Compound Generator: 3 KW, 250V. Separately Excited with variac, Standard ISI Product. Insulation Class "B", Horizontal foot mounted</p> <p>2. 3 phase 5 HP 400V foot mounted Squirrel cage AC Induction Motor: Motor Performance conforms to IS:325 and dimensions conform to IS:1231, Degree of Protection:- Motors are designed for degree of protection IP 55, Class F insulation class.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-B</p>	No.	1			
250.	Squirrel cage induction motor 3 H.P. 400 V with D.O.L starter	<p>A.C. SQUIRREL CAGE INDUCTION MOTOR 2 HP WITH DOL STARTER with Mechanical Load</p> <p>A.C. SQUIRREL CAGE INDUCTION MOTOR :- Rating: 3 HP 400 volts, 50 Hz, Squirrel cage Induction Motor horizontal foot mounted with Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting 	No.	1			

		<p>arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given Appendix-F</p>					
251.	Automatic Reverse Forward starter	Automatic Reverse Forward starter complete in all aspects	No.	1			
252.	Single phasing preventer	Single phasing preventer of 415 V rating	No.	3			
253.	Two point starter for DC series motor	2- point starter for DC series motor suitable to work on min. 2.5 KW. D.C. series motor, Voltage 230/250 with a maximum 15% full load current the starting period shall not exceed 30 seconds with under voltage and an intensions (Magnetic) over load release device.	No.	1			
254.	Soft starter 1 ph	Single Phase soft starter complete in all aspects.	No.	1			
255.	2 KVA Alternator with 3 ph induction motor	<p>Specifications for above shall as follows:</p> <p>1. 3 phase 415V foot mounted Squirrel cage or Slip ring AC Induction Motor with suitable rating to perform as prime mover for Alternator:</p> <p>Motor Performance conforms to IS:325 and dimensions conform to IS:1231, Degree of Protection:- Motors are designed for degree of protection IP 55.</p> <p>2. ALTERNATOR :- 2 K.V.A., 440/230 Volts, 50 H.Z., 0.8 power factor, self-static field exciter, self-regulation, Horizontal foot mounting. Alternator is provided lifting bolt & earthing terminal.</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical/ Electrical Loading</p>	No.	1			

		Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-E					
256.	Lead Acid battery 75Ah	Lead Acid battery 75Ah, *Voltage :12 V, Capacity (Ah): 75 AH Battery Type:Sealed Acid Lead Battery	No.	1			
257.	Solar street light lamp set	Solar street light lamp set of 12 V 18 Watt and 12 V 24 Watts	No.	4			
258.	Hydraulic crimping tool for UG cable crimping with bits	Hydraulic crimping tool for UG cable crimping with bits ranging from 20 sq mm to 250sq mm	No.	1			
259.	Transformer Three phase (oil cooled)	THREE PHASE TRANSFORMER, SHELL TYPE OIL COOLED Working Model For Conducting Various Experiments. 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' or better 6) Tapping on Secondary Side 50% and 86.6% 7) Copper Wound 8) Educational type Bakelite insulated banana terminals 30 Amp. With color code provided on the top of the transformer and on 6mm Bakelite sheet 9) The tank will be provided oil filling Hole with cap, oil level indicator, drain plug and earthing terminal, Conservator, Bucholz relay with alarm and tripping arrangement, Explosion vent, Breather , Bushings for Primary and secondary etc.	No.	2			

		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 liters required) 13) Input and output terminals brought to the control panel with voltmeters, Wattmeter, Powerfactor meter, Frequency meter, ammeters, MCBs etc. for measuring and protection.					
260.	Transformer oil testing kit	The technical characteristics of our High Voltage Oil Test Sets are as follows: • NMC : Oil Test set is ideal for speedy and accurate testing of DI-i-electric strength of transformer and circuit breaker oil under test room condition in accordance with IS:6792-1972 for oil testing • Input : 230 Volts, Single Phase, 50 Hz, AC. • Output : Continuously variable from 0 to 60 Kv • Capacity: Min. 500 VA • Nature of cooling: The transformer will be epoxy resin cast type air-cooled type • The instrument should have step-less/continuous voltage incrementing ability from 0 to 50kV. User should be able to use as a breakdown test set or as withstand test set. • The instrument should have a 60-0-60 kV Vacuum Epoxy molded transformer for low-PD levels. • Test vessel: The test vessel (Oil Cell)fitted with two brass spheres on sides of test vessel made from non-absorbent insulating material • Cover: Sets shall be provided with transfer and high impact acrylic sheet cover for covering the H.T. side with suitable inter-locking device	No.	1			
261.	Autotransformer	Single Phase Variable Auto Transformer with min specifications: 1 KVA, 0 - 300 V, (Air cooled) with safety fuses and line indicators	No.	2			
262.	Autotransformer	Three Phase Variable Auto Transformer with min	No.	2			

		specifications: 1 KVA, 0 - 500 V (Air cooled) with safety fuses and line indicators					
263.	Current transformer	Current Transformer Test Set - Educational panel type arrangement for studying Current Transformer of Following Ranges: 10/1, 20/1, 30/1, 50/5, 100/5 and 300/5A Measurement is on principle of comparison and null indication on magnetic balance bridge. C.T.BURDEN BOX Min. of 30VA , 0.8 PF Variable Current Source Model Single ph. Complete with control panel Accuracy : + 1% of reading Min. Indications on panel : a) Reverse Polarity : b) 'Std' C.T. Sec. open : c) 'X' C.T. Sec. Open : d) Difference Ratios of 'Std' & 'X' CT Hi-imbalance : e) Over Current : f) Ratio Error Polarity : g) Phase lag-lead : h) Phase Error Over Range	No.	1			
264.	Potential transformer	Educational panel type arrangement for studying Potential Transformer Test Set with 415 V, 50Hz, Min. range of PT Ratio shall be as follows: 220/110, 300/110, 440/110, 600/110, 440V/110V, It shall be Complete with control panel	No.	1			
265.	Digital and Analog IC Tester	Digital and analog IC Tester (Portable) with following Specifications: • VOLTAGE: 230V 50Hz +/- 10% • Automatic testing of variety of ICs. • Potential free 40 pin universal ZIF socket. • Six Seven Segment Display to show IC number, PASS & FAIL Status, Operations display. • Audio alarm to user whenever it is required. • ANALOG IC RANGE : Operational Amplifiers, Comparators, Transistor Arrays, Optocouplers, Analog Switches, Multiplexers, Voltage followers, timers, cross point switches, ADC, DAC etc.	No.	1			

		<p>● DIGITAL IC RANGE: ● 74 series of TTL ICs, 40 and 45 series of CMOS ICs, Microprocessors (8085,8086,8088, Z80,6502) Peripheral ICs (8255,8253,8251,8259,8155,8279,Z80 PIO) EPROMs (blank check only), RAM ICs 6116,6264,62256 etc.,</p>					
266.	Jacket stripper/ Coring tool for 500 series cable	Jacket stripper/ Coring tool for 500 series cable	No.	1			
267.	Universal drop trimmer for RG 6/11 cables	Universal drop trimmer for RG 6/11 cables	No.	1			
268.	F - connector tool for RG 6/11 cables	F - connector tool for RG 6/11 cables	No.	1			
269.	F – connector compression tool for RG 6/11 cables	F – connector compression tool for RG 6/11 cables	No.	1			
270.	DC shunt motor	<p>DC Shunt Motor of 1 HP 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 3 point D.C. starter of suitable capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	No.	1			

271.	Rheostat	Rheostat (Sliding type) 0 -1K ohm	No.	2			
272.	3 phase induction motor	<p>A.C. SQUIRREL CAGE or slip ring INDUCTION MOTOR 1 HP WITH DOL Starter with Mechanical Load -</p> <p>AC MOTOR :- It should be A.C. 3 Phase 1 HP 415 volts, 50 Hz, Squirrel cage/ Slip Ring Induction Motor, class 'F' insulation or better, horizontal foot mounted. Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-F</p>	No.	1			
273.	1hp motor	<p>DC drives trainer with phase control method</p> <p>Motor : DC Motor rating of Min. 1 HP, 220 V.</p> <p>Drive Rating: 1 Hp</p> <p>Controller Details: suitable Phase controlled based controller complete in all aspects</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of</p>	No.	1			

		items/component as given ELECTRICAL PANEL BOARD given in Appendix-Q					
274.	1hp motor	<p>Programmable DC drive trainer with SCR chopper circuit Motor : DC Motor rating of Min. 1 HP, 220 V. Drive Rating: 1 Hp, 4 Amp Controller Details: SCR chopper circuit based suitable controller</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-P</p>	No.	1			
275.	Programmable DC drive with motor	<p>Programmable DC drive with motor and (Simoreg DC master) 6RA70 controller Motor : DC Motor rating of Min. 1 HP, 220 V. Drive Rating: 1 Hp, 4 Amp Controller Details: Simoreg DC Master 6RA70</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine.</p>	No.	1			

		Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-L					
276.	Solar panel based Inverter	<p>Solar panel based Inverter with following specifications:</p> <ul style="list-style-type: none"> • Type : Solar Inverter • Rating in VA : 500 VA • Solar PV Module Compatibility : 400 Watts • Waveform : Pure Sine Wave • Battery Module : External Battery Module • Battery Capacity : 135 AH - 180 AH • DC Voltage : 12V • Charge Controller : PWM, 20Amp - 12V 	No.	1			
277.	3 phase motor	<p>Objective: Thyristor/IGBT Controlled AC Motor With VVVF Control has been designed to start & control of AC motor.</p> <p>AC Induction Motor 3 Phase 1 HP with Sensor Arrangement (Induction Motor):</p> <p>IGBT : Suitable Thyristor/IGBT AC Drive, Mounted on Control panel</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-M</p>	No.	1			
278.	AC motor	<p>Objective: AC Motor drive With Siemens Micro Master 420 controller designed to start & control of AC motor.</p> <p>AC Motor 3 Phase 1 HP with AC Motor</p> <p>Siemens Micro Master 420 controller:</p> <p>Mounted on Control panel</p> <p>Machine Control Panel & Operating Table:</p>	No.	1			

		<p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical / Electrical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-O</p>					
279.	PLC Systems with digital I/P, O/P modules Trainer kit and software	<p>PLC Systems with digital I/P, O/P modules Trainer kit and software with following specifications:</p> <p>6 Digital Inputs (24V DC). 4 Digital Outputs (24V DC) 2K Words of memory, 256 words of register.</p> <p>Powerful features like built in Floating Point, Sub Routines etc.</p> <p>One RS232 C communication facility for PC interface.</p> <p>Three channels can be configured as follows, Pulse width modulation output or Pulse train output or High speed counter input.</p>	No.	3			
280.	Solenoid	<p>Educational Solenoid and Electromagnet with Iron Core with following specs:</p> <p>- Voltage rating : 24 V AC</p>	No.	4			
281.	AC power supply	<p>Regulated AC Power Supply with following specifications:</p> <ul style="list-style-type: none"> • Bench top model Type AC Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-24 volts, 2 Amps, at 50 Hz • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Protections: Fuse protection to be provided <p>Outputs are protected against over loads & short</p>	No.	2			

		circuits					
282.	DC power supply	Regulated DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-5volts, 2 Amps • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits	No.	2			
283.	Electronic Pneumatics Trainer kit	Electronic Pneumatics Trainer kit designed to demonstrate the design, construction and application of Pneumatic components and circuits with following specifications: <ul style="list-style-type: none"> - Programmable Logic Controller Digital Inputs : 12 nos., Digital Outputs : 8 nos., Interfacing : USB, Input & Output Voltage : 24 V DC, Power Supply : 110V - 260V AC, 50/60Hz - Other components on panel: Toggle Switches, Push to On Switch, Visual Indicators, Audio Indicator - Min. Pneumatics Components mounted on panel: <ul style="list-style-type: none"> • Double Acting Cylinder : 2 nos., • Single Acting Cylinder: 1 no. , • 5/2Hand lever Valve : 1 no. • Min 4 Port Manifold : 1 no. , • Flow control Valves : 2 nos. , • 5/2 Solenoid Valves : 2 nos. , • 3/2 Solenoid Valve : 1 no. , • 3/2 Push Button (Palm Actuator): 1 no., • Shuttle Valve (OR Valve) : 1 no. , • Roller lever Valve : 1 no. ,, • Inductive Proximity Sensor : 1 no., Limit Switch : 1 no. • Pressure Gauge : 1 no. with following min. specs: Pressure Range : 0 to 150 Psi • Air Compressor : 1 no. with following min. specs: Voltage : 220V/50Hz, Power : Min. 0.7 HP, Pressure : 100 Psi (maximum), Min. Tank Capacity : 20 Liter 	No.	2			

284.	Servo Motor drives Trainer kit	Educational model of Servo Motor drive trainer kit complete in all aspects with min. following Experiments to be performed: - Construct a simple circuit to control servo motor using IC 555 - Connect servo motor with drive & control its parameters. - Connect the servo motor to computer for monitoring & controlling of various parameters. - Parameter programming of servo motor. - Various control method for controlling velocity & torque.	No.	2			
285.	Autotransformer	•Single Phase Variable Auto Transformer •0 - 270 V, 15 Amp (Air cooled) Specification:- •Type :Single Phase Auto Transformer Amperage 15 Amp input voltage 0-270 V with safety fuses and line indicators	No.	2			
286.	Digital and Analog IC Tester	Digital and analog IC Tester (Portable) with following Specifications: • VOLTAGE: 230V 50Hz +/- 10% • Automatic testing of variety of ICs. • Potential free 40 pin universal ZIF socket. • Six Seven Segment Display to show IC number, PASS & FAIL Status, Operations display. • Audio alarm to user whenever it is required. • ANALOG IC RANGE : Operational Amplifiers, Comparators, Transistor Arrays, Optocouplers, Analog Switches, Multiplexers, Voltage followers, timers, cross point switches, ADC, DAC etc. • DIGITAL IC RANGE: • 74 series of TTL ICs, 40 and 45 series of CMOS ICs, Microprocessors (8085,8086,8088, Z80,6502) Peripheral ICs (8255,8253,8251,8259,8155,8279,Z80 PIO) EPROMs (blank check only), RAM ICs 6116,6264,62256 etc.,	No.	1			
287.	AM/FM Commercial radio receivers	AM/FM Commercial radio receivers with following min. requirements:	No.	2			

		<ul style="list-style-type: none"> • An Experimental board for understanding the theory and practice of active circuits used in analog telecommunication related to AM/FM radio receivers • The trainer kit shall also provide descriptive approach for AM receiver in which all the block can be studied individually 					
288.	CCTV set up	CCTV Camera System complete in all aspects with minimum following equipments to be supplied: <ul style="list-style-type: none"> - 8-Channel DVR - 8 Number of Min. 4 MP HD Night vision Cameras (4 dome and 4 Bullet Type cameras) of Min. of 1080p - Power supply - 2 TB hard Drive - Min. 100 Meter and all required BNC & DC Connectors 	No.	1			
289.	Microwave oven	Grill Type conventional Microwave with following specifications: Power Output • 700 W(Min.) Power Requirement • AC 230 V, 50 Hz Capacity • 20 Litre (Min) Technology • Grill- conventional Type Other functions: • Grilling along with defrosting, reheating and cooking food Convection Microwave with following specifications: Power Output • 700 W(Min.) Power Requirement • AC 230 V, 50 Hz Capacity • 20 Litre (Min) Technology • ConvectionType	No.	1			
290.	Electric rice cooker	Electric rice cooker with following Min. Specifications: Power supply: 220V 50 Hz Capacity: Min. 2.5 Litre	No.	3			
291.	Water purifier	UV Type Water Purifier with following specifications: Purifying Technology • UV Power Requirement • 230 V AC, 50 Hz Power Consumption • 40 W (Min)	No.	1			

		<p>Electrical Type • Electrical Electrical & Non - Storage : • Electrical purification - suitable for direct water supply Filter Type • Sediment</p> <p>RO Type Water Purifier with following specifications: Purifying Technology • Reverse Osmosis (RO) Power Requirement • 230 V AC, 50 Hz Power Consumption • 40 W (Min) Electrical & Storage with Min. 8 Litre of storage : • Electrical purification - suitable for direct water supply Filter Type • Pre-filter, Pre Carbon Filter, ZX Double Protection Dual Filter (Silver Activated Post Carbon Block and SCMT), Patented Side Stream RO Membrane</p>					
292.	Induction cooktop	Electric Induction plate with min 1500 Watt, 240V having Ceramic cook top. • ISI mark product	No.	2			
293.	DTH with accessories	DTH with following equipments: Set Top Box, HDMI cable, Remote, Out Door Unit, Upto 10 meter cable Display Technology HD Display Resolution Maximum 1080i	No.	1			
294.	SAT meter	SAT Meter with following specifications: Measurement Range • DVB -S, DVB-S2 Type • Digital Body Material • ABS Plastic	No.	1			
295.	Co- Axial cable cutter	Co- Axial cable cutter	No.	1			
296.	Jacket stripper/ Coring tool for 500 series cable	Jacket stripper/ Coring tool for 500 series cable	No.	1			
297.	Universal drop trimmer for RG 6/11 cables	Universal drop trimmer for RG 6/11 cables	No.	1			
298.	F - connector tool for RG 6/11 cables	F - connector tool for RG 6/11 cables	No.	1			
299.	F – connector compression tool for RG 6/11 cables	F – connector compression tool for RG 6/11 cables	No.	1			

300.	Load Bank (variable)	Load Bank - (Lamp/ heater Type) 1.2 KW, Frequency: 50Hz	No.	1			
301.	Rooftop Mounting Structure	Rooftop Mounting structure For 4 x 250 W solar panels mounting for practice along with tilt adjustment	No.	2			
302.	Electrical wiring and switch gear rack	Electrical wiring and switch gear rack with Electrical control elements suitable for practice of control circuits using banana plugs and socket	No.	1			
303.	Solar Insulation meter	Solar Insulation Meter: Insulation resistance measurement for Photo Voltaic Module with following specifications: Rated output voltage: 50 V DC/ 125 V DC/ 250 V DC /500 V DC/ 1000 V DC (• Five ranges (50/125/250/500/1000V) built in for normal insulation resistance measurement) Effective corresponding maximum indicated value against output voltages : 100 MΩ/ 250 MΩ/ 500 MΩ/ 2000 MΩ/ 4000 MΩ Display Semi-transmissive: LCD/TFT or better with back lighting Power supply :AA alkaline batteries	No.	2			
304.	Pyranometer	SPECIFICATIONS OF PYRANOMETER: • Classification : Classified as Secondary Standard • Sensor Type : Circular Multi-junction wire wound thermopile • Type of the Dome : Double Dome Type • Material of the Dome : High Quality Glass-WG295 Glass or Equivalent • Sensitivity : 7-10 micro V/Wm-2 • Spectral Range : 300 -2800 nm • Response Time : One second (Max) • Linearity : ±0.5% from 0 to 2800 W/m2 • Tilt Error : < 0.5% • Zero Offset: Response to 200 W/m2 net thermal radiation : < 5 W/m2 • Resolution : ±1 W/m2 • Output Signal : Analog Voltage • Environmental withstanding Condition : Temperature range: -20 degC to 60 deg C Relative humidity range: 0-100% • Cable : 10 metres	No.	1			

		<ul style="list-style-type: none"> • Certificate : Calibration certificate is needed 					
305.	Pyrheliometer	<p>SPECIFICATIONS OF PYRANOMETER:</p> <ul style="list-style-type: none"> • Classification - High quality Normal Incidence Pyrheliometer • Spectral Range - 300 -2800 nm • Response Time - One second or better • Stability - 1% Full Scale or better • Temperature Dependence - $\pm 1\%$ or better • Linearity - $\pm 0.5\%$ from 0 to 1400 W/m² or better • Sensitivity - 7MicroV/Wm-2 or more • Impedance - 200 Ohm or better • View Angle - 5 deg ± 1 deg • Output Signal - Analog Voltage • Environmental withstanding Condition - Temperature range: -20 deg C to 60 deg C Relative humidity range: 0-100% • Cable - 10 metres (Min) • Certificate - Calibration certificate is needed with reference to WRR/WRC 	No.	1			
306.	Sun Shine recorder	<p>Sunshine recorder with following requirements:</p> <ul style="list-style-type: none"> • Measuring element Cut glass sphere burning glass optical principle • Range of application: In northern and southern equatorial zones between 0...40° • Housing: non-corrosion materials integrated circular spirit level on the base plate with additional mounting plate 	No.	2			
307.	Weather monitoring station	<p>Weather monitoring station complete in all aspects to To monitor and record Sunshine, wind velocity, temperature, rainfall etc with software. Wirth following mi. Specifications:</p> <ul style="list-style-type: none"> • Air Temperature <ul style="list-style-type: none"> - Operating Range : 0°C to 100°C - Resolution : 2°C Max • Relative Humidity <ul style="list-style-type: none"> - Operating Range : 5% to 95%RH - Resolution : 1% or better • Solar Radiation sensor <ul style="list-style-type: none"> - Output : 0-2VDC or suitable - Range : 0 to 2000W/m² • Atmospheric Pressure Sensor 	No.	1			

		<ul style="list-style-type: none"> - Detection Range : 15- 115kPa suitable - Response time : 5 Sec or better • Air Quality Sensor (PM2.5) - Detection Range : 10 - 500 ppm - Response time : 5 Sec or better • Wind Speed Sensor - Speed : 0 to 20m/S - Resolution : 1m/S or better • Wind Direction Sensor : North, East, West, South, North-East, East-South, North-West, South-West • Rainfall : Tipping bucket in mm • UV Index Sensor - Response wavelength : 200nm-370nm - Response time : 5 seconds or better • Power Supply - Battery : 12V/40AH or better - Solar Panel : 75W or better • Wireless Transmission : GPRS Based • Cloud Services : 1 Year min. 					
308.	Solar cell based sunlight radiation meter	Solar cell based sunlight radiation meter for Solar power measurement up to 2000 w/square meter	No.	2			
309.	Lead Acid battery	1. Lead Acid battery 75Ah , *Voltage :12 V, Capacity (Ah): 75 AH Battery Type: Sealed Acid Lead Battery 2.1. Lead Acid battery 40Ah , *Voltage :12 V, Capacity (Ah): 40 AH Battery Type: Sealed Acid Lead Battery	No.	1			
310.	Lead Acid battery	Lead Acid battery 100Ah , *Voltage :12 V, Capacity (Ah): 100AH Battery Type: Sealed Acid Lead Battery	No.	4			
311.	Solar simulator for solar cell characteristic study	A Solar Simulator complete in all aspects which provides illumination Spectrum approximately similar to Sunlight. And further be able To study IV curve of a solar cell of minimum 2 watt under variable illumination, temperature and suitable load The Solar simulator shall provide controlled test facility inside laboratory and to allow trainer to test Solar system independent from current weather conditions and time of day. Following shall be he Specifications:	No.	1			

		<ul style="list-style-type: none"> • Supply Voltage : 220V AC $\pm 10\%$, 50Hz • Solar Cell characterizations: Open Circuit Voltage (Voc) : 2V DC Short Circuit Current (Isc) : suitable size • Quartz Halogen Lamp : suitable size • Voltmeter : suitable size • Ammeter : suitable size • Intensity Control : Variable • Temperature Controller : up to 99°C • Heater : Suitable size • Load Resistance : Suitable size • Fuse : Suitable size 					
312.	IV Curve tester	<p>IV Curve tester complete in all aspects with Interface software having following min. specifications :</p> <ul style="list-style-type: none"> • Power Supply : +5V DC or suitable • DC Voltage Range : 0-50V or suitable • DC Current Range : 10A (min) • Measurement Max. Voltage(V) : at Pmax Max. Current(I) : at Pmax Voltage at Open Circuit : Voc Current at Short Circuit : Isc Instant Power : W • Battery : suitable rating • RS232 connectivity • LCD/TFT or better display • CE/ISI/IS or relevant certified product or ISO Certified factory product 	No.	1			
313.	Sun path finder	Sun path finder complete in all aspects.	No.	1			
314.	Solar energy trainer with grouping of solar cells	<p>Solar Energy Trainer complete in all aspects for training system for use in workshops. System shall be able to demonstrate the basic concept of Solar cell (photovoltaic cell) for converting sunlight into electrical energy. The system shall work as a live demonstration unit of Solar cells in terms of its concepts and applications. System must consists of Solar Energy Trainer and a Solar Panel.</p> <p>Following are min. specifications involved:</p> <ul style="list-style-type: none"> • Solar Panel : Consists of 6 Solar cells each with minimum 2 W with suitable loads 	No.	1			

		<ul style="list-style-type: none"> • Maximum Voltage of each Solar cell : 1.5V or better • Maximum Current of each Solar cell : 150mA or suitable • Voltmeter : suitable rating • Ammeter : suitable rating • Potentiometer : suitable rating • AA Rechargeable NiCd Battery : suitable rating • Bulb : suitable rating • Fan : suitable rating • FM Band Radio : suitable rating <p>Note: Latest ISO Certified factory product</p>					
315.	Solar tracker demonstrator kit	<p>Solar Tracking System complete in all aspects for study and demonstration of solar tracking. And, further be able to study manual and automatic control of 10 W solar panel in East- west and North-south & back. Also, tracks the motion of the Sun and ensuring that the maximum amount of Sunlight strikes the panels throughout the day. Following Mi. Specifications involved are:</p> <ul style="list-style-type: none"> • Supply Voltage : 12V DC • Solar Panel <ul style="list-style-type: none"> o Maximum Output Power (Pm): 10W(Min.) • DC Motor : Suitable rating • Rechargeable Battery : Suitable rating • Display : LCD/TFT or better with easy visual for person accessing trainer • Light Sensor : Phototransistor or better • Acceleration/Vibration : Suitable rating • /Tilt Sensor – 3 Axis • Fuse : Suitable rating • DC Adaptor : Suitable rating 	No.	1			
316.	Solar PV e-learning software using animations for training	<p>Solar PV e-Learning Software using Animations for training with some of the topics to be covered:</p> <ul style="list-style-type: none"> • Basics of electricity and related concepts • Basics of energy, its units, quantities of energy • Concepts of solar cells • Interconnection of solar cells in PV modules • Design of PV array • Fundamentals of batteries • Interconnection of batteries(series and parallel 	No.	1			

		connections) <ul style="list-style-type: none"> • Electronics that are used in PV systems • Details about wires, their physical sizes • Design of standalone solar PV system • Grid connected PV system • Maintenance and troubleshooting of PV components and PV system as a whole. etc. 					
317.	Halogen lamp with stand for illumination of solar panels in lab	Halogen lamp of suitable size with stand for illumination of solar panels in lab with following requirements: Power supply: 220 V AC 0 to 1000 watts per meter square	No.	2			
318.	Solar photovoltaic module	Solar photovoltaic module of following specifications: 1. 75 W mono crystalline module 2. 275 W amorphous silicon module 3. 50 W thin film module 4. 5W, 10W, 40W poly crystalline module	No.	1			
319.	Solar panels	Solar Panel of 250 Wp	No.	4			
320.	Solar Charge controller with Dusk to Dawn automatic switching	Solar Charge controller with Dusk to Dawn automatic switching shall be a microcontroller based controller. It Shall be designed to monitor the battery voltage during charging and discharging. It shall disconnect the Solar panel when battery is fully charged and disconnects the load when battery is discharged up to a predefined voltage. It shall again connects the Solar panel when battery voltage decreases, and connects the load when battery voltage increases. Following are the specification intended for the product: <ul style="list-style-type: none"> • Maximum charging current : 10A or better • LED Indications : (A) Charging (B) Battery Low • System operating voltage : 12V DC 	No.	5			
321.	Solar charge controller with manual switch (Day lighting)	Solar Charge controller with manual switching (day lighting)with Following are the specification intended for the product:	No.	5			

		<ul style="list-style-type: none"> • Maximum charging current : 10A or better • LED Indications : (A) Charging (B) Battery Low • System operating voltage : 12V DC 					
322.	Array junction box	Array junction box of suitable material for connecting 250W x 4 Nos. solar panel with DC fuse, DC MCB, and surge suppressor protection	No.	2			
323.	Solar lantern	<ul style="list-style-type: none"> • Solar LED Porta Lantern as a portable lighting system with sealed maintenance free battery and a Solar PV module. • The battery shall be charged by electricity generated by PV module. Shall be suitable for indoor and outdoor lighting applications and covers 360 degrees to spread light. • Type of Load LED-3W or better • Battery 12V, 7Ah (SMF) or suitable • Charging time 7-8 hours/Day or better • Solar Panel wattage 10Wp or better • Solar Panel Voc 21V or better • Back up 4-5 Hours or better 	No.	1			
324.	Solar lantern	<ul style="list-style-type: none"> • Solar CFL Porta Lantern as a portable lighting system with sealed maintenance free battery and a Solar PV module. • The battery shall be charged by electricity generated by PV module. Shall be suitable for indoor and outdoor lighting applications and covers 360 degrees to spread light. • Type of Load CFL-7W or suitable • Battery 12V, 7Ah (SMF) or better • Charging time 7-8 hours/Day or better • Solar Panel wattage 10Wp or better • Solar Panel Voc 21V or better • Back up 4-5 Hours or better 	No.	1			
325.	Solar lantern assembly sets	<ul style="list-style-type: none"> • Solar CFL Porta Lantern as a portable lighting system with sealed maintenance free battery and a Solar PV module. • The battery shall be charged by electricity 	No.	1			

		generated by PV module. Shall be suitable for indoor and outdoor lighting applications and covers 360 degrees to spread light. • Type of Load CFL-7W or suitable • Battery 12V, 7Ah (SMF) or better • Charging time 7-8 hours/Day or better • Solar Panel wattage 10Wp or better • Solar Panel Voc 21V or better • Back up 4-5 Hours or better					
326.	Home light system	Home light system 12 V DC with FM receiver, LED bulb and mobile charger as loads	No.	1			
327.	Solar cell kit	Solar Cell kit complete in all aspects.	No.	1			
328.	DC table fan	12 V DC Table Fan Directly Run Through Solar Panel or Any 12 Volts Battery	No.	1			
329.	A.C. Voltmeter M.I	A.C. Voltmeter M.I. , Multi Range A.C. Voltmeter M.I. 0V - 500 V A.C Confirming to BS 89, IEC 51 & IS 1248	No.	2			
330.	Volt meter	Voltmeter 0V - 30 V Confirming to BS 89, IEC 51 & IS 1248	No.	2			
331.	Volt meter	Voltmeter 0V - 100 V Confirming to BS 89, IEC 51 & IS 1248	No.	2			
332.	Ammeter MC	•Ammeter MC - (0-1 A- MC) with Moving Coil with Central Magnetic Core	No.	2			
333.	Ammeter MC	•Ammeter MC - (0-5A- MC) with Moving Coil with Central Magnetic Core	No.	2			
334.	Ammeter MC centre zero	Ammeter MC centre zero •Centre - zero analog, •Milli Voltmeter centre zero 20– 0 – 20 Amps •Confirming to BS 89, IEC 51 & IS 1248	No.	2			
335.	Ammeter MC centre zero	Ammeter MC centre zero •Centre - zero analog, •Milli Voltmeter centre zero 50– 0 – 50 Amps •Confirming to BS 89, IEC 51 & IS 1248	No.	2			
336.	A.C. Energy Meter	A.C. Energy Meter- induction type Single Phase,10 A, 240 V • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	No.	1			

337.	A.C. Energy Meter	AC energy meter Three Phase, 15 A , 440 V induction portable type AC Energy Meter Housed in Bakelite case	No.	1			
338.	DC LED Lamp	DC LED Lamps of three wattages: 1. 3W 2. 5W 3. 10W	No.	50			
339.	DC Pump	24 V DC Pump	No.	2			
340.	PWM Controller	PWM Solar Charge Controller with following Min. Specifications: • System voltage : 12 Volt or 24 Volt • Charging capacity : 60 amps or better • Peak Charger efficiency : 99% or better	No.	4			
341.	MPPT Charge Controller	MPPT Solar Charge Controller with following Min. Specifications: • System voltage : 12 Volt or 24 Volt • Charging capacity : 30 amps or better • Peak Charger efficiency : 99% or better	No.	4			
342.	Solar PCU	Off Grid Solar Power conditioning unit with inbuilt MPPT charge controller are specially designed for solar applications with following specifications: • Rated AC power (W) : 230V, 4.3A, Single phase Max Supported Panel Power - 1100 Wp Output Waveform - Pure Sinewave • DC input Range (V) : 60-130 • Nominal battery bank voltage : 48 • Usable current from grid (A) : 24 or suitable • Max. supported panel power (Wp) : 1100 or suitable • Technology (Solar) : With Battery	No.	4			
343.	Solar Grid tied inverter Demonstrator kit	Solar Grid tied inverter Demonstrator kit complete in all aspect with following equipment specifications: • Solar Panel of 300 Watt - Cell Type : Poly (multi) crystalline • Inverter - Capacity : suitable - DC Input voltage : 24V - Input Voltage : 190~260V AC (Grid)	No.	1			

		<ul style="list-style-type: none">- Technology : Microcontroller Based Design- LED Indication : Mains ON, UPS ON, Low• MPPT Charge Controller- PV Module Input Voltage : suitable rating- Max Current : Suitable rating- Battery voltage : 24V- Technology : MPPT- Display type : LCD/ Better- Charging Stage : Bulk, Absorptions and Float• Battery- Make : Tubular- Capacity : Suitable- Quantity : Suitable• Meters- DC Voltmeter& Ammeter : Suitable rating and number.- AC Multi-Function Meter (Voltage, Current, Watt, Frequency) of suitable rating and number• Structure for Solar Panel- Material : MS- Tracking Type : Manual, Dual Axis Seasonal and day wise- Assembly : Detachable and easy to install• Safety and Protection- MCB (DC) for solar panels and battery: suitable rating .- MCB (AC) for AC output load protection & Grid charging of suitable rating- Fuse of suitable rating of solar panel and battery for Individual protection- Banana Terminals : suitable rating for (shock proof connections)						
344.	Solar Street Light	Solar Street Light complete in all aspects along with : 12V, 75Ah battery, 75 Wp solar panel, 12V, 10A dusk to dawn charge controller, 60 W LED lights with suitable colors and Min. 9 m height suitable pole all dismountable	No.	1				
345.	Solar, wind and hybrid power plant	Demonstration kit for solar and wind generation (Wind turbine with blower) hybrid setup for laboratories to understand the conversion of	No.	1				

		<p>wind energy, solar energy combined into electrical energy. It shall introduce the basic concept of wind turbine and Solar PV, of converting kinetic energy of wind into mechanical energy and then this mechanical energy into electrical energy and solar energy to electrical energy. The setup shall work as a live demonstration unit of solar pV and wind turbine and generator in terms of its concepts and applications. It must contain solar PV and Wind Turbine Setup and Trainer. The following are some min. specifications for equipment to be included:</p> <ul style="list-style-type: none"> • cumulative Power output: 1000 Watt(Min.) • Solar Cells: Suitable rating and number • Wind Turbine Setup : Contain 3 blades <p>Maximum Open Circuit Voltage : suitable rating Maximum Short Circuit Current : suitable rating</p> <ul style="list-style-type: none"> • Voltmeter Ammeter Potentiometer of suitable rating • AA Rechargeable NiCd Battery : suitable rating 					
346.	Solar Traffic Light	<p>Solar Traffic light complete in all aspects along with: 12V, 75Ah battery, 75 Wp solar panel, 12V, 10A dusk to dawn charge controller, 15 W LED lights with suitable colors and 9 m height suitable pole all dismountable</p>	No.	1			
347.	Used water treatment solar plant demonstrator kit	Used water treatment solar plant demonstration kit complete in all aspects with Min. 1 Litre capacity	No.	1			
348.	Solar DC pump	<p>1HP Solar DC Pump Specifications</p> <ul style="list-style-type: none"> - Solar Panel Rating : 1000Wp array or suitable - Type : DC centrifugal Pump - Rating : 1HP - Operating Voltage : 30V or suitable - Current : 25A or suitable - Inlet Caliber : 2" inch or suitable - Outlet Caliber : 1.5" inch or suitable 	No.	1			

349.	Demonstration kit for wind generation (Wind turbine with blower)	<p>Demonstration kit for wind generation (Wind turbine with blower) setup for laboratories to understand the conversion of wind energy into electrical energy. It shall introduce the basic concept of wind turbine, of converting kinetic energy of wind into mechanical energy and then this mechanical energy into electrical energy. The setup shall work as a live demonstration unit of wind turbine and generator in terms of its concepts and applications. It must contain Wind Turbine Setup and Wind Energy Trainer. The following are some min. specifications for equipment to be included:</p> <ul style="list-style-type: none"> • Power output: 300 Watt(Min.) • Wind Turbine Setup : Contain 3 blades Maximum Open Circuit Voltage : suitable rating Maximum Short Circuit Current : suitable rating • Voltmeter Ammeter Potentiometer of suitable rating • AA Rechargeable NiCd Battery : suitable rating 	No.	1			
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2. Delivery and Completion Schedule

The delivery period shall start as of date of Signing the Contract

Item No	Description of Goods or Related Services	Delivery Schedule (Duration)	Location	Required Arrival Date of Goods or Completion Date for Related Services
1 To 349	As per Schedule 1 – List of Goods and Related Services	Within 365 Days from the Signing of the contract.	The location of Delivery of various items attached separately	Within 365 Days from the Signing of the contract.

3. Technical Specifications

Item No.	Name of Goods or Related Services	Technical Specifications of Item and/or Bureau of Indian Standards (BIS) (if applicable) reference	Features	Accessories	Spare parts	Documents	Installation & Training	Warranty of Equipment/parts
1.	0-30 V, 2 Amp, Regulated DC Power Supply	Regulated DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-30volts, 2 Amps • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits 	<ul style="list-style-type: none"> • Indications: LED indications for ac input CV,CC operations • Controls: On/Off switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers • Terminations: Input through a power card Output will be brought on to binding terminals on front panel and also with remote sense terminals on to rear pane • Latest ISO 9001 Certified factory product 	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
2.	20 MHz Dual Trace Oscilloscope	Oscilloscope Dual Trace 20 MHz <ul style="list-style-type: none"> • DC - 20MHz Bandwidth • 1mV/div Sensitivity on Both Channels or better • X-Y Operation • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD/TFT or better Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220VV \pm	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product • CH1, CH2 (Independent Channels), CH1 & CH2 (Alternate / CHOP), CH2 INVT, ADD and SUBTRACT • Dual channels / dual traces, X-Y mode • High brightness oscilloscope tube • TV synchronous separation circuit to observe stable TV signal. • Triggering mode : AUTO / NORM / AV-V / AV-H • Vertical : ALT / CHOP / ADD 	Main Power cord	Standard Spares	Instructional manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		10%, 50Hz	•Polarity reversal; CH1 Sync output					
3.	3- Point D.C. Starter	Starter, 3- point D.C. For 2.5 KW DC motor 3-point DC Starter. 3 Point D.C. Motor starter suitable to work on 2.5 KW. D.C. motor, Voltage 230/250 with a maximum 15% full load current the starting period shall not exceed 30 seconds with under voltage and an intensions (Magnetic) over load release device.	Relay Operated, Under/Over voltage and overload Relay shall be included. Latest ISO 9001 Certified factory product.	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
4.	4- Point D.C. Starter	Starter, 4- point D.C. For 2.5 KW DC motor 4-point DC Starter :- 4 Point D.C. Motor starter suitable to work on 2.5 KW. D.C. motor, Voltage 230/250 with a maximum 15% full load current the starting period do shall not exceed 30 seconds with under voltage and an intensions (Magnetic) over load release device.	Relay Operated, Under/Over voltage and overload Relay shall be included. Latest ISO 9001 Certified factory product.	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
5.	Electric Induction plate	Electric Induction plate with min 1500 Watt, 240V having Ceramic cook top. <ul style="list-style-type: none"> •ISI mark product 	<ul style="list-style-type: none"> • Touch panel • Automatic Whistle counter, • Timer with temp. control facility • Automatic Keep warm Function • Automatic voltage regulator • Anti-magnetic wall • Feather-touch buttons, High/Low Voltage protection. 	Power Cord		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
6.	A.C. Energy Meter	A.C. Energy Meter- induction type Single Phase, 10 A, 240 V <ul style="list-style-type: none"> • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case 	<ul style="list-style-type: none"> • 6 digits including one decimal digit display • LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Accuracy Class 1.0 	case and connection cords		<ul style="list-style-type: none"> *Manual *Test Certificates 	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

							be provided as required to the Institute faculty.	
7.	A.C. Energy Meter	AC energy meter Three Phase, 15 A , 440 V induction portable type AC Energy Meter Housed in Bakelite case	<ul style="list-style-type: none"> • 6 digits including one decimal digit display • LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case • Accuracy Class 1.0 	case and connection cords		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
8.	A.C. Series type Motor	<p>AC Series type Motor with Mechanical Loading arrangement and Electric Control Panel as given below:</p> <p>AC Series Motor :- Rating: 1 HP, 240 V, 50 Hz with terminals are brought out on terminal box. Insulation : Class 'B', or better</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied . 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<p>- User Manual / Operation Manuals .</p> <p>- Test / Experiment list and procedure manual. (if applicable).</p> <p>- Warranty Certificate of Motor and major components</p>	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J				used on the control panel. - Service providers contact details.		
9.	A.C. Voltmeter M.I. Analog	A.C. Voltmeter M.I. analog, Multi Range A.C. Voltmeter M.I. 75V - 150 V - 300 V - 600V A.C Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
10.	Air Conditioner unit split 2 Ton capacity with Stabilizer	<ul style="list-style-type: none"> • Type - Split AC complete in all aspects • Capacity in Tons- 2 Ton • Star Rating- Min. 3 Star BEE Rating • BEE Rating Year- 2019 • Power Requirement AC 230 V, 50 Hz • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Refrigerant -R-410A or better • Condenser Coil -Copper 	<ul style="list-style-type: none"> • Auto Air Swing, • Dust Filter, • Auto Restart, • Timer, • Sleep Mode, • Refrigerant Leakage Detector • LED Display • Turbo Mode 	Voltage stabilizer with other standard Accessories as required		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
11.	Air conditioner split type 1.5 tons	<ul style="list-style-type: none"> • Type -Split type AC complete in all aspects • Capacity in Tons- 1.5 Ton • Star Rating- Min. 3 Star BEE Rating • BEE Rating Year- 2019 • Power Requirement AC 230 V, 	<ul style="list-style-type: none"> • Auto Air Swing, • Dust Filter, • Auto Restart, • Timer, • Sleep Mode, • Refrigerant Leakage Detector 	Voltage stabilizer (if required) with other		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		50 Hz • Color -White • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Condenser Coil -Copper	• LED Display • Turbo Mode	standard Accessories as required			be provided as required to the Institute faculty.	
12.	Ac Ammeter Mi, Analog	AC Ammeter MI, analog, 0-1 A range with Moving iron spring-mounted jewel bearing suspension	• This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
13.	Ac Ammeter Mi, Analog	AC Ammeter MI, analog, (0-5 A MI) with Moving iron spring-mounted jewel bearing suspension	• This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh.- Training to be provided as required to the Institute faculty.	
14.	Ac Ammeter Mi, Analog	AC Ammeter MI, analog, (0-25A MI) with Moving iron spring-mounted jewel bearing suspension	• This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
15.	AC Motor Trainer Kit ¼ HP motor, Single Phase	AC Motor MOTOR : Single Phase, Capacity 1/4 HP, 230 volts A.C., 50 Hz, TEFC or	• The components fitted on the Panel should be labelled with the name of the	• Patch cords for	Spares: • One spare	- User Manual /	To be installed the designated training	2 year Warranty for Generator,

	<p>Contactors, Relays, MCB, DOL Starter</p>	<p>better, Insulation: class 'B' or better , horizontal foot mounted.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J</p>	<p>component.</p> <ul style="list-style-type: none"> • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>connecting Machine to panel</p> <ul style="list-style-type: none"> • Any other special tool required for assembling/deassembling the Setup supplied . 	<p>set of patch cords.</p> <ul style="list-style-type: none"> • One set of spare fuses. . 	<p>Operation Manuals .</p> <ul style="list-style-type: none"> - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	<p>Motor and each component mounted on the Panel.</p>
16.	<p>AC phase-wound slip ring Motor along with control panel.</p>	<p>AC PHASE-WOUND SLIP RING MOTOR WITH ROTOR RESISTANCE TYPE STARTER SWITCH</p> <p>Motor :- 5 HP, 440 volts, 3-phase, 50 Hz - 440 volts, slip ring Induction Motor, horizontal foot mounted. Six terminals are</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of 	<p>- User Manual / Operation Manuals .</p> <ul style="list-style-type: none"> - Test / 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as 	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		<p>brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-G</p>	<p>should also be provided.</p> <ul style="list-style-type: none"> • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>other special tool required for assembling/deassembling the Setup supplied .</p>	<p>spare fuses. .</p>	<p>Experiment list and procedure manual. (if applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>required to the Institute faculty.</p>	
17.	AC Squirrel Cage Motor with Mechanical Load along with control panel.	<p>A.C. SQUIRREL CAGE INDUCTION MOTOR 5 HP WITH Automatic STAR DELTA STARTER with Mechanical Load - AC MOTOR :- It should be A.C. 3 Phase 5 HP 415 volts, 50 Hz, Squirrel cage Induction Motor, horizontal foot mounted. Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. . 	<ul style="list-style-type: none"> - User Manual / Operation Manuals . - Test / Experiment list and procedure 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		<p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-F</p>	<p>copper wound</p> <ul style="list-style-type: none"> • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	assembling/disassembling the Setup supplied.		<p>manual. (if applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 		
18.	Resistance type AC starter	AC Starters: - Resistance type starter For A.C Motors of 2 to 5 H.P.	ISO 9001 of latest version certified Factory product	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
19.	DOL AC Starters	<p>Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 2 to 5 HP motor</p> <ul style="list-style-type: none"> • Conforms to IS 13947 or IEC 60947-4-1 & IEC 60947-4-1. • Sheet steel enclosures with IP 54 protection. 	<ul style="list-style-type: none"> • Built-in single phasing protection • Terminal block for ease of termination • Relays having phase failure sensitive tripping mechanism provides reliable 	standard accessories		Operation Manual	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		<ul style="list-style-type: none"> • Wide range of relay settings and coil voltages. 	protection against Single Phasing & Overload conditions.				be provided as required to the Institute faculty.	
20.	Manual Star-Delta type AC starter	Star Delta Starter- Manual Manual Star Delta starter for 3 phase AC motors of min. 5 HP ratings complete in as aspects. Sheet steel enclosures with IP 54 protection. with Standardized accessories and spares .	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
21.	Semi-Automatic Star-Delta type AC starter	Star Delta Starter – Semi automatic in Sheet-Steel Enclosure (Motor Rating min 5 HP AC-3 Duty, 415V, 50Hz, 3-Ph Sheet steel enclosures with IP 54 protection. with Standardized accessories and spares.	<ul style="list-style-type: none"> • Flush Mounted Push Buttons • Built in Overload Relay • Copper & Aluminium cable terminations possible • As per IS: 13947-4-1 and IEC: 60947-1 standards • Wide Band Operating Coil • Wide Relay Range • Silver Contacts for Long Life 	standard accessories		Operation Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
22.	Fully Automatic Star-Delta type AC starter	Fully Automatic Star-Delta Starters Suitable for motor starting upto 2 to 5 HP AC-3 Duty, 415V, 50Hz, 3-Ph Sheet steel enclosures with IP 54 protection.	<ul style="list-style-type: none"> • Flush Mounted Push Buttons • Built in Overload Relay • Copper & Aluminium cable terminations possible • As per IS: 13947-4-1 and IEC: 60947-1 standards • Wide Band Operating Coil • Wide Relay Range • Silver Contacts for Long Life 	standard accessories		Operation Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
23.	Star Delta AC Soft Starter	Star Delta Starter - Soft starter Star Delta soft Starter complying IEC 60947 in Enclosure with IP 20 protection class for Motor		standard accessories		Operation Manual	To be installed the designated training institute in	2 Years

		Rating 2-5 HP AC-3 Duty, 415V, 50Hz, 3-Ph					Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
24.	Auto Transformer starter	Auto Transformer starter suitable for Motor starting upto 2-5 HP Motors. Shall conform to IEC 60947-4-1 Starter enclosure to conform IP 53	Push button operation for ON-OFF Ammeters, ammeter selector switch	standard accessories		Operation Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
25.	Air blow gun with standard accessories	Air blow gun Copper body with jet operating lever and suitable hose/connector	*Removable nozzle and connection nipple. *The gun is fitted with a non-leak air-valve and can be used on both high and low pressures. *the gun fitted with a non-leak air-valve and can be used on both high and low pressures *comfortable pistol grip	*Jet Operating lever * Suitable Hose/connector	*Spare Jet operating Lever and hose/connector	Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years
26.	Ammeter (0-10 mA), (0-50mA), (0-100mA) (table model)	Table model Analog Ammeter with range 0-10 mA : • Range: Current (A): 0 – 10 mA Table model Analog Ammeter with range 0-50 mA : • Range: Current (A): 0 – 50 mA Table model Analog Ammeter with range 0-100mA : • Range: Current (A): 0 – 100 mA	• Movement Type: Moving Iron type • Standards: IS-1248 • Accuracy: $\pm 1.5\%$ of Full Scale	Standard Accessories		catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

27.	Ammeter 300A/60A DC with external shunt	Analog type portable Ammeter Min 300 A/60 A DC with external shunt with probe Fitted in Box Shall conform to I.S. 1248 / I.E.C. 60051 (Part 2)	Linear Scale Anti-glare Glass.			Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years
28.	Ammeter Mc Analog	Ammeter MC analog - (0 - 500mA) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	<ul style="list-style-type: none"> This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
29.	Ammeter Mc Analog	Ammeter MC analog - (0-5 A-MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	<ul style="list-style-type: none"> This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
30.	Ammeter Mc Analog	Ammeter MC analog- (0-25 A-MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and	<ul style="list-style-type: none"> This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case Meters Shall comply to IS- 	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	2 Years

		anti parallax mirror, it should be moving coil type	1248 or IEC-1010,				the Institute faculty.	
31.	Analog multimeter	Analog Multimeter AC Voltage (Volts) 10-1000 V AC Voltage Accuracy $\pm 4\%$ DC Voltage Accuracy $\pm 3\%$ DC Current (Amp) 50 μ A-10 A DC Voltage 0.1mV-1000 V DC Current Accuracy $\pm 3\%$ Resistance (ohm) 0.2 Ω -20 M Ω Resistance Accuracy $\pm 3\%$	<ul style="list-style-type: none"> Analog Multimeter with Mirror Scale Inbuilt Buzzer and LED 0 Ω Adjustment with X 100 Range Transistors Test , hFE with Diode. Test Resistance Range : X1 , X10 , X100 , X1K , X10K Diode Test Transistor Testing Continuity Buzzer About 100 Ω Function Protection Meters Shall comply to IS-1248 or IEC-1010, 	*Batteries *Case *Test Leads		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
32.	Application kits for Microcontrollers 6 different applications	Application kits for Microcontrollers 6 different applications: 1. Input Interface : 4x4 Matrix Keypad, ASCII Key PAD, Four Input Switch 2. Display Module 16X2 LCD, Seven Segment, LED Bar Graph 3. ADC/DAC Module with most popular DC/DAC0808 4. PC Interface: RS232 & USB 5. Motor Drive: DC, Servo, Stepper 6. DAQ: Data Acquisition to sense different sensors signals	<ul style="list-style-type: none"> Should be compatible with the Microcontroller Kit (8051) at item No. 10 above.) Application Kits:- Four Digit Seven Segment Display. Stepper Motor Driver Card & Motor, DC Motor Interface, Motor traffic light interface. Relay & opto interface, Elevator simulator interface, Other relevant application kits. Latest ISO 9001 Certified factory product 	Standard Accessories		English language user manual with Operation and Maintenance instructions to be provided	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
33.	Auto Electrical test bench	Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo, alternator, regulators and starter motors with following specifications:	<ul style="list-style-type: none"> Table top model. Fitted with digital ammeter/voltmeter for easy reading. Maximum capacity of alternators that can be 	<ul style="list-style-type: none"> Patch cords for connecting Machine 	Spares: • One spare set of suitable current	Manuals / catalogues of standard	To be installed the designated training institute in Himachal Pradesh.	2 year Warranty for each component mounted on the Panel.

		Instrumentation Installed <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter 0-100 Amps DC • Alternator output current - Digital Panel meter 0-100 V DC Drive • 220V single phase, 2HP, 1440 RPM induction motor Protected with circuit breakers Field Supply • 12V/24V fixed Protection • Circuit breakers incase of sudden surges in voltage <ul style="list-style-type: none"> • Fuses provided for protection of rectifiers, battery etc Power Requirements • 220V single phase, 15 Amperes Vice • Heavy duty, fast mounting for alternators and starters <ul style="list-style-type: none"> • latest ISO 9001 Certified factory product 	tested. 75 amps at 12V <ul style="list-style-type: none"> • Provision for checking and testing alternators at 2 speeds Large V/poly - V groove pulley for high speeds Small V - pulley for low speeds. • Starter free spin testing directly from battery. • Alternator loading through four rotary switches. • Starter short-circuit test facility available. • Battery Charging facility available during the alternator testing process. • Vehicle simulation of battery charging through alternator. • Provided with 12V battery supply for testing a wide range of electrical components like horns, bulbs, relays child parts of starters and alternators. 	to panel <ul style="list-style-type: none"> • Any other special tool required for assembling/disassembling the Setup supplied . 	capacity patch cords for interconnections required on the panel board. <ul style="list-style-type: none"> • One set of spare fuses. 	products used in the Panel. Instruction manual for complete panel along with Practical details to be performed.	- Training to be provided as required to the Institute faculty.	
34.	Autotransformer	Single Phase Variable Auto Transformer 0 - 270 V, 15 Amp (Air cooled) Specification:- Type :Single Phase Auto Transformer Amperage 15 Amp input voltage 0-270 V with safety fuses and line indicators	ISO 9001 of latest version certified Factory product	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
35.	Electric Kettle	Electric Kettle Min. 1500 Watts, 240V with 1.7 Litre capacity.	• ISI Mark product	standard accessories		Manual	To be installed the designated training institute in Himachal	2 Years

							Pradesh. - Training to be provided as required to the Institute faculty.	
36.	Basic Analogue Electronics Trainer	<p>Basic Analogue Electronics Trainer with following specifications:</p> <ul style="list-style-type: none"> • Bread Board : Unique solderless large size, spring loaded breadboard consisting of two Terminal Strips • Regulated DC Power Supply of suitable rating • AC Supply of suitable rating • Function Generator : Sine / Square / Triangular waveforms frequency. Variable in between steps. Sine / Square / Triangular waveform • Modulation Generator : Sine / Square / Triangular wave forms frequency. Variable in between (100 KHz) steps. Sine / Square / Triangular waveform • Digital Meter (3½Digit) : Dual range DC voltmeter / Ammeter • Continuity Tester : For testing the continuity. Provided with Beeper Sound • Potentiometers : 3 Potentiometers (1K, 100K and 100K) with terminals • On Board Switches : 2 Switches Single pole double through • Power : 230 V \pm 10%, 50 Hz 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product • Completely self - contained Multi Experiment Unit covering various Characteristics & Applications • Housed in an elegant cabinet with a well spread intelligently designed multicoloured functional blockwise front panel • Shall perform Study of : Diodes in DC circuits, Light Emitting Diodes in DC Circuits, Half wave rectifier, Full wave rectifier, Zener Diode as a voltage regulator, transistor series voltage regulator, transistor shunt voltage regulator, Low pass filter, High pass filter., band pass filter, CE configuration of NPN transistor, CB configuration of NPN transistor, CE amplifier, Monostable multivibrator using transistor, Bistable multivibrator using transistor, Astable multivibrator using transistor, CB Amplifier (PNP), CC Amplifier (PNP), Transistor Audio Amplifier, Two Stage R.C. 	<ul style="list-style-type: none"> • Mains cord, • Red & Black patch cords (2mm with Pin) 10 each, • Red & Black patch cord (Pin to Pin) 10 each & Component Set 		<ul style="list-style-type: none"> • Operating and Experimental manual, 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			Coupled Transistor, Inverting Amplifier, Non-inverting Amplifier, Integrating Amplifier for A.C input Signal, Differentiator Amplifier, Square Wave Generator					
37.	Battery Charger	Battery Charger of Capacity-30amps(High) The charger is for automotive, SMF, VRLA, Tubular and stationary batteries. It shall be possible to recharge 20Ah to 200Ah batteries. These charger should be able to select 12V/24V/36V and 48V respectively with low and High current selector to choose current level for low Ah battery and High Ah battery. Power on indication, reverse mcb and Thermal trip with connecting probes. It shall use full wave rectifier coupled copper transformer combination . An ammeter for indication charging current.	Charger should have the facility to disconnect the charging when battery is fully charged, to prevent the over-charging or damage. • Latest ISO 9001 Certified Factory Product	• Patch cords for connecting Machine to panel(5 Meter) • Any other special tool required for assembling/disassembling the Setup supplied .		Instruction manual for complete panel along with test details to be performed.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years
38.	Battery storage lead acid 6V & 12 V	*Voltage :12 V Capacity (Ah): 50 AH Battery Type: Sealed Acid Lead Battery *Voltage :6 V Capacity (Ah):4.5 AH Battery Type: Sealed Acid Lead Battery	CE Mark or ISO 9001 Certified factory product or As per Relevant IS Standards	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
39.	Brake Test arrangement	Brake Test arrangement with two spring balance rating	• Brake loading arrangement for loading the	Standard		Manuals /	To be installed the designated	2 Years

		Brake Test arrangement with two spring balance 0 to 25 kg rating friction brake dynamometer set having two nos. six inches dial type spring balances should be provided with fixed on motor base plate.	motor with following facilities; o Attachable to the base frame of the Motor railing o Hand Wheels for varying the braking o Spring balances (Dial type or other type) with Large dial for easy reading. o High quality Belts with connecting arrangement to the Spring balances • Latest ISO 9001 Certified factory product	Accessories		catalogues	training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
40.	Bus bar with brackets	200 Amps, 1 Meter each, four buses of RYBN of Copper material with extension assembly. All hardware shall be copper. Housed in enclosure with locking arrangement.		Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
41.	Electric Iron	Electric Iron Automatic - 750 W, 240 V.	• ISI Mark product	Standard Accessories		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
42.	Steam iron automatic	Electric Steam Iron Automatic - 750 W, 240 V.	• ISI Mark product	Standard Accessories		Manual	To be installed the designated training	

				ries			institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
43.	C.R.O Dual trace/ Double beam	C.R.O Dual trace/ Double beam 60 MHz <ul style="list-style-type: none"> • DC - 60MHz Bandwidth • X-Y Operation • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD/TFT or better Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220VV \pm 10%, 50Hz	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product • CH1, CH2 (Independent Channels), CH1 & CH2 (Alternate / CHOP), CH2 INVT, ADD and SUBTRACT • Dual channels / dual traces, X-Y mode • High brightness oscilloscope tube • TV synchronous separation circuit to observe stable TV signal. • Triggering mode : AUTO / NORM / AV-V / AV-H • Vertical : ALT / CHOP / ADD • Polarity reversal; CH1 Sync output 	Main Power cord		Instructional manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
44.	Calculator Desk Type	Desk Type Calculator with Min. specifications as: <ul style="list-style-type: none"> • Shall have memory • Dual power (Battery and solar) • LR44 Battery • 12 Digits Display • mini desktop Type • Upright Angled LCD Display with Angled Display • Calculation Command Sign Display • Thousand separator Digit Comma Separator 	<ul style="list-style-type: none"> • Constant Calculation • Grand Total • Key Roll-Over • Change Function • Percentage, O Key(s), Plastic Keytops, Reverse (RV) Key, Shift key, Square Root, GT Key, Sign Change Key, Total Key, Mark-up • Auto-power Off • Display up to 150 previous calculation steps • CE mark Product 	Batteries		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

45.	Ceiling fan coil Winding Machine	<p>Ceiling fan coil Winding Machine with following specifications:</p> <ul style="list-style-type: none"> • Winding Gauge: 27 SWG to 37 SWG • Size of fan :600 mm to 1400 mm • Starting coil winding :4 slots to 20 slots • Running coil winding: 4 slots to 20 slots • Motor AC 1/ 10 H.P, 1350 R.P.M • Power requirement: 220V AC, 50 HZ Single Phase • Fill counter:4-Digit, Preset, LED Display through controller • Winding Speed: Continuously variable Max. 1000 R.P.M to 1350 R.P.M 	<p>*Running direction indicator; Type Led Indicator</p> <p>*Controller Micro Processor Logic Controller</p> <ul style="list-style-type: none"> • Program memory :Micro Controller Logic Controller • Stamping length in mm: 09 mm to 45 mm • Speed control of Main Motor: Through AC, with wire cut function • Latest ISO 9001 Certified factory product 	Relevant Fitting tools for Machines		Operational and training Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
46.	Clamp meter	<p>Tong Tester / Clamp Meter 0 – 10 amp.(Min)</p> <ul style="list-style-type: none"> • Dial (aka rotary switch). • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and frequency modes. • Zero button (yellow): Removes dc offset from dc current measurements. Also serves as dial's shift button to select yellow functions scattered around the dial. <p>Shall comply to Safety standard IEC 1010 or IEC 61010</p>	<ul style="list-style-type: none"> • Current-sensing jaw. • Tactile barrier (to protect fingers from shocks). • Hold button: Freezes the display reading. Reading is released when button is pushed a second time. • Backlight button. • Jaw release lever. • Alignment marks: To meet accuracy specifications, a conductor must be aligned with these marks. • Common input jack. • Volts/ohm input jack. • Input for flexible current probe 	Test Leads Batteries Soft carrying case		Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	3 Years
47.	Contactor & auxiliary contacts-25Amps	<p>Contactor & Auxiliary contacts 3 phase, 415 Volt, 25 Amp with 2 NO and 2 NC</p>	<p>Shall comply with IS/IEC 60947-2</p>	Standard Accessories		Product catalogue	To be installed the designated training institute in Himachal Pradesh.	2 Years

							Pradesh. - Training to be provided as required to the Institute faculty.	
48.	Contactors & auxiliary contacts- 32 Amps	Contactors & Auxiliary contacts 3 phase, 415 Volt, 32 Amp with 2 NO and 2 NC	Shall comply with IS/IEC 60947-2	Standard Accessories		Product catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
49.	Current Transformer	Current Transformer Test Set - should have secondary rated for 5 Amp. which are intended to be used on 50 Hz. The measurement is on principal of comparison and null indication on magnetic balance bridge. Specification- C.T.BURDEN BOX 5A, 30VA , 0.8 PF STANDARD C.T. Primary ranges-100-75-50-25-10/ 5amp. Secondary range- 5 amp Burden- 2.5VA, Class of Accuracy-0.2, single ph. C.T. Under Test Primary ranges-100-75-50-25-10/ 5amp. Secondary range- 5 amp Burden- 15VA, Class of Accuracy-0.5, single ph. Variable Current Source Model 0-4V@100A, 400VA, single ph.	The Current Transformer Test set provides the following Features- 1. Separate terminals to connect standard C.T. and Test C.T. secondary's. 2 Ratio error and phase angle error calibrated dials 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 energise electronic null detector 9 High permeability magnetic core 10. Secondary current selector 1A . or 5A	standard		Operational Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		Complete with control panel B) Phase Ratio Error : 0-1000 Minutes C) Input Current : 0.05A to 7.5A AC D) Accuracy : + 1% of reading Indications : a) Reverse Polarity : b) 'Std' C.T. Sec. open : c) 'X' C.T. Sec. Open : d) Difference Ratios of 'Std' & 'X' CT Hi-imbalance : e) Over Current : f) Ratio Error Polarity : g) Phase lag-lead : h) Phase Error Over Range	Additional Features shall include: - Compact in size. - Light in weight. - High Accuracy. - Reverse Polarity indication. - Direct reading from LCD display. - The Ratio Error is directly given in percentage. - The Phase Error is directly given in minute. - Current Injection Set - Output Variable Current 100 Amps, Provided with Digital Current Meter & Timer - Current Transformer 100:5Amps 3nos. - Burden Box					
50.	Cut out Relays	16A, 440V ·Relay Type : Instantaneous Cut Out Relay (Electromechanical) ·Terminals :Terminals for Trip, Current Output and Input ·Meters (Digital) : 1No. AC Current Meter 0 – 20Amps & 1 No. Digital Timer .0001sec. to 9999sec. (Auto) ·Current Injector : Inbuilt variable current injector Amps 20Amps to create Phantom Fault Current ·Indicators : Provided on front panel for Mains, Current, Trip and Alarm ·Power Requirement : 440VAC +10%, 50Hz	·To study the construction of relay ·Test an relay in instantaneous Cut Out protection scheme for operating characteristic using current injection ·Relay Circuit Diagram : Screen Printed on front panel ·Switches : Provided on front panel for Mains, Timer Reset, Test Switch (ON/OFF) • Latest ISO 9001 Certified factory product	Standard Accessories: ·Power Cords, Patch Cords,		Instruction Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
51.	Immersion Heater	Immersion Heater 1500 Watt, 240V.	•ISI Mark product	Standard Accessories		Manual	To be installed the designated training institute in	

							Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
52.	D.C. Compound Generator with AC Motor along with control panel	<p>Specifications for above shall as follows:</p> <p>DC Compound Generator: 2.5 KW, 220V,. Self Excited with variac,. Standard ISI Product, Horizontal foot mounted</p> <p>3 phase 5HP 440V foot mounted Squirrel cage AC Induction Motor:</p> <p>Motor Performance conforms to IS:325 and dimensions conform to IS:1231, IS:8223.</p> <p>Degree of Protection:- Motors are designed for degree of protection IP 55 according to IS:4691</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied . 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals . - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-A				contact details.		
53.	D.C. Shunt Generator with AC Motor along with control panel	<p>Specifications for above shall as follows:</p> <p>1. DC Shunt Generator: 2.5 KW, 220V,. Self-Excited with variac, 4 Pole. Standard ISI Product., Horizontal foot mounted</p> <p>2. 3 phase 5HP 440V foot mounted Squirrel cage AC Induction Motor: Motor Performance conforms to IS:325 and dimensions conform to IS:1231, IS:8223. Degree of Protection:- Motors are designed for degree of protection IP 55 according to IS:4691 Class F insulation class.</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		BOARD given in Appendix-A						
54.	DC compound Motor with starter along with control panel	<p>DC Compound Motor of 2.5 KW 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled.</p> <p>Motor should be Strictly copper wound & confirmed to IS 4722 with 4 point D.C. starter of suitable capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>
55.	Dc Power Supply	DC Power supply- 0 to 30V Table Top and Portable type Outputs:	Input Overload Protected Output Short Circuit Protected	Standard		Operating Manual	To be installed the designated training	

		0 to 30V DC continuously Variable + 15 V and -15 V Volts DC constant output + 5 V DC Constant output Current capacity : 5 Amps	Digital Display of Variable output Voltage and Load current latest ISO 9001 certified factory product	Accessories			institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
56.	DC regulated power supply (5 volts and 12 volts)	DC Power supply- 0 to 5V Table Top and Portable type Outputs: 0 to 5V DC continuously Variable DC Power supply- 0 to 12V Table Top and Portable type Outputs: 0 to 5V DC continuously Variable	Input Overload Protected Output Short Circuit Protected Digital Display of Variable output Voltage and Load current latest ISO 9001 certified factory product	Standard Accessories		Operating Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
57.	DC Regulated Variable Programmable DC Power Supply 0 - 30V / 3A	Regulated DC Power Supply with following specifications: • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-30volts, 3 Amps • Line & load regulation: ±0.05% for variations in input and load variations • Ripple: Less than 3mv RMS • Protections: Fuse protection will be provided Outputs are protected against over loads & short circuits	• Indications: LED indications for ac input CV,CC operations 4 ½ digit digital meters to read output voltage & load current. • Controls: On/Off switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers • Terminations: Input through a power card Output will be brought on to binding terminals on front panel and also with remote sense terminals on to rear pane • Latest ISO 9001 Certified factory product	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
58.	DC Series Motor coupled with spring	DC series Motor of 2.5 KW 220 V, Screen protected, Horizontal foot mounted, Internal fan	• The components fitted on the Panel should be labelled with the name of the	• Patch cords for	Spares: • One spare	- User Manual /	To be installed the designated training	2 year Warranty for Generator,

	balance load fitted with control panel	<p>cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 2 point D.C. starter of suitable capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-C</p>	<p>component.</p> <ul style="list-style-type: none"> • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>connecting Machine to panel</p> <ul style="list-style-type: none"> • Any other special tool required for assembling/disassembling the Setup supplied 	<p>set of patch cords.</p> <ul style="list-style-type: none"> • One set of spare fuses. 	<p>Operation Manuals</p> <ul style="list-style-type: none"> - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	<p>Motor and each component mounted on the Panel.</p>
59.	DC Shunt Motor	<p>DC Shunt Motor of 2.5 KW 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled.</p> <p>Motor should be Strictly copper wound & confirmed to IS 4722 with 4 point D.C. starter or equivalent starter of suitable</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of 	<p>- User Manual / Operation Manuals</p> <ul style="list-style-type: none"> - Test / 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as 	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		<p>capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	<p>should also be provided.</p> <ul style="list-style-type: none"> • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	other special tool required for assembling/disassembling the Setup supplied .	spare fuses. .	<p>Experiment list and procedure manual. (if applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	required to the Institute faculty.	
60.	DC & AC ammeter 0-1 A (table model for lab experiments)	<ul style="list-style-type: none"> • AC Ammeter MI, analog, 0-1 A range with Moving iron spring-mounted jewel bearing suspension • DC Ammeter MC analog- (0 - 1 A MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals, it should have knife edged pointer and anti parallax 	<ul style="list-style-type: none"> • It should have banana terminals with permanent marking of range and terminals, it should have knife edged pointer and anti parallax mirror, it should be moving coil type • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case), 	case and connection cords		User Manual	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	2 Years

		mirror	portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,					
61.	Ammeter MC analog- (0 - 1 mA MC)	<ul style="list-style-type: none"> • AC Ammeter MI, analog, 0-1 mA range with Moving iron spring-mounted jewel bearing suspension • Ammeter MC analog- (0 - 1 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror 	<ul style="list-style-type: none"> • It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
62.	DC & AC ammeter 0-50 mA (table model for lab experiments)	<ul style="list-style-type: none"> • AC Ammeter MI, analog, 0-50 mA range with Moving iron spring-mounted jewel bearing suspension • Ammeter MC analog- (0 - 50 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror 	<ul style="list-style-type: none"> • It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
63.	DC & AC ammeter 0-500 mA (table model for lab)	<ul style="list-style-type: none"> • AC Ammeter MI, analog, 0-500 mA range with Moving iron spring-mounted jewel bearing suspension 	<ul style="list-style-type: none"> • It should have banana terminals with permanent marking of range and terminals , it should have 	case and connection cords		User Manual	To be installed the designated training institute in	2 Years

	experiments)	<ul style="list-style-type: none"> • Ammeter MC analog- (0-500 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension, It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror 	knife edged pointer and anti parallax mirror, it should be moving coil type <ul style="list-style-type: none"> • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 				Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
64.	Desoldering pump	Manual, suction type. With static free Teflon nozzle. Type: Manual Hot Solder Sucker De-soldering Pump Tool. Operation: Hand operated. Body: Metal or Moulded. Non Static Teflon Nozzle	<ul style="list-style-type: none"> • Tools easily disassemble for fast cleaning. • Fitted with a Teflon tip. 	Cleaning kit	One Spare Nozzle	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
65.	De-soldering pump electrical heated	Electric Vacuum Desoldering Pump Wattage: 40 Watt Power Supply: 220-240 Volts AC 50 Hz	<ul style="list-style-type: none"> • Tools easily disassemble for fast cleaning. • Fitted with a Teflon tip. 	Cleaning kit		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
66.	De-soldering pump/gun	Manual, suction type. With static free Teflon nozzle. Type: Manual Hot Solder Sucker De-soldering Pump Tool. Operation: Hand operated. Body: Metal or Moulded. Non Static Teflon Nozzle	<ul style="list-style-type: none"> • Tools easily disassemble for fast cleaning. • Fitted with a Teflon tip. 	Cleaning kit	One Spare Nozzle	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

							be provided as required to the Institute faculty.	
67.	Diesel Generator Set	<p>Diesel Generator set of Power (kVA): 7.5 KVA complete in all aspects with following key specifications.</p> <p>Engine Reference Standard Engine - BS: 5514, ISO: 3046, IS: 10000, Genset - ISO: 8528 Type of cooling: Air/water Cooled Lub oil Sump capacity (with filters) 5 Engine Electrical System 12 Volts DC Electronic Governor, Class A1 Governing</p> <p>Alternator Phase 3Phase, brushless alternator, Self-excited, AVR/Capacitor-regulated - Class 'H' insulation - Salient pole revolving field - Single bearing Voltage 415 V AC Power Alternator Type Single Bearing, Brushless, Insulation Class H Power Factor 0.8 lag, Efficiency of Alternator as per standards IS 4722</p> <p>Canopy: Bolted type made of CRCA sheet with fire retardant insulation having noise level of less than 75 dBA at 1 meter in line with CBCP norms. Acoustic Insulation PU FR- Acoustic Foam</p> <p>Control Panel shall have following functions:</p>	<p>Min. Functions: Auto start & Stop, Inbuilt AMF features, Emergency Stop, LCD display, acknowledgment & Fault Reset Centralized lifting for easy handling and safety Compact size to fit low space criteria in roof – top applications. Have ample space in acoustic for Easy Maintenance. U V protected polyurethane powder coating for long life.</p> <p>Min. Protection: Short Circuit, Over load, MCCB, MCB's for control circuit</p> <p>Safeties: Low lube oil pressure, High coolant temperature, Overload Under & Over Voltage, Under & Over frequency, Auto shutdown, Visual & Audio Alarm against fault, Radiator water level, Low fuel level, charging failure.</p> <p>Fuel Tank Capacity (Lt.) :Min. 50 litres</p> <p>Base Frame: Pressed CRCA Channel</p>	Standard Accessories		Operation Manual General maintenance & installation Guideline Foundation Drawing Parts manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		Measurement: Microprocessor based controller with DG parameters display such as Volts line to line & line to neutral, Amps, Hz, Hour, KW,KWH,kVA,PF						
68.	Digital and Analog Bread Board Trainer	Digital and Analog Bread Board Trainer with following components: <ul style="list-style-type: none"> • DC Power Supply +5V, 1A (fixed) ,+15V, 1A (fixed),-15V, 1A (fixed),+15V, 200 mA (variable),-15V, 200 mA (variable) AC Power Supply 5V-0V-5V, 10V-0V-10V , Sine/ square/ TTL Generator 10Hz to 1MHz Data Switches 8Nos, LED indication 8Nos, Logic level indicator H/L for TTL level (7 segment display), Potentiometers 6Nos, Bread Board 172.5 mm x 128.5mm with 1685 points , Simulation/ Teaching Content through software 	<ul style="list-style-type: none"> •DC / AC Power Supply •Sine/ square/ TTL Generator Data Switches •LED indication •LED Display: 8 in Nos Simulation/ Teaching Content through software. • Latest ISO 9001 Certified factory product 	Standard accessories.		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
69.	Digital I.C. Trainer	Digital IC Trainer <ul style="list-style-type: none"> • DC Power Supply 5 V, 500 mA (IC based regulated output). • Clock Generators (TTL, 5V)- Fixed and Variable • Manual Pulser • Logic probe with Low, High & pulse indicator • Independent buffered logic level inputs to select High I Low TTL levels, each with a LED to indicate high flow status and termination. • Independent buffered logic level indicators for High / Low status indication of digital 	The Digital IC Trainer should be able to facilitate conduct of both basic and advance experiments as below: <ul style="list-style-type: none"> • Study of basic gates and verification of their truth tables (NOT, OR, AND, NOR, NAND, EX-OR, EX-NOR). • Study and verifications of the laws of Boolean Algebra and De-Morgan's Theorems. • Study of important TTL terminologies. Verification of important TTL circuit parameters. • Construction and 	Cords : Set of 20 assorted coloured multi-stand wires with 2 mm stackable (stackable) termination at		<ul style="list-style-type: none"> • List of Experiments with Procedures and Observation sheets • Detailed Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		<p>outputs.</p> <ul style="list-style-type: none"> • Potentiometer (ILOOK) with terminations. • Power ON switch with indicator for mains on indication and fuse for protection. • Set of assorted coloured multi-strand wires with 2 mm termination at both ends • Working Voltage: 230V 10% single phase AC • Latest ISO 9001 Certified factory product 	<p>verification of various types of flip - flops using gates & IC's (RS, JK, D, T, M / SJK).</p> <ul style="list-style-type: none"> • Construction and verification of various types of combinational circuits such as Half Adder, Full Adder, Half Subtractor, Full Subtractor, Even I Odd Parity Checker, Multiplexer, Demultiplexer, Binary to Gray & Gray to Binary Converters. • Construction and verification of various types of Up / Down, Synchronous I Asynchronous, Ripple / Reverse, Ring, Binary, BCD & Decade Counters. • Construction and verification of 4 Bit Universal Shift Register (SR / SL operation). • Study of 7 - segment display and decoder / driver. • other experiments which are a combination of two or more above using the on-board components with use of external components without soldering. 	both ends				
70.	Digital IC tester	<ul style="list-style-type: none"> • Digital IC Tester (Portable) with following Specifications: • Power Supply: 220 V+-10%, 50 Hz • Automatic testing of variety of ICs. • Potential free 40 pin universal ZIF socket. • Six Seven Segment Display to 	<ul style="list-style-type: none"> • The list includes 74/54, 40/45, 93/96 series ICs, EPROMs, RAMs, peripheral ICs, microprocessor (8088/8085/Z80/6502), 4000 and 4500 series CMOS, miscellaneous digital ICs. • Tests most of the 6 to 40 pin ICs in DIP package. 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	2 Years

		show IC number, PASS & FAIL Status, Operations display. • Audio alarm to user whenever it is required.	<ul style="list-style-type: none"> • Portable size Mains operation • Self Diagnosis • Identifies Unknown model number of Devices Note: The product shall strictly be Latest ISO 9001 certified factory product				faculty.	
71.	Digital IC Trainer	Digital IC Trainer <ul style="list-style-type: none"> • DC Power Supply 5 V, 500 mA (IC based regulated output). • Clock Generators (TTL, 5V)- Fixed and Variable • Manual Pulser • Logic probe with Low, High & pulse indicator • Independent buffered logic level inputs to select High I Low TTL levels, each with a LED to indicate high flow status and termination. • Independent buffered logic level indicators for High / Low status indication of digital outputs. • Potentiometer (look) with terminations. • Power ON switch with indicator for mains on indication and fuse for protection. • Set of assorted coloured multi-strand wires with 2 mm termination at both ends • Working Voltage: 230V 10% single phase AC 	The Digital IC Trainer should be able to facilitate conduct of both basic and advance experiments as below: <ul style="list-style-type: none"> • Study of basic gates and verification of their truth tables (NOT, OR, AND, NOR, NAND, EX-OR, EX-NOR). • Study and verifications of the laws of Boolean Algebra and De-Morgan's Theorems. • Study of important TTL terminologies. Verification of important TTL circuit parameters. • Construction and verification of various types of flip - flops using gates & IC's (RS, JK, D, T, M / SJK). • Construction and verification of various types of combinational circuits such as Half Adder, Full Adder, Half Subtractor, Full Subtractor, Even I Odd Parity Checker, Multiplexer, Demultiplexer, Binary to Gray & Gray to Binary Converters. • Construction and verification of various types of Up / Down, Synchronous I Asynchronous, Ripple / Reverse, Ring, Binary, BCD 	Cords : Set of 20 assorted coloured multi-strand wires with 2 mm stackable (stackable) termination at both ends		<ul style="list-style-type: none"> • List of Experiments with Procedures and Observation sheets • Detailed Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			& Decade Counters. • Construction and verification of 4 Bit Universal Shift Register (SR / SL operation). • Study of 7 - segment display and decoder / driver. • other experiments which are a combination of two or more above using the on-board components with use of external components without soldering. • Latest ISO 9001 Certified factory product					
72.	Digital LCR Meter	Digital LCR meter with following specifications: • RESISTANCE: 600/6k/60k/600k/6M $\Omega \pm 1.0\%$, 60M $\Omega \pm 1.5\%$ • CAPACITANCE: 6nF $\pm 2.0\%$, 60n/600n/6 $\Omega \pm 1.0\%$, 60 Ω /600 Ω /6mF $\pm 1.5\%$ INDUCTANCE: 600 $\Omega \pm 2.5\%$; 6m/60m/600mH $\pm 1.5\%$; 6H: <4H $\pm 2.8\%$ >4H $\pm 5.0\%$; 60H: <40H $\pm 3.5\%$ >40H Unspecified • POWER: 6 (1.5V) (AAA Type)	• Designed to international safety standard IEC1010-1 • A tilt stand provides position flexibility for viewing and operating the meter • SMT application • Auto range and manual range • Data hold • Max. /min. Value measurement Auto power off / disable auto power off	*Batteries *Case *Test Leads		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
73.	Digital Multimeters	Multimeter Digital Specifications :- Voltage between any Terminal and Earth Ground: 1000V Min Display: Digital: 4000 count updates 3/sec Operating Altitude: 0 to 2000 meters Specification: DC voltage: 200m/2V/20V/200V $\pm 0.5\%$, 1000V $\pm 0.8\%$ AC voltage: 2V/20V/200V \pm	• Basic dc accuracy • Digital display to 4,000 words • Automatic and manual range • Display hold function • Diode and continuity test with buzzer • Cover designed for easy hanging • Automatic shutdown • Easily replaceable battery	• Universal hanger clip • Test Leads • Batteries		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		0.8%, 750V \pm 1.2% Resistance: 200/2k/20k/200k/2M? \pm 0.8%, 20M? \pm 1.0% DC current: 200mA \pm 1.5%, 10A \pm 2.0% AC current: 200mA \pm 1.8%, 10A \pm 3.0% Capacitance: 20nF/200nF/2 μ F/20 μ F/200 μ F \pm 4.0% Temperature: -20 ° C ~ 1000 ° C Inductance: 20mH/200mH/2H/20H \pm 3.0% Transistor hFE: 1 ~ 1000 Power supply: (9V) Battery Life: Alkaline: 500 Hours Safety Compliance: IEC 61010-1, 2000 CAT I 1000 V, CAT II 600 V, and CAT III 300 V overvoltage standards	design • 500 hours battery life • Voltage AC, Voltage DC, resistance, capacitance, continuity beeper, diode test, A ac, A dc all in a durable holster • Rugged and durable design – all inputs, ranges and functions are protected up to 1000 V					
74.	Digital trainer kit	Digital trainer kit to study different types of logic gates and digital circuits using breadboard with min. Specifications as: • On board 8 TTL Input switches with Dual colour LEDs to indicate low or High • On board 8 Output LEDs • On board Four seven segment Displays • On board Two Displays also have segment wise controls • On board Manual Pulsing • On board Logic Probe • Bread Board with 1240 Tie Points • On board Micro Processor Interface • Bare board Tested Glass Epoxy SMOBC PCB is used.	Min. Experiments to be performed are as follows: • OR/NOR Function. • AND/NAND Function. • NOT/BUFFER Function. • Simple function of several variables. • Distributive Law. • Commutative Law. • Associative Law. • De Morgan's Theorem Note: The product shall strictly be Latest ISO 9001 certified factory product	patch cords and other standar d accesso ries		Manual and experim ent lists to be perform ed	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<ul style="list-style-type: none"> • Block Description Screen printed on glassy epoxy PCB • All interconnections are made using 2mm banana Patch cords • ON/OFF switch for power indication. • With built-in power supply • Enclosed in a wooden/plastic box 						
75.	Digital Wattmeter	Digital Wattmeter which calculate and displays power of single phase 230 V, Min. 1 KW Measurement, 50 Hz on a seven segment display. 600 V CAT IV/1000V CAT III as per International Safety standard IEC61010-1- 2010	<ul style="list-style-type: none"> • Range change function. • Data Hold Function freezes the reading. • Continuity check. • Diode measurement. • Low battery indication • Auto Power Off (APO) function. • Active Reactive and Apparent Power • Horse Power Measurement 	<ul style="list-style-type: none"> *Batteries *Case 		<ul style="list-style-type: none"> *Manual *Test Certificates 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
76.	Dimmer starter	Dimmer Starter 0 - 270 V, 3Amp (Air cooled) Specification:- Type :Single Phase Auto Transformer Amperage 3 Amp input voltage0-270 V with safety fuses and line indicators	ISO 9001 of latest version certified Factory product or Standard ISI product or CE Mark Product	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
77.	Discrete Component Trainer	Discrete Component Trainer Discrete Component Training Board should be cater for the study of Discrete Electronic Components. The Trainer should also have the capability of adding more exercises based on requirement. Should Consist of suitable voltage and Current rating regulated/stabilized A.C. &	Required Minimum Features: <ul style="list-style-type: none"> • Bread Board: Unique solder-less large size, spring loaded breadboard consisting of two Terminal Strips • Continuity Tester: For testing the continuity • Inbuilt Resistors, 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Detailed Operating Manual • List of Experiments with 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	2 Years

		<p>D.C. Power Supplies with Overvoltage and short circuit protection.</p> <ul style="list-style-type: none"> Regulated DC Power Supply: +5V at 1 Amp, - 5V at 1Amp, +12V 500ma , -12V 500ma, 0 to 20V ,500 ma - Continuously Variable. AC Supply: 5-0-5V, 10-0-10V at 100mA Function Generator: Sine/Square/Triangular waveforms frequency 1 Hz to 110 KHz in 5 Steps. Modulation Generator: Sine/Square/Triangular wave forms frequency 1 Hz to 110 KHz in 5 Steps. Digital Meter (3½Digit): Dual range DC voltmeter 0-20 V/Ammeter 0-200ma Operating Voltage: 230V ±10% at 50Hz A.C. Mains. 	<p>Capacitors, Diodes, Zeners, Transistors, Diac, Triac, FETs,UJTs, LEDs, Potentiometers, Audio transformers, OEN relays, Speaker, DIP switches and others used in construction of electronic circuits for carrying out experiments.</p> <ul style="list-style-type: none"> Suitable number of Red & Black patch cords at least half meter long each. Mains ON/OFF switch, fuse and Neon Indicator are provided. Latest ISO 9001 Certified factory product 			Procedures and Observation sheets	faculty.	
78.	DOL starter	<p>Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 1/2 HP AC motor</p> <ul style="list-style-type: none"> Conforms to IS 13947 or IEC 60947-4-1 & IEC 60947-4-1. Sheet steel enclosures with IP 54 protection. Wide range of relay settings and coil voltages. 	<ul style="list-style-type: none"> Built-in single phasing protection Terminal block for ease of termination Relays having phase failure sensitive tripping mechanism provides reliable protection against Single Phasing & Overload conditions. 	standard accessories		Operation Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

79.	DSO (colour)	Color DSO with 4 Channel , 50MHz Real Time Sampling 1G Samples/Sec, 12 Mpts Memory with PC Interface USB, LAN and math function includes +, -, FFT, differential, integral, abs, log etc	<ul style="list-style-type: none"> • Trigger types: Edge, Pulse width, Video, Slope. • Alternative - Digital Filter function and Waveform Recorder function, 32 parameters Auto Measure function , Save/recall types: Setups, Waveforms, CSV file, Picture . • Adjustable Waveform Intensity and grid brightness. • Standard configuration port: USB Host: Support USB flash driver save/recall function and update firmwar. • USB Device: Support PictBridge compatible printer and support PC remote control, RS232 Pass/Fail Output. • CE Mark/ Latest ISO 9001 Certified factory product 	standard accessories		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
80.	Dual DC regulated power supply	Regulated DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 30-0-30volts, 2 Amps • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Ripple: Less than 3mv RMS • Protections: Fuse protection will be provided Outputs are protected against over loads & short circuits 	<ul style="list-style-type: none"> • Indications: LED indications for ac input CV,CC operations 4 ½ digit digital meters to read output voltage & load current. • Controls: On/Off switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers • Terminations: Input through a power card Output will be brought on to binding terminals on front panel and also with remote sense terminals on to rear pane 	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 					
81.	A.C. Ceiling Fan and AC Table Fan	A.C. Ceiling Fan :min 1200mm 68-Watt 230 V with handing arrangement and regulator AC Table Fan: Min. 68 Watt, 230 V with oscillation mechanism	<ul style="list-style-type: none"> • ISI Mark product 	Standard Accessories		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
82.	Earth Electrode	Primary Electrode 2100x28x3.25mm Secondary Cu Strip 20x5mm		Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
83.	Earth Plate	60cm X 60cm X 3.15mm Copper Plate		Standard Accessories		Test Report	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
84.	Earth Plate	60cm X 60cm X 6mm GI Plate		Standard Accessories		Test Report	To be installed the designated training institute in Himachal Pradesh. - Training to	

							be provided as required to the Institute faculty.	
85.	ELCB and RCCB	Earth Leakage Circuit Breaker- (ELCB) 25Amps, double pole and 25Amps, double pole, IΔn 30 mA(Rated Short circuit capacity) Specification: shall comply to IEC 61008-1/IS 12640-1:2008/EN 61008-1 Residual Current Circuit Breaker (RCCB) 25 Amps, Double pole , IΔn 30 mA (Rated Short circuit capacity) Specification: IEC 61008-1/IS 12640-1:2008/EN 61008-1	Earth Leakage Circuit Breaker- (ELCB): Features: Shock proof, Fine finish, Easy to use Residual Current Circuit Breaker (RCCB) Features: - Shock proof, Fine finish, Easy to use -Shape compatible with and suitable for standard busbar connection to other devices. -Twin-purpose terminal (lift/open-mouthed) above and below. -Bus bar positioning optional line or load. -Free terminal space despite installed busbar. -Suitable for being used with standard fluorescent tubes with or without electrical ballast (typically up to 20 units per phase conductor)	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
86.	Electric Automatic steam press	<ul style="list-style-type: none"> • Steam 30g/min;100g steam boost • Non-stick soleplate/ Ceramic Soleplate • Anti-calc • 2100 Watts • Water tank capacity with min. 200 ml • Power supply: 220 V AC Single phase 50 Hz 	<ul style="list-style-type: none"> • Drip stop system • Triple precision tip Reaching tricky areas • Vertical steaming • Spray • CE Mark Product 	Standard Accessories		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
87.	Electric pump	Electric Pump of 1 HP with min. desired specifications as Follows:	<ul style="list-style-type: none"> • Aluminium extruded motor body to prevent corrosion 	Standard		Instruction	To be installed the designated	2 Years

		<ul style="list-style-type: none"> • Head :10-40 M • Discharge : 3960 - 360 LPM • Rating :1.00HP • Voltage Range : 170 - 230 V single Phase <p>MATERIAL OF CONSTRUCTION</p> <ul style="list-style-type: none"> • Pump Housing : Cast Iron • Impeller : H T Brass/bronze • Shaft : Carbon Steel • Motor Body : Extruded Aluminium 	<ul style="list-style-type: none"> • Compact, sleek look and robust construction • High quality and long life mechanical • Fitted with Thermal Overload Protector(TOP) - protector motor from burning • capacitor inside terminal box • Mechanical Steel : Carbon Ceramic • Motor with IP 44 protection and class B insulation 	Accessories		manual	training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
88.	Electric Soldering Iron	<p>Soldering iron 25 Watts:</p> <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. <p>Soldering Iron 60 Watts:</p> <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: Min 60W Temperature: 850° F / 440° C • Cord length: 5 feet • Tip: Short length, Taper, Chisel type, 0.15" , Replaceable Soldering Pencil type • Peg hook for hanging the Soldering Iron • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	<p>Features:</p> <ul style="list-style-type: none"> • Moulded, soft-grip handle design for reduced slippage. • Round shaped handle for easy rotation. • Stainless steel heater technology for heat up to 750o F for 25 Watt and 850oF for 60 Watt Soldering iron • Cord Strain relief for extended life. 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • Screw driver or Allen key for replacing soldering Iron Tip • Tip Cleaning Knife <p>Note: above accessories of suitable rating/size</p>	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • One spare Tip cleaning sponge. 	Instruction manual for complete panel along with test details to be performed.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years

				shall be provided with each Type of soldering iron.				
89.	Electrical Machine Trainer	<p>Electrical Machine Trainer: Suitable for demonstrating the construction and functioning of different type of DC Machines and AC Machines (single phase & three phase) Should be fitted with friction brake arrangement, AC/DC meters, instrument panel and power supply unit with internal panel duly wired. Completed with work bench that already equipped with galvanic isolated power supply and a cupboard to store the motors and other modules with emergency stop button. All inputs and outputs on each panel are equipped with safety socket and safety connecting cross 4mm. Ratings and qty. of machines etc. are mentioned in Appendix-K</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p>	<p>Following Essential accessories should be provided with trainer: A) Hand held tachometer – 1 No. B) Shrouded patch cords C) Well written students workbook explaining atleast 50 experiments with instructor guide some of them are as follows: The Trainer shall be suitable for demonstrating construction, functioning of machines mentioned in specifications. Minimum experiments to be performed are as follows: For Motors: Speed torque curves of all the Motors. Further, speed torque curves for Induction motor with rotor shorted & with different rotor resistance, and with DOL/star delta starters. Application of Synchronous motors as PF improvement. Also, Running characteristics, No-Load Test, Blocked Rotor, Load Test, Measurement of Slip in</p>	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		<p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-K</p>	<p>a case of Induction Motor.</p> <p>For generators: Its Operational Working Principle</p> <ul style="list-style-type: none"> • short circuit characteristics • open circuit characteristics • Study and measure of voltage regulation Etc. 			provider's contact details.		
90.	Electronic circuit simulation software with 6 user licenses	<p>Circuit Design, Simulation, Analysis and PCB Design Software</p> <p>The software should have facility of circuit simulation and PCB design with analyzing, designing and real time testing of analog, digital, Verilog-AMS, VHDL, MCU and mixed electronic circuits and their PCB layouts. It should also have facility to analyze SMPS, RF, Communication and optoelectronic circuits. It should have features to generate and debug MCU code using the integrated flow chart tool and test microcontroller applications in a mixed circuit environment.</p>	<p>It should have following features:</p> <ul style="list-style-type: none"> • Analog & Digital, HDL, RF, Symbolic, Mixed Signal Circuit Analysis • Integrated PCB Layout Design with Animated 3 D View • Multimedia Parts Advanced Diagrams, Virtual Instruments • Spice, S-parameter, HDL & MCU Models • Virtual and Real-Time Measurement • Mechatronics Simulation <p>PCB Design: Create Multilayer PCB layouts of your Circuits by a Single mouse click with automatically placed and routed components. All components in software should "PCB-ready" and have associated footprints which user can review and change on a component spreadsheet. IT should also have unique 3D capability to view the physical parts</p>	standard accessories		manual/catalogue	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	2 Years

			already on the schematic diagram.					
91.	Geyser (Storage type)	Capacity 10 litres 3 KW Heating Element Min. 3 Star rated from BEE ISI Mark Product	Long lasting outer body made of high impact resistance rust proof ABS material and sturdy inner tank made of 304 grade high quality stainless steel a) Thermostat, b) Thermal cut off, c) Pressure release valve (PRV), d) Non returning valve (NRV), e) Fusable plug	Flexible corrugated Stainless steel connectors for hot water heaters. Of Min. of 18" size (st of 2 -for Both Hot and cold)		Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	5 Years inner tank warranty and 2 year product warranty
92.	Fiber optic communication trainer	<ul style="list-style-type: none"> The Fiber optic Communication Trainer should provide the learning platforms to carryout practical to learn Basic Optical fiber communication Technology. The Trainer kit should be able to demonstrate Full Duplex method of transmitting information from one place to another by sending pulses of light through an Optical fiber. Using the trainer it should be possible to demonstrate;- properties of Fiber Optics Transmitter & Receiver - Characteristics of Fiber Optics Cable - Different types of Modulation / Demodulation techniques and - PC to PC communication via fiber link using RS232 interface. Full Duplex Analog & Digital Trans-receiver. 	<ul style="list-style-type: none"> Input-output & test points provided on board. On board voice link. Built in DC power supply. Numerical Aperture measurement jig and mandrel for bending loss measurement. <u>following experiments to performed using the Trainer:</u> Setting up Fiber Optic Analog & Digital Link AM system using Analog & Digital Input Signals Frequency Modulation System and Pulse Width Modulation System Study of Propagation Loss, Bending Loss & Measurement of Numerical Aperture Characteristics of Fiber 	Standard accessories.	Fiber Optic cable, RS 232 connectors, Crystal controlled clock module.	English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years

		<ul style="list-style-type: none"> •Single Module covering large number of experiments including experiments with Optical Power Meter. •660 nm & 950 nm Optional Laser Source channel with Transmitter & Receiver. • AM-FM-PWM modulation / demodulation. • PC-PC comm. with RS232 ports & software. •On board Function Generator. Crystal Controlled Clock. • Functional Blocks indicated on-board mimic • Latest ISO 9001 Certified factory product 	<p>Optic Communication Link</p> <ul style="list-style-type: none"> •Setting of Fiber Optic Voice Link using Amplitude frequency & PWM Modulation. • Study of Switched Faults in AM, FM & PWM system. • Full Duplex Computer Communication using RS232 ports and software • Voltage – Current (V-I) Characteristics of LED (E - O converter) - Characteristics of Photo Detector - Measurement of Bit Error Rate - Study of Eye Pattern 					
93.	Clamp Meter	<p>Fluke Meter Tong Tester / Clamp Meter</p> <p>0 – 100 amp.(Min)</p> <p>Shall comply to Safety standard IEC 1010 or IEC 61010</p>	<ul style="list-style-type: none"> • Current-sensing jaw. • Tactile barrier (to protect fingers from shocks). • Hold button: Freezes the display reading. Reading is released when button is pushed a second time. • Dial (aka rotary switch). • Backlight button. • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and frequency modes. • Zero button (yellow): Removes dc offset from dc current measurements. Also serves as dial's shift button to select yellow functions scattered around the dial. • Jaw release lever. <p>Alignment marks: To meet</p>	Test Leads Batteries Soft carrying case		Catalogue/Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			accuracy specifications, a conductor must be aligned with these marks. • Common input jack. • Volts/ohm input jack. • Input for flexible current probe					
94.	Frequency Meter	Frequency Meter AC frequency meter analog with range 45 to 55hz , installation category 300 V CAT III IS : 1248 / IEC 51	<ul style="list-style-type: none"> • Better resolution. • Linear Scale • Glass filled polycarbonate • Knife edge pointer. • Easily replicable glass and bezel. • IP 52 case • Accuracy class 0.5 according to IS: 1248 	Test Leads Batteries Soft carrying case		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
95.	Frequency modulator and Demodulator trainer kit	Frequency modulator and Demodulator trainer kit with following specifications: FM Modulator Type : Reactance Modulator, Varactor Modulator, VCO Based Modulator FM Demodulator type, All 5 demodulation techniques Detailed teaching and learning contents through software. • Frequency modulation should be using Voltage Controlled Oscillator • Demodulation should be through Phase locked Loop circuit.	<ul style="list-style-type: none"> • Built-in Audio Signal Generator • DC Source/ Level Shifter on board. • The trainer unit should have : AC source with variable amplitude and frequency, DC Source / Level shifter • Latest ISO 9001 Certified factory product 	Test Leads Batteries Soft carrying case		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
96.	Function Generator	2 -200 KHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator with DDS Technology • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified factory product	<ul style="list-style-type: none"> • Versatile Waveform Generation for a Wide Range of Testing Application • Choice Selectable Waveforms • Outputs to Drive 50 ohms Terminations • Trigger and Gate Modes with Adjustable Start/Stop 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	2 Years

			Control <ul style="list-style-type: none"> • Double-pulse Mode • Simultaneous Fixed Level TTL, TTL, ECL and ECL outputs • 20 Volts Peak to Peak Output • SYNC Out Facility 				the Institute faculty.	
97.	Function Generator (Sine, Square, Triangle, Ramp, Pulse, Serial Data, TTL and Modulation.)	1 mHz- 10 MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator with DDS Technology	<ul style="list-style-type: none"> • Versatile Waveform Generation for a Wide Range of Testing Application • Wide Range of Frequencies from 1 mHz- 10 MHz • Choice Selectable Waveforms • Outputs to Drive 50 ohms Terminations • Trigger and Gate Modes with Adjustable Start/Stop Control • Double-pulse Mode • Simultaneous Fixed Level TTL, TTL, ECL and ECL outputs • 3 Digit Digital Indication for Frequency • 20 Volts Peak to Peak Output • SYNC Out Facility • Latest ISO 9001 Certified factory product 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
98.	Mixture & Grinder	Mixture & Grinder with Min. 750 W, 240 V.	• ISI Mark product	Standard Accessories		Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	

							faculty.	
99.	Growler	Growler 230 V, 50 Hz, Single Phase, • ISO 9001 of latest version certified Factory product	<ul style="list-style-type: none"> Adjustable jaws, Testing armature with ampere meter and testing probes. External meter type checking capacity, adjustable dia, and for checking the reverse coil, defective winding and complete for commutator ground test switch Built in check meter for checking reverse coils, defective windings etc. Complete with probes for commutator ground test, switch and test leads. 	Power cord		Instructi on manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years
100.	Washing Machine Semi Automatic	Washing Machine Semi Automatic 5 Kg,	•CE/ISI Mark product	Standar d Accesso ries		Catalog ue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years
101.	Washing Machine Automatic	Washing Machine Automatic 5 Kg,	•CE/ISI Mark product	Standar d Accesso ries		Catalog ue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years

102.	Hand blower	Hand blower with following Min. Specifications: • Supply voltage: 230 V AC • Motor Power: 500watts • RPM: Min. 14000 r/min • Air Flow: Min. 3.5l/min	<ul style="list-style-type: none"> • Light and compact designs for ease of handling • Optimized fan structure for better air flow • Lock-on button for one hand control and user safety • Hand grip design suitable for left/right handed users 	Standard Accessories		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
103.	Home theatre system	Home theatre system •5.1 Channel FM Radio •Remote controlled, 100w, USB, HDMI, AUX, With blue ray/ DVD Player. Bluetooth connectivity • 5 Speakers	Stereophonic audio system. CE Mark product	Accessories: Cables, connectors, etc., as required.		English language user manual with Operation and Maintenance instructions to be provided	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
104.	Hydrometer	Hydrometer - Range: 1.100 - 1.300 Specific Gravity at 27°C - Complete with Glass Barrel	Use to check gravity of battery	Case		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
105.	Motor Pump set	Electric Pump of 1 HP with min. desired specifications as Follows: Head :10-40 M Discharge : 3960 - 360 LPM Rating :1.00HP Voltage Range : 170 - 230 V	<ul style="list-style-type: none"> • Aluminium extruded motor body to prevent corrosion • Compact, sleek look and robust construction • High quality and long life mechanical 	Standard Accessories		Instruction manual	To be installed the designated training institute in Himachal Pradesh.	2 Years

		single Phase MATERIAL OF CONSTRUCTION Pump Housing : Cast Iron Impeller : H T Brass/bronze Shaft : Carbon Steel Motor Body : Extruded Aluminium Mechanical Steel : Carbon Ceramic	<ul style="list-style-type: none"> • Fitted with Thermal Overload Protector(TOP) - protector motor from burning • capacitor inside terminal box • Motor with IP 44 protection and class B insulation 				- Training to be provided as required to the Institute faculty.	
106.	Inverter with Battery	Inverter with Battery 12 V Heavy Duty , Battery Input- 12 volt DC, Output- 220 volt AC Technology should have:- Inverters should be IGBT based . It should provide a uniform output of 230V . Power Output: 1.1 KVA at an input voltage of 12 volts. WaveForm: Square Wave	<ul style="list-style-type: none"> • Inverter should have an electronic circuit that contains battery charge sensor, AC mains sensor, Soft start facility, output control etc. • It should be 1.1KVA • Inverter features a sophisticated design that works on IGBT Based PWM Technology. • The output produced is a square waveform that consists of flat increase in positive voltage and drops drastically to zero for a minimum period of time. • It provides maximum operational efficiency to offer the perfect output. • It drops again to flat increase in negative voltage. It goes back to zero and then returns to positive level. The short stoppage time at zero level offers more amount of power to 50 Hz frequency of AC. 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
107.	Kilo Wattmeter	Kilo Wattmeter Analog 0-1.5-3KW, pressure coil rating- 240v/440v,	<ul style="list-style-type: none"> • Knife edge pointer and Anti-parallax mirror scale. • Accuracy class as per 	*Connecting Leads		*Manual *Test Certificate	To be installed the designated training	2 Years

		current rating-5A/10A(min) Analog, portable type Housed in Bakelite case Conforming to IS 1248	IS:1248 • Wooden case with Bakelite Top. • Wide window for easy reading. • Quick response due to unique damping.	*Case		tes	institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
108.	Knife Switch DPDT fitted with fuse terminals	Knife Switch DPDT fitted with fuse of Min. 16 Amps. The arrangement shall be enclosed in the MS box	• Latest ISO 9001 Certified factory product	Standar d Accesso ries		Product Catalog ue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
109.	Laboratory Type Induction Coil	Laboratory Type Induction Coil 1000 Watt Laboratory type induction coil 6 volt to 800-1000 volt	• Latest ISO 9001 Certified factory product	Standar d Accesso ries		Product Catalog ue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
110.	LCD PROJECTOR	LCD PROJECTOR with following specifications: • Lamp Type: 190W P-VIP • Zoom Magnification and Control: 1.0x Fixed • Focus Control: Manual • Brightness: 3000 lumens (2200 Lumens Eco mode) • Contrast Ratio: 2300:1 (with lamp control) • Screen Size: Min. 70" - 120" (151 x 94cm - 258 x 162cm)	• Digital RGB Compatibility: (UXGA / SXGA+ / WXGA+ / FWXGA) / WXGA / SXGA / XGA / SVGA / VGA • Analogue RGB Compatibility: (UXGA / SXGA+ / WXGA+ / FWXGA) / WXGA / SXGA / XGA / SVGA / VGA / MAC • Digital Video Scan Systems: 1080p / 1080i / 720p / 576p / 480p	Standar d Accesso ries		Operati ng Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<ul style="list-style-type: none"> • 4000h lamp life (6000h in Eco Mode) • Power Source: 100V - 240V AC, 50/60Hz • Noise Level: Normal Mode: 36dBA / Eco Mode: 29dBA • Operating Environment: 0°C to +40°C 	<ul style="list-style-type: none"> • Display Modes: Presentation, Standard, sRGB, Movie, User 1 & 2 • Built-in Speaker: 10W RMS, Monaural • HDMI™ port and 2 x VGA ports • RJ-45 network port for remote control and monitoring • CE mark Product 					
111.	LCD TV (21")	<ul style="list-style-type: none"> • Superior quality 21-inch full HD LED Color Television/ PC Monitor. • PAL/ NTSC video formats Std AV/RF Inputs, PC Audio In: 1, PC D-sub: 1, RF Connectivity Input: 1, HDMI-CEC, RF Capable and USB. 	<ul style="list-style-type: none"> • Manual and Remote control operation • Camera and mobile synchronisation/ connectivity with TV. • CE Mark Product 	Cables, connectors, Chrome cast, etc., as required .		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
112.	LCD TV (Trainer kit)	21-inch full HD LCD Color Television should support PAL/ NTSC video formats with Complete block diagram of a LCD TV system, Study board indicating various sections of LCD TV along with the test points and switch faults <ul style="list-style-type: none"> • Display Type :LCD • Screen Size : 21 Inch or above • Connectivity – Input : HDMI/VGA • Supported Image Type : JPEG • Audio Interface : RCA Left & Right • Audio Output Power : 5W X 	<ul style="list-style-type: none"> • Complete block diagram of a LED TV system on-board. • The different circuit sections of LED TV are exposed on a PCB. • Manual & Remote Control operation. • PAL/ NTSC video formats. • Composite Video output and RF output. • Easy measurement of voltages and observation of wave forms on test points. • Interfaceable to computer and antenna / set-top box of commercial 	Cables, connectors, etc., as required .		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years

		2 <ul style="list-style-type: none"> Receiving System : PAL BG/I/DK and NTSC On board Control : Volume, Brightness, Contrast, Color, Channel, Tuning. Channel Coverage : VHF-2-12; UHF21-69 Antenna Impedance : 75 ohms Unbalanced Fault Switches: 5 No. Test Point: 10 No. Operating Power supply: 230V + 15% AC, 50 Hz. 	DTH services providers <ul style="list-style-type: none"> On board ports like VGA/PC Input, AV Out, Ear Phone etc. Latest ISO 9001 Certified factory product 					
113.	LCR meter	Digital LCR meter with following specifications: <ul style="list-style-type: none"> RESISTANCE: 600/6k/60k/600k/6M $\Omega \pm 1.0\%$, 60M $\Omega \pm 1.5\%$ CAPACITANCE: 6nF $\pm 2.0\%$, 60n/600n/6 Ω F $\pm 1.0\%$, 60 Ω /600Ω /6mF $\pm 1.5\%$ INDUCTANCE: 600 Ω H $\pm 2.5\%$; 6m/60m/600mH $\pm 1.5\%$; 6H: <4H $\pm 2.8\%$ >4H $\pm 5.0\%$; 60H: <40H $\pm 3.5\%$ >40H Unspecified POWER: 6 (1.5V) (AAA Type) 	<ul style="list-style-type: none"> Designed to international safety standard IEC1010-1 A tilt stand provides position flexibility for viewing and operating the meter SMT application Auto range and manual range Data hold Max. /min. Value measurement Auto power off / disable auto power off 	*Batteries *Case *Test Leads		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
114.	LCR meter (Digital) Handheld	Digital LCR meter with following specifications: <ul style="list-style-type: none"> RESISTANCE: 600/6k/60k/600k/6M $\Omega \pm 1.0\%$, 60M $\Omega \pm 1.5\%$ CAPACITANCE: 6nF $\pm 2.0\%$, 60n/600n/6 Ω F $\pm 1.0\%$, 60 Ω /600Ω /6mF $\pm 1.5\%$ INDUCTANCE: 600 Ω H $\pm 2.5\%$; 6m/60m/600mH $\pm 1.5\%$; 6H: <4H $\pm 2.8\%$ >4H $\pm 5.0\%$; 60H: <40H $\pm 3.5\%$ >40H Unspecified 	<ul style="list-style-type: none"> Designed to international safety standard IEC1010-1 A tilt stand provides position flexibility for viewing and operating the meter SMT application Auto range and manual range Data hold Max. /min. Value measurement Auto power off / disable 	*Batteries *Case *Test Leads		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		•POWER: 6 (1.5V) (AAA Type)	auto power off					
115.	LED lighting system	LED lighting system with Measurement of Power, Voltage, Current, Power Factor and Light output performance of different lighting products like LED, CFL at variable input voltages 0 to 245V variable AC		LED and CFL bulbs of different sizes.		English language user manual with Operation and Maintenance instructions to be provided	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
116.	LED TV (21")	•Superior quality 21-inch full HD LED Color Television/ PC Monitor.PAL/ NTSC video formats Std AV/RF Inputs, PC Audio In: 1, PC D-sub: 1, RF Connectivity Input: 1, HDMI-CEC, RF Capable and USB.	•Manual and Remote control operation •Camera and mobile synchronisation/ connectivity with TV. • CE Mark Product	Cables, connectors, Chromecast, etc., as required .		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
117.	LED TV (Trainer kit)	LED TV (Trainer kit) with following specifications: • Display Type :Full HD LED • Screen Size : 21 Inch or above • Connectivity – Input : HDMI/VGA • Supported Image Type : JPEG • Audio Interface : RCA Left & Right • Audio Output Power : 5W X	• Complete block diagram of a LED TV system on-board. • The different circuit sections of LED TV are exposed on a PCB. • Manual & Remote Control operation. • PAL/ NTSC video formats. • Composite Video output and RF output.	Cables, connectors, Chromecast, etc., as required .		English language user manual with Operation and Maintenance instructions to be	In house training to be provided to the Instructors of the Institute.	2 Years

		2 <ul style="list-style-type: none"> Receiving System : PAL BG/I/DK and NTSC On board Control : Volume, Brightness, Contrast, Color, Channel, Tuning. Channel Coverage : VHF-2-12; UHF21-69 Antenna Impedance : 75 ohms Unbalanced Fault Switches: 5 No. Test Point: 10 No. Operating Power supply: 230V + 15% AC, 50 Hz. 	<ul style="list-style-type: none"> Easy measurement of voltages and observation of wave forms on test points. Interfaceable to computer and antenna / set-top box of commercial DTH services providers On board ports like VGA/PC Input, AV Out, Ear Phone etc. Latest ISO 9001 Certified factory product 			provided		
118.	Limit Switch	Limit Switch, Liver operated 2A 500v, 2-contacts	Shall comply to IS 13947	Standard Accessories		Product catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
119.	Linear I.C. Trainer	Linear I.C. Trainer with built in regulated power supply 1.2V to 15V PIC socket 16pin and 20 pin with bread board Built-in relay, speaker & other related active/passive components Supply DC : +5V, 1A (fixed) +12V, 500 mA (fixed) -12V, 500 mA (fixed) +12V, 500 mA (variable) -12V, 500 mA (variable) , AC Supply 9V-0V-9V, 500mA Bread Board 172.5 mm x 128.5mm with 1685 tie points , Function Generaor Sine, Square, and Triangular functions	Should have required Power supply, Signal sources and components to be able to carryout the following experiments: <ul style="list-style-type: none"> Study of major operational amplifier characteristics open loop gain, output resistance, differential input resistance, unity gain bandwidth, rated output, full power response, slewing rate, input offset voltage, input bias current, input noise current, CMRR, common mode input 	Cords : Set of 20 assorted coloured multi-stand wires with 2 mm stackable (stackable) termination at		<ul style="list-style-type: none"> List of Experiments with Procedures and Observation sheets Detailed Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		<p>Frequency range:10Hz to 100KHz , Meter to measure Voltage(-DC 10V to +10V) , Current (DC 0 to 400mA) Frequency (DC to 100KHz)with respect to Ground.</p> <ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	<p>resistance etc.</p> <ul style="list-style-type: none"> • Study of operational amplifier amplifications inverting amplifier, non-inverting amplifier, difference amplifier, inverting summing amplifier, voltage follower, differentiators, integrator, log amplifier, limiter, AC - DC converter etc. • Study of the operation of monolithic voltage regulator • Verification of regulator characteristics. • Study of the characteristics and operation of a high speed voltage comparator & study of comparator applications, Schmitt trigger, pulse width modulator, etc. • Study of operation and characteristics of a Timer IC and Applications of timers in systems and circuits • Study of Phase Lock Loop, Measurement of important PLL characteristics: lock range, capture range, VCO sensitivity, VCO linearity etc. 	both ends				
120.	Load Bank (Lamp / heater Type)	Load Bank - (heater Type) 6 KW,3Phase,440 volt, Current: 5A to 50A, Frequency: 50Hz	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	2 Years

							the Institute faculty.	
121.	Logic Probes/Logic Pulsar	Logic Probe with Pulsar having min. specifications as : • Input impedance 120 kilo-ohm • Pulse Width Min. 10µS • Power Supply Range ...5 - 15V DC • Maximum Input Signal Frequency ..50MHz • Operating supply range ... 4V DC Minimum, 18V DC Maximum	<ul style="list-style-type: none"> Probe for troubleshooting digital circuits Shall be Used directly to inject a signal into the logic circuits without removing the IC or breaking the circuits. TTL: Logic "1" (Hi LED) >3.0±0.25V Logic "0" (Lo LED) >0.75±0.25V CMOS : Logic "1" (Hi LED) >60%Vcc±5% Logic "0" (Lo LED) ... >15%Vcc±5% 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
122.	Lux Meter	Lux Meter - • Display -3½ digit ,LCD , • Ranges - 0-70,000 Lux .(3 ranges) , • Accuracy - + (5% rdg. +2 dgts) , • Operating Temperature - 0° to 50 °(32° to 122° F) • Operating Humidity - Less than 80% R.H. • Power Supply - min 9V battery (6F 22) ,	<ul style="list-style-type: none"> *Photo Detector Shall have a Spectral Sensitivity close to CIE photopic Curve. *Low Battery Indication - (- +) , Data Hold , Display in Lux , 	Standard Accessories Case, batteries		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
123.	Magnetic Flux	Magnetic Flux Meter portable type Housed in Bakelite case Technical Specifications : Range : 0-500 tesla Accuracy : ± 0.5% Display : 3 ½ digit 7 seg. (DPM) Detector : Hall probe with an imported hall element Power : 220V, 50 Hz	<ul style="list-style-type: none"> Shall operate on the principle of Hall Effect in Semiconductors. Indicate the direction of the magnetic field. Latest ISO 9001 Certified factory product 	Standard Accessories Case		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	

							faculty.	
124.	Maintenance Free Battery	VRLA Maintenance Free Battery with following Specifications: Voltage: 12 Volt Capacity: 9 AH	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product or Relevant IS complying product 	Standard Accessories		Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
125.	Manual Motor coil Winding Machine	Manual Motor coil Winding Machine with min. six numbers of Straight and Step Arbors, suitable for 1/8 H.P. to 40 H.P. Motor coil. durable and efficient, with capacity of winding both-Single and Three phase Motor's coil of Straight and Step winding.	Digital Counter system with reset/hold. Machine fitted on Movable stand with sitting arrangement	relevant Fitting tools for Machines		Operational Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
126.	MCCB	MCCB of Min. 100 Amps Triple pole 440 V with enclosure.	<ul style="list-style-type: none"> • MCCB shall conform to IEC 60947 and enclosure shall conform to IEC 62208 with IP 30 Protection. • Inbuilt neutral link for TPN system. • Mounting holes on the back plate of enclosure. 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
127.	Megger	Megger - (500 Volt) insulation Tester Nominal test voltages Dust & Water protection: IP54 Protected against dust and splashing water Safety Protection Meets EN	<ul style="list-style-type: none"> *ABS Resin Case with Acrylic Meter Cover *Measurement from 10% to 100% of the Insulation Resistance Range *Terminal Voltage :>85% of Rated Voltage for Insulation 	<ul style="list-style-type: none"> • Pair of Crocodile / Alligator Test Leads (Red & 		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		61010-1 (1995) to 600 V phase to earth, Category IV Designed to Generally Confirm to IS 10656-1983	Resistance	Black) • Carrying Case • AA Batteries (Fitted - In) or Battery adaptor if required [Input : 240V, 50]			be provided as required to the Institute faculty.	
128.	Microcontroller kits (8051) along with programming software (Assembly level Programming)	Microcontroller kits (8051) along with programming software (Assembly level Programming) • With Core 8051, ready to run programmer for AT89C51/52 & 55, programming modes Key Pad and PC circuits. • Detailed learning content through simulation Software. • Full featured development system for 8051 microcontrollers. • It should be an ideal platform to implement and test the designs both for the beginners and carryout Projects. • Should be with Hex keypad and LCD Display for user programming. • On board LCD for both programming mode and run mode. • Latest ISO 9001 Certified factory product/ CE Mark Product	<ul style="list-style-type: none"> • The Trainer kit should support PC based programming for large size program code. • Should be able to do a range of projects in various domains like telecommunication, robotics, consumer electronics, etc., • There should be facility that allows user to make external connections. • Should have an on board breadboard that allows the trainees to make their own circuits and perform any experiment. • Additional Features: - Core 8051 MCU Clocked at 11.0592 MHz. User shall be able to enter op code using on board 20 keys Hex keypad. • For large program user can use on board PC based USB Programmer. 	Standard Accessories		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years

			<ul style="list-style-type: none"> •All pins are marked for easy identifications. •User can write assembly codes in PC software and run on Nvis 5001A. • PC Programmer mode also supports other devices like AT89C51/52/55, AT89S51/52/53 , AT89S8252. •Input / Output & test points provided on board. •Self contained development board with on board DC Power. •On board breadboard for self circuit design 					
129.	Milli Ammeter (AC)	AC Ammeter MI, analog, 0-200mA range with Moving iron spring-mounted jewel bearing suspension	<ul style="list-style-type: none"> • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	Standard Accessories		Catalogue/Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
130.	Milli Ammeter (DC)	Ammeter MC analog- (0 - 500 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension p It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	<ul style="list-style-type: none"> • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
131.	Milli Voltmeter	Milli Voltmeter centre - zero analog, Milli Voltmeter centre zero 100 –	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training	

		0 – 100 m volt Confirming to BS 89, IEC 51 & IS 1248					institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
132.	Miniature Breaker	MCB 16 Amps.	Conforming to IS/IEC 60898-1			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
133.	Generator(DC to AC) set	<p>Specifications for above shall as follows:</p> <p>1 MOTOR :- It should be 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 I.S. 4722-1992. lifting bolt & earthing terminal shall be provided.</p> <p>2. ALTERNATOR :- 3.5 K.V.A., 440/230 Volts, 50 H.Z., 0.8 power factor, 3 phase 4 wires 0.8 P.F. self-static field exciter, self-regulation, insulation class 'H', Horizontal foot mounting. Alternator is provided lifting bolt & earthing terminal.</p> <p>Machine Control Panel & Operating Table:</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied. 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals. - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		<p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-E1</p>				and major components used on the control panel.		
134.	Motor-Generator (AC to DC) along with Control Panel	<p>Specifications for above shall as follows:</p> <p>1. DC Shunt Generator: 5 KW, 440V. Separately Excited with variac, output voltage to vary from 110V to 440 V, 4 Pole. Standard ISI Product. Horizontal foot mounted</p> <p>2. 3 phase 7.5 HP 415V foot mounted Squirrel cage AC Induction Motor:</p> <p>Motor Performance conforms to IS:325 and dimensions conform to IS:1231, Degree of Protection:- Motors are designed for degree of protection IP 55.</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied. 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<p>- User Manual / Operation Manuals.</p> <p>- Test / Experiment list and procedure manual. (if applicable).</p> <p>- Warranty Certificate of</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		<p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-B</p>				<p>Motor and major components used on the control panel.</p> <p>- Service providers contact details.</p>		
135.	Digital Multimeter	<p>Multimeter Digital Specifications :-</p> <p>Voltage between any Terminal and Earth Ground:1000V Min</p> <p>Display: Digital: 4000 count updates 3/sec</p> <p>Operating Altitude: 0 to 2000 meters</p> <p>Specification:</p> <p>DC voltage: 200mV/2V/20V/200V ± 0.5%, 1000V ± 0.8%</p> <p>AC voltage: 2V/20V/200V ± 0.8%, 750V ± 1.2%</p> <p>Resistance:</p> <p>200/2k/20k/200k/2M? ± 0.8%, 20M? ± 1.0%</p> <p>DC current: 200mA ± 1.5%, 10A ± 2.0%</p> <p>AC current: 200mA ± 1.8%, 10A ± 3.0%</p> <p>Capacitance: 20nF/200nF/2 µF/20 µF/200 µF ± 4.0%</p> <p>Temperature: -20 ° C ~ 1000 ° C</p> <p>Inductance:</p> <p>20mH/200mH/2H/20H ± 3.0%</p>	<ul style="list-style-type: none"> • Basic dc accuracy • Digital display to 4,000 words • Automatic and manual range • Display hold function • Diode and continuity test with buzzer • Cover designed for easy hanging • Automatic shutdown • Easily replaceable battery design • 500 hours battery life • Voltage AC, Voltage DC, resistance, capacitance, continuity beeper, diode test, A ac, A dc all in a durable holster • Rugged and durable design – all inputs, ranges and functions are protected up to 1000 V 	<ul style="list-style-type: none"> • Universal hanger clip • Test Leads • Batteries 		User Manual	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	2 Years

		Transistor hFE: 1 ~ 1000 Power supply: (9V) Battery Life: Alkaline: 500 Hours Safety Compliance: IEC 61010-1, 2000 CAT I 1000 V, CAT II 600 V, and CAT III 300 V overvoltage standards						
136.	Ohm Meter; Portable box type	Ohm Meter- Shunt Type - Specification :- Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. Range : 0-2000 ohm . Accuracy : +/- 5 % of the indicating value at center zero	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product • Portable Box type, Self contained , Battery operated, • Should be moving coil type and anti parallax mirror scale and knife edge pointer provided accurate reading. Should have facility of press to read switch avoids battery drain, • An infinity adjustment potentiometer help to provide accurate reading without effect of variation of battery voltage. • Mechanical zero adjuster is provided adjust zero, 	Batterie s if applicab le, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
137.	Ohm Meter; Series Type	Ohm Meter- Series Type - Specification :- Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. Range : 0-2000 ohm . Accuracy : +/- 5 % of the indicating value at center zero	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product • Portable Box type, Self contained , Battery operated, • Should be moving coil type and anti parallax mirror scale and knife edge pointer provided accurate reading. Should have facility of press to read switch avoids battery drain, • An infinity adjustment potentiometer help to provide accurate reading without effect of variation of 	Batterie s if applicab le, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

			battery voltage. • Mechanical zero adjuster is provided adjust zero,					
138.	Ohm Meter; Shunt Type	Ohm Meter- Shunt Type - Specification :- Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. Range : 0-2000 ohm . Accuracy : +/- 5 % of the indicating value at center zero	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product • Portable Box type, Self contained , Battery operated, • Should be moving coil type and anti parallax mirror scale and knife edge pointer provided accurate reading. Should have facility of press to read switch avoids battery drain, • An infinity adjustment potentiometer help to provide accurate reading without effect of variation of battery voltage. • Mechanical zero adjuster is provided adjust zero, 	Batteries if applicable, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
139.	Oil Testing Kit	The technical characteristics of our High Voltage Oil Test Sets are as follows: <ul style="list-style-type: none"> • NMC : Oil Test set is ideal for speedy and accurate testing of DI-i-electric strength of transformer and circuit breaker oil under test room condition in accordance with IS:6792-1972 for oil testing • Input : 230 Volts, Single Phase, 50 Hz, AC. • Output : Continuously variable from 0 to 60 Kv • Capacity: Min. 600 VA • Nature of cooling: The transformer will be epoxy resin cast type air-cooled type • The instrument should have step-less/continuous voltage 	<ul style="list-style-type: none"> • Automatic tripping mechanism for protection of H.T Transformer • One zero start inter locking device • Three pilot lamps to indicate mains 'ON' , H.T. circuit 'ON' & H.T. circuit 'OFF' • One memory effect volt meter show the break down voltage even after the high voltage circuit stripped off • Mode of operation: sets are available either in manual or in motor; operated mode. Besides, motorized auto-transformer regulator can be operated in manual through switch 	It should be supplied with carrying case with Oil and oil Vessel and other accessories.		The instruction manual and calibration certificate having traceability to NABL accredited lab should be supplied along with the	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		<p>incrementing ability from 0 to 100kV. User should be able to use as a breakdown test set or as withstand test set.</p> <ul style="list-style-type: none"> • The instrument should have a 60-0-60 kV Vacuum Epoxy molded transformer for low-PD levels. • The instrument should have a large graphic backlit LCD display with membrane keypad or touch-screen display for user interface. • Test vessel: The test vessel (Oil Cell)fitted with two brass spheres on sides of test vessel made from non-absorbent insulating material • Cover: Sets shall be provided with transfer and high impact acrylic sheet cover for covering the H.T. side with suitable inter-locking device 	<ul style="list-style-type: none"> • The centre-point of the secondary winding should be Earthed via measuring circuit to detect the current level flowing through the HV side. • Continuously variable Auto-Transformer for smooth variation of output voltage • Safety Standards to Meeting IEC 61010 • Latest ISO 9001 Certified factory product 			instrum ent)		
140.	Op Amp Trainer	<p>Op Amp Trainer with following specifications:</p> <p>Function Generators :</p> <p>Sine Wave : 10Hz - 100 KHz (10VPP)</p> <p>Square Wave : 10Hz - 100 KHz (10 VPP)</p> <p>Triangle Wave : 10Hz - 100 KHz (8 VPP)</p> <p>On board test Power : 0-5V (variable)</p> <p>Supplies</p> <p>Test Points : 28 (Gold plated)</p> <p>Power Supply : 230 V \pm10%, 50/60 Hz</p> <p>Power Consumption : 4 VA approximately</p> <p>Operating Conditions : 0-40 C, 85% RH</p>	<ul style="list-style-type: none"> • Self contained easy to operate platform • On board Function Generator • On board test variable power supply • Functional blocks indicated on board mimic • Built in power supply • Min. Scope of Learning: Study and observe Op-Amp as Voltage Comparator, Op-Amp as Zero Crossing Detector, Op-Amp as a Phase Shift Oscillator and its phase shift at every RC combination, Op-Amp as a Function generator, generating Square and Triangle wave, Op-Amp as a 	Patch Cords and Main power cords		List of experim ents, that are possible in the Trainer must be specifie d, along with Observa tion sheets. English languag e user manual with Operatio	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			Half Wave Precision Rectifier, Op-Amp as active second order High Pass Filter, Op-Amp as a Wien Bridge Oscillator and its gain factor for a smooth sine wave • Latest ISO 9001 certified factory product.			n and Maintenance instructions to be provided.		
141.	20 MHz Dual Trace Oscilloscope	Oscilloscope Dual Trace 20 MHz • DC - 20MHz Bandwidth • 1mV/div Sensitivity on Both Channels • X-Y Operation • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD/TFT or better Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220V \pm 10%, 50Hz	• Latest ISO 9001 Certified factory product or CE mark product • CH1, CH2 (Independent Channels), CH1 & CH2 (Alternate / CHOP), CH2 INVT, ADD and SUBTRACT • Dual channels / dual traces, X-Y mode • High brightness oscilloscope tube • TV synchronous separation circuit to observe stable TV signal. • Triggering mode : AUTO / NORM / AV-V / AV-H • Vertical : ALT / CHOP / ADD • Polarity reversal; CH1 Sync output	Main Power cord		Instructional manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
142.	Over Current Relay	Over current relay of 16A, 440V Technical Specifications: • Relay Type : Thermal Over Load Relay • Terminals : 4mm Terminals for Trip, Current Output and Input • Meters (Digital) : 1No. AC Current Meter 0 – 20Amps & 1 No. Digital Timer .0001sec. to 9999sec. (Auto) • Current Injector : Inbuilt variable current injector 20Amps to create Phantom Fault Current	Objective: • To study the operating characteristics of relay • To study the time – current characteristics of the given fuse • Indicators : Provided on front panel for Mains, Current, Trip and Alarm • Switches : Provided on front panel for Mains, Timer Reset, Test Switch (ON/OFF)	Standard Accessories: • Power Cords, Patch Cords, Instruction Manual.		Instruction Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<ul style="list-style-type: none"> • Relay Circuit Diagram : Screen Printed on front panel • Power Requirement : 440V AC +10%, 50Hz 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 					
143.	PAM, PPM,PWM trainer kit	<p>PAM, PPM,PWM trainer kit with following specifications:</p> <p>Modulation & Demodulation Techniques : PAM,PWM, PPM , Line Coding Techniques</p> <p>Internal Signal Generator : Direct Digital Synthesizer</p> <p>Types of Signal : Sine, Square, Triangle, Arbitrary signals.</p> <p>Frequency : 500Hz, 1KHz, 2KHz, 3KHz</p> <p>Types of Signal : Sine, Square, Triangle, Arbitrary signals</p> <p>Frequency : 500Hz to 3.5KHz</p> <p>• SMD LED Indicators for:DDS signal selection, DDS signal frequency selection, Sampling selection,Technique Selection</p> <p>Interconnect path</p> <p>Crystal Frequency : 20MHz</p> <p>Selection Mode : Push switches</p> <p>Data Frequency : 500Hz, 1KHz, 2KHz, 3KHz</p> <p>Power Supply : 220-240V AC, 50Hz</p>	<ul style="list-style-type: none"> • Modulator and Demodulator on same board • Different type of sampling, Natural, Flat top, sampled and hold • On-board DDS Signal Generator for standard and arbitrary signals • Selectable sampling frequencies for PAM • Selectable Ramp frequencies for PWM and PPM • On board 2nd order Butterworth low pass filter • SMD LED Indicators • Can be issued just like a book for hands-on learnings • Latest ISO 9001 certified factory product. 	Standard accessories.		English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
144.	PCI slot Testing tool	<ul style="list-style-type: none"> • PCI-E slot tester shall be able to diagnose the open circuit or short circuit of motherboard PCI-E slot quickly. It shall find the error easily without knowing the resistance value. • Inbuilt Power Supply: 12V DC power supply • Standard PCI ISA interface • 4-Digit error code display 	<ul style="list-style-type: none"> • Support for 80H, 84H 300H port and compatible with all mainstream motherboards • PCI bus compatible, • Power On Self Test (POST) status codes display, 	Standard accessories should be provided.		Operational Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

145.	Phase Sequence Indicator	Phase Sequence Indicator 3 Phase, 415 V , Working Voltage: 100 - 500 Volt Freq. : 25-60 Hz Shall comply to Safety standard IEC 1010 or IEC 61010 or EN 61010	<ul style="list-style-type: none"> • Indicates Phase Presence • Indicates Phase Rotation • Indicates Motor Rotation / wiring • Indicates Battery Status 	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
146.	Insulators	PIN INSULATORS:- 11/22KV Brown Glazed pin insulators confirming to IS-731 to give rigid support to an overhead line and intended to be mounted vertically on supporting structure by GI Pin passing up inside this insulator with minimum failing loads 10 KN. Shackle type Insulator Standards to which insulators will conform IS: 1445/1977 Latest amendment. Dry Power freq. Withstand voltage (KV) : 12 KV Wet Power freq. Withstand voltage (KV) : 06 KV Minimum failing Load (KN): 7.7 KN Egg type Insulator 11 KV Egg Type Insulator conforming to relevant IS standard. Suspension type insulators 11KV Brown Glazed 'Disc' insulators conforming to IS-731/71 for suspension or tension strings, ball and socket type having ball shank dia.16mm and minimum failing load of 70 KN		all the insulators shall include hardware fittings for conductor or fixing.		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		along with phosphor bronze 'W' clips.						
147.	Portable electric drill Machine	Portable hand Drill (Electric) with min. 2 to 20mm Capacity Input Voltage: 1 Phase 230 V AC For drilling into masonry, concrete, wood and metal.	*Dual-mode selector – converts operation from rotation-only to hammer drilling *Variable-speed trigger with reversing – allows for accurate bit starting as well as removing fasteners or bound bits *Ball-and-roller bearing construction – provides smooth power transmission and extended tool life Auxiliary handle with adjustable depth stop can be rotated 360° *Soft grip for a secure hold • CE mark product / Latest ISO 9001 Certified factory product	*Set of drill bits of different sizes (12 pieces) each for concrete, Steel, and wood. *Depth Gauge *Chuck Key *Carrying Case		Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 years
148.	Post error debugging card	Post error debugging card				Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
149.	Potential Transformer	Potential Transformer Test Set with 415 V, 50Hz, PT Ratio, 440V/110V, Burden: 10VA Complete with control panel	Floor mounting Type PT Test Set provides the following:- 1. Separate terminals to connect standard P.T. and P.T. under test 2. Ratio error and phase angle error calibrated dials 3. Range selecting Switch 4. Polarity check indicator	Standard accessories		Operational Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	

			5. Voltmeter to indicate percentage voltage injected 6. Null detector with sensitivity control 7. Terminal to connect burden box 8. Power supply to energise electronic null detector 9. high permeability magnetic core 10. secondary voltage selector switch for 110 V and 63.5V				the Institute faculty.	
150.	Power electronics Trainer kit	The instrument comprises of the following:- • AC Power Supply on Board: 18V-0V-18V, 0V-15V • DC Power Supply on board: +5 V, -5 V 500 mA, +12V, -12 V 500 mA, +15 V, 250 mA, +35V, -35V, 250 mA • Triggering Circuit on Board : 5 gate signal output. PWM control of G1, G2, G3 and G4 Duty cycle control of "Gate" Signal is 0 to 100% • Single Phase Rectifier: Firing angle control 0°-180° variables • Firing Circuit on Board: Four gate signal output with isolation. • SCR Assembly: 4 SCRs 2P4M, 600V, 2A • Power Devices: IGBT-G4BC20S, MOSFET-IRF Z44N, SCR TYN 616, UJT-2N2646, DIAC-DB3, TRIAC-BT136, PUT-2N6027	1) Study of Characteristics of SCR, MOSFET, IGBT & POWER TRANSISTOR. 2) Triggering of SCR, MOSFET, IGBT & POWER TRANSISTOR. 3) UJT trigger circuit for half wave & full wave converter. 4) STEP UP & STEP DOWN Chopper Circuits. 5) Series resonant inverter. 6) Single phase bridge inverter. • Latest ISO 9001 Certified Factory Product	Standard Accessories Connecting Leads, Power Cord		Operating Manual/ user Manual, General Maintenance manual System Warranty Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years comprehensive onsite warranty
151.	POWER ELECTRONICS TRAINER	The instrument comprises of the following:- • AC Power Supply on Board: 18V-0V-18V, 0V-15V • DC Power Supply on board: +5	1) Study of Characteristics of SCR, MOSFET, IGBT & POWER TRANSISTOR. 2) Triggering of SCR, MOSFET, IGBT & POWER	All standard accessories for		English language user manual with	To be installed the designated training institute in Himachal	2 Years

		<p>V, -5 V 500 mA, +12V, -12 V 500 mA, +15 V, 250 mA, +35V, -35V, 250 mA</p> <ul style="list-style-type: none"> • Triggering Circuit on Board : 5 gate signal output. PWM control of G1, G2, G3 and G4 Duty cycle control of "Gate" Signal is 0 to 100% • Single Phase Rectifier: Firing angle control 0°-180° variables • Firing Circuit on Board: Four gate signal output with isolation. • SCR Assembly: 4 SCRs 2P4M, 600V, 2A • Power Devices: IGBT-G4BC20S, MOSFET-IRF Z44N, SCR TYN 616, UJT-2N2646, DIAC-DB3, TRIAC-BT136, PUT-2N6027 	<p>TRANSISTOR.</p> <p>3) UJT trigger circuit for half wave & full wave converter.</p> <p>4) STEP UP & STEP DOWN Chopper Circuits.</p> <p>5) Series resonant inverter.</p> <p>6) Single phase bridge inverter.</p> <ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	conducting experiments.		Operation and Maintenance instructions to be provided	Pradesh. - Training to be provided as required to the Institute faculty.	
152.	Power Factor Meter	<p>415 V, 20 A, Three Phase portable type Power Factor Meter</p> <ul style="list-style-type: none"> • Accuracy Class Class1.0 • Frequency 50Hz ± 5 % • System Voltage 415V AC • Mounting flush <p>Display parameters: E.B Energy (6.3 format),Line voltages (Vr, Vy, and Vb with respect to Neutral),Line currents (Ir, Iy, and Ib),Line Frequency,Average power factor lag or lead,Active power- R ph, Y ph, B ph & summation,EB On hour</p>	<ul style="list-style-type: none"> • True RMS measurements • Accuracy class 1.0 • L.E.D Indications:• Presence of phases (R, Y, B)• Reverse polarity • 2 –Line, 16 Char back lit LCD display • Confirms to IS-13779/ IEC-62052-11& IEC-62053-21 • RS 485 PORT – Mod bus protocol • Compact and ideal for industrial environment 	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
153.	Power Meter	<p>Digital Wattmeter which calculate and displays power of single phase 230 V, Min. 1 KW Measurement, 50 Hz on a seven segment display.</p> <p>600 V CAT IV/1000V CAT III as per International Safety standard</p>	<ul style="list-style-type: none"> • Range change function. • Data Hold Function freezes the reading. • Continuity check. • Diode measurement. • Low battery indication • Auto Power Off (APO) function. • Active 	Standard accessories		Operating Manual/ user Manual,	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		IEC61010-1- 2010	Reactive and Apparent Power• Horse Power Measurement				be provided as required to the Institute faculty.	
154.	Primary current injection set	<ul style="list-style-type: none"> • Output current: 0-200A • Accuracy: $\pm 1.5\%$ of Reading ± 2 digits • Resolution: 1A • Mains supply: 230Vac,50Hz ± 10 • Operation: manual • Display: LED • Indication: Bright LED for Test ON and Power ON operation • Protected by MCB, HRC fuse, Zero start interlock 	<ul style="list-style-type: none"> • Zero start interlock for safety • Continuously variable output current • High VA burden to test high impedance object • Digital timer for measuring tripping time • Auto cutoff upon tripping relay • Wheel mounted for easy transportation • Standard Output cables • CE Mark product / Latest ISO 9001 Certified factory product 	Test Lead set: pair of cotton braided copper cables with lugs at both end Mains Cord Spare Fuse Instruction manual Calibration certificate Warranty certificate	pair of cotton copper cables with C - clamp at one end	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
155.	Pulse Generator	20 Hz - 20MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator <ul style="list-style-type: none"> • Wide Frequency Range: 20 Hz - 20MHz • Pulse duration 20 ns to 20 s or better <ul style="list-style-type: none"> • Fast rise/fall time of >10ns or better • LCD Readout for frequency & 	<ul style="list-style-type: none"> • Versatile Waveform Generation for a Wide Range of Testing Application • Choice Selectable Waveforms • Outputs to Drive 50 ohms Terminations • Trigger and Gate Modes with Adjustable Start/Stop Control • Double-pulse Mode 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		mode • Output Impedance: 50 Ohms or better • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified Factory Product	• Simultaneous Fixed Level TTL, TTL, ECL and ECL outputs • 20 Volts Peak to Peak Output • SYNC Out Facility					
156.	Pulse Generator	20 Hz - 20MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator • Wide Frequency Range: 20 Hz - 20MHz • Pulse duration 20 ns to 20 s • Fast rise/fall time of >10ns • LCD Readout for frequency & mode • Output Impedance: 50 Ohms • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified Factory Product	• Versatile Waveform Generation for a Wide Range of Testing Application • Choice Selectable Waveforms • Outputs to Drive 50 ohms Terminations • Trigger and Gate Modes with Adjustable Start/Stop Control • Double-pulse Mode • Simultaneous Fixed Level TTL, TTL, ECL and ECL outputs • 20 Volts Peak to Peak Output • SYNC Out Facility	• Standard Accessories		• Operating Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
157.	Reverse current Relay	Reverse current relay of 16A, 440V The Experimental Setup consists of the following parts: • 2nos. of Reverse Power Relay provided on the Front Panel. • 2 Nos. of Digital Current meter (0-20A) provided on the Front Panel. • 2 Nos. of •Digital Timer provided on the Front Panel. • Power Requirement: 440V/50Hz .	• To study the construction and operation of relay • Relay Circuit Diagram : Screen Printed on front panel • Latest ISO 9001 Certified factory product • Circuit Diagram printed on front panel With Instruments Connecting lamp i.e TRIP, CURRENT & ALARM.	Standard Accessories: • Power Cords, Patch Cords,		Instruction Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
158.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 - 25 Ohm, 2 Amp Standard ISI Product	• Latest ISO 9001 Certified factory product	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh.	

							- Training to be provided as required to the Institute faculty.	
159.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 - 300 Ohm, 2 Amp	• Latest ISO 9001 Certified factory product			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
160.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -1 Ohm, 10Amp	• Latest ISO 9001 Certified factory product			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
161.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -10 Ohm, 5 Amp	• Latest ISO 9001 Certified factory product			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
162.	Rheostat variable values	0-1 ohm, 5 A 0-10 ohm, 5 A 0-25 ohm, 1 A 0-300 ohm, 1 A	• Latest ISO 9001 Certified Factory Product	Connecting cables		Product Catalogue	To be installed the designated training institute in	2 Years

							Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
163.	Room temperature thermometer	Spirit-filled glass thermometer mounted on a rust-proof aluminium plate with dual scale - 20° to 230°F x 1°F and -30 to 110 C x 1°C division.	• Latest ISO 9001 Certified Factory Product / CE mark product	Standard accessories should be provided.		manual/catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years comprehensive on site warranty
164.	Rotary Switch	Rotary Switch of 16 A/440v	Shall comply to IS 13947			Product catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
165.	Rubber mat	Rubber Mat of Min 2' x 4' x 1" dimensional conforming to IS 15652				Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
166.	SC Couplers	Fiber optic cable adaptor coupler SC-SC Duplex single mode.	SC to SC, Duplex Multimode Fiber Optic Cables,	Standard		Product catalogue	To be installed the designated	2 Years

				Accessories		e	training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
167.	Sensor Trainer Kit	Sensor Trainer Kit Containing following Sensors of suitable ratings:- 1. Thermocouple 2. RTD 3. Load Cell/ Strain Gauge 4. LVDT 5. Smoke Detector Sensors 6. Speed Sensor 7. Limit Switch 8. Photo sensors 9. Optocoupler 10. Proximity Sensor On Board DC Regulated Power Supplies	<ul style="list-style-type: none"> Onboard 6" Touch Screen Display Graphical touch LCD with inbuilt processor for viewing the output waveforms, In built DAQ, and standard processing circuits like Inverting , Non – Inverting , Power, Current , Instrumentation Differential Amplifier, F/V,V/F,V/I,I/V Converter, Sensors : RTD, NTC Thermistor,LM35 Thermocouple, Gas(Smoke) Sensor, Load cell, LVDT Sensor, Speed Sensor Latest ISO 9001 certified factory product On-Board Screw Gauge provided for LVDT On-board DPM meter Enclosed in ABS plastic cabinet; with cover Latest ISO 9001 certified factory product. 	Standard accessories.		Product catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
168.	Seven segment DPM trainer	Seven segment DPM trainer •Input – AC or DC selectable. •Multiple Input ranges in single DPM 200mV., 2 Volt and 20 Volt. •Option to connect binary input through Switches. • Colour – RED / GREEN /AMBER.	• Latest ISO 9001 certified factory product.			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		•Size – 1"LED seven segment digits, Digits: 4 ½ .					be provided as required to the Institute faculty.	
169.	Shaded Pole Motor	Fractional HP,with Min. 25 Watt Shaded pole motor 240 V, 50 Hz				Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
170.	Signal Generator with Digital Display for Frequency Amplitude	10Hz - 100kHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator • Pulse duration 20 ns to 20 s • Fast rise/fall time of 3ns • LCD Readout for frequency & mode •Output Impedance: 50 /600 Ohms	<ul style="list-style-type: none"> • Versatile Waveform Generation for a Wide Range of Testing Application • Wide Range of Frequencies from 2Hz to 200kHz • Choice Selectable Waveforms • Outputs to Drive 50 ohms Terminations • Trigger and Gate Modes with Adjustable Start/Stop Control • Double-pulse Mode • Simultaneous Fixed Level TTL, TTL, ECL and ECL outputs • 3 Digit Digital Indication for Frequency • 20 Volts Peak to Peak Output • SYNC Out Facility • Latest ISO 9001 certified factory product. 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Operating Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
171.	Single Phase 220 V Capacitor type AC Meter	Single Phase Capacitor Motor of 1 HP 240 VOLT WITH STARTER/SWITCH	• The components fitted on the Panel should be labelled with the name of the	• One spare set of	Spares: • One spare	- User Manual /	To be installed the designated training	2 year Warranty for Generator,

	squirrel cage Induction moter	<p>1. MOTOR : A.C. Single Phase Capacitor Start Induction Motor 1 HP 230volts AC, 50 Hz, horizontal foot mounted. Educational type Bakelite banana type terminals 30 Amps provided on terminal box. Starting winding, running winding with capacitor terminals brought out on terminal box Control Panel</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J</p>	<p>component.</p> <ul style="list-style-type: none"> • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	suitable current capacity patch cords for interconnections required on the panel board.	<p>set of patch cords.</p> <ul style="list-style-type: none"> • One set of spare fuses. 	<p>Operation Manuals .</p> <ul style="list-style-type: none"> - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	Motor and each component mounted on the Panel.
172.	Single phase Transformer, core type, air cooled	<p>SINGLE PHASE TRANSFORMER, CORE TYPE, AIR COOLED TRANSFORMER SINGLE PHASE 1 KVA A Laboratory Type Model For Conducting Various Experiments.</p> <p>TECHNICAL SPECIFICATION : -Transformer Single Phase air</p>	<p>All Machines should be made of Copper windings. Circuit diagram shall be painted/printed on panel</p>			Manual	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as 	

		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. Bakelite sheet and the terminals of primary & secondary will be brought out with Educational type Bakelite banana type terminals 30 Amps and proper marking.					required to the Institute faculty.	
173.	Single Phase Variable Auto Transfer	Single Phase Variable Auto Transformer 0 - 270 V, 10Amp (Air cooled) Specification:- Type :Single Phase Auto Transformer Amperage 10 Amp input voltage0-270 V with safety fuses and line indicators Standard ISI product	ISO 9001 of latest version certified Factory product	Standard Accessories		<ul style="list-style-type: none"> Calibration certificate User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
174.	SMD Soldering & De soldering Station with necessary accessories	SMD soldering/desoldering station with following specifications: Pump Type: Diaphragm pump Air flow rate: 22L/min(Min) Temperature: 200° C - 500° C (hot air) <ul style="list-style-type: none"> Latest ISO 9001 Certified Factory Product CE Mark Product 	<ul style="list-style-type: none"> Temperature and air flow can be adjusted to suit the task you are doing Blows away heat automatically after you switch of the power, so that it extends the life of the heater and handle No touch PCB point soldering method, to prevent the SMD component from shifting or blowing away Microprocessor based power control unit with built-in vacuum pump Hot air gun for non-contact soldering and desoldering of SMDs with 	Nozzles with standard accessories		<ul style="list-style-type: none"> Operating manual, 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			single hole nozzle <ul style="list-style-type: none"> • Side attachment for hot air gun and stand for soldering iron • Optical isolation with zero volt switching • Closed loop temperature control • Self-contained air pump • Hot air gun for safe and non-contact SMD component removal or replacement 					
175.	SMD soldering/desoldering station	SMD soldering/desoldering station with following specifications: Pump Type: Diaphragm pump Air flow rate: 22L/min(Min) Temperature: 200° C - 500° C (hot air) <ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product/ CE Mark Product • Temperature and air flow can be adjusted to suit the task you are doing 	<ul style="list-style-type: none"> • Blows away heat automatically after you switch of the power, so that it extends the life of the heater and handle • No touch PCB point soldering method, to prevent the SMD component from shifting or blowing away • Microprocessor based power control unit with built-in vacuum pump • Hot air gun for non-contact soldering and desoldering of SMDs with single hole nozzle • Side attachment for hot air gun and stand for soldering iron • Optical isolation with zero volt switching • Closed loop temperature control • Self contained air pump • Hot air gun for safe and non-contact SMD component removal or 	Nozzles with standard accessories		<ul style="list-style-type: none"> • Operating manual, 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			replacement					
176.	SMPS of different make	SMPS •Input power: 200-300V AC. •Output Voltage: 12V. •Power Rating: 450 Watt.	<ul style="list-style-type: none"> •Over Voltage, Output Short Circuit protection. •Low Noise and Ripple output. •Suitable for LEDStrip, CCTV, Radio, Spy camera, etc. •Low Power consumption and high efficiency 			Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
177.	SMPS of PC	Input power: 200-300V AC. Output power: 12V. Power Rating: 450 Watt.	Over Voltage, Output Short Circuit protection. Low Noise and Ripple output. Suitable for LED Strip, CCTV, Radio, Spy camera, etc. Low Power consumption and high efficiency CE Mark product	standard accessories		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
178.	SMPS Trainer	SMPS Trainer with following specifications: • Isolation Transformer: Input of Transformer: 230V AC, 50/60 Hz, Output of Transformer: 230V AC, 50/60 Hz • AC Mains: 230V AC, 50/60Hz or through variac 80VAC to 230VAC • DC Outputs: +12V DC regulated -12V DC regulated +5V DC regulated • Input of Switching Transformer: 320V Switching DC at 132 KHz • Fuse :500mA Onboard test points to observe different voltages.	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product Experiments performed: <ul style="list-style-type: none"> • To study of primary rectifier and filter section of SMPS • To study of Switching Transformer and its working • To study the working of opto coupler in SMPS • To study the regulator working in SMPS • To study the Line regulation of SMPS using Variac To introduce the switch faults in different sections of SMPS and its effect	Power Cords and standard accessories as required		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

179.	Solar panel with Battery	Solar panel with Battery 12 volts solar panel charging at 12 volt battery with a traditional 12 volt Pulse Width Modulation (PWM) charge controller It should be a 12 volt solar panel with a 12 volt charge controller, 12 volt battery bank and a 12 volt inverter Battery Bank Specification - 18 Watt battery, 12 volt rechargeable 8 Amp Nos. of cells - 36 Open circuit Voltage - 22 volt Maximum Power Volt - 18 Volt				Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
180.	Solar Training Kit/ Simulator	Solar Training Kit complete in all aspects to study fundamentals of PV System at Laboratory with following equipments: Solar Module of suitable size MPPT Charge Controller PV Module Input Voltage : 24–50V Max Current : 25A Battery voltage : 24V Technology : MPPT/PWM Display type : LCD or better Charging Stage : Bulk, Absorptions and Float Battery: Solar Tubular, Capacity : Min. 100Ah Meters: DC Voltmeter : Suitable rating DC Ammeter : Suitable rating AC Multi Function Meter : suitable rating for Voltage, Current, Watt, Frequency measurement Structure for Solar Panel Material : MS Tracking Type : Manual, Dual Axis Seasonal and day wise	<ul style="list-style-type: none"> • Complete training system to study the fundamentals of photovoltaic system • The system has two modes for study: Characteristics and Application Modes • On board voltmeter and ammeter are provided to, measure the voltage and current respectively, during, various modes of operation • Charging the batteries using solar energy, Weather proof solar cells, Portable and light weight • BS-10 terminals for making the connection, Single/ Dual axis tracking system Charge Controller : PWM based MPPT, Charging Stage : Bulk, Absorptions and Float . *Kit Shall include Solar PV panels, Inverters, Batteries with complete system. • Latest ISO 9001 certified factory product 	List of Accessories Patch Cards : 20Amp. & 10 Amp. Mains Card : 2 Nos. Wires : 2.5 Square mm havells : Red – 30 meters : Black – 30 meters Gravity Hydrometer : 1 No. BNC to		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		Assembly : Detachable and easy to install Safety and Protection MCB (DC) : suitable rating MCB (AC) : suitable rating AC output load protection & Grid Charging Fuse : suitable rating Banana Terminals : suitable rating (shock proof connections)		BNC cable : 1 No. Glass Fuse 10Amp. : 10 Nos. Optional Accessories Sun Path Finder : 1 No. Rheostat 100W/8 Amp : 1 No				
181.	Soldering & De soldering Station	Temperature controlled soldering/ desoldering station with min. specifications as: • Input Voltage : 180-240VAC,50Hz Fuse : Suitable rating • DEsolder pump :Suitable rating • Vacuum Pressure :Suitable rating • Min. Temp Range : 180 to 480°C • Temperature control accuracy +/- 1°C • Tip Leakage Current : < 2 mA • Temperature control Stability +/- 1°C • Tip to Ground Resistance : < 2 Ohms • Tip to Ground Leakage Voltage : < 2 mV	• Latest ISO 9001 Certified Factory Product • Microprocessor based power control unit with built in vacuum pump. • Temperature Control for accurate and precise temperature • Digital Display for clear visibility with 7 segment display • Auto tune systems control • Closed loop temperature control • Soft On/Off Power switch • Modular and compact design • Quality nozzles for long life	• Stand with cleaning sponge & Cellulose tip cleaning sponge • Power cord & Tool box: Fiber filters ,solder collector glass tube , Tip replace Spanner		• Operating manual,	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

				<ul style="list-style-type: none"> • Cleaning spring, Silicon washers. 				
182.	Soldering iron	Soldering iron 25 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	Features: <ul style="list-style-type: none"> • Moulded, soft-grip handle design for reduced slippage. • Round shaped handle for easy rotation. • Stainless steel heater technology • Cord Strain relief for extended life. 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • Screw driver or Allen key for replacing soldering Iron Tip • Tip Cleaning Knife 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • One spare Tip cleaning sponge. 	Instruction manual for complete panel along with test details to be performed.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
183.	Soldering iron 25 W. 240 V.	Soldering iron 25 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	Features: <ul style="list-style-type: none"> • Moulded, soft-grip handle design for reduced slippage. • Round shaped handle for easy rotation. • Stainless steel heater technology • Cord Strain relief for extended life. 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • Screw driver or Allen key for replacing soldering Iron 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • One spare Tip cleaning sponge. 	Instruction manual for complete panel along with test details to be performed.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

				Tip • Tip Cleanin g Knife Note: above access ories of suitabl e rating/ size shall be provide d with each Type of solderi ng iron.				
184.	Soldering Iron Changeable bits 15 W	Soldering iron with changeable bits 15 Watt 240 V • Type: Non-temperature controlled • Wattage: 15W • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning.	Features: • Moulded, soft-grip handle design for reduced slippage. • Round shaped handle for easy rotation. • Stainless steel heater technology • Cord Strain relief for extended life.	• One set of Solderin g Iron tips of different shapes. • Screw driver or Allen key for replacin g solderin g Iron Tip • Tip Cleanin g Knife Note: above	• One set of Solderin g Iron tips of different shapes. • One spare Tip cleaning sponge.	Instructi on manual for complet e panel along with test details to be perform ed.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

				accessories of suitable rating/size shall be provided with each Type of soldering iron.				
185.	Soldering iron, 20/25watts	Soldering iron 25 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 25W Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	Features: <ul style="list-style-type: none"> • Moulded, soft-grip handle design for reduced slippage. • Round shaped handle for easy rotation. • Stainless steel heater technology • Cord Strain relief for extended life. 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • Screw driver or Allen key for replacing soldering Iron Tip • Tip Cleaning Knife Note: above accessories of suitable rating/size	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • One spare Tip cleaning sponge. 	Instruction manual for complete panel along with test details to be performed.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

				shall be provided with each Type of soldering iron.				
186.	Solenoid with core	Educational Solenoid and Electromagnet with Iron Core	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product 			Instruction Sheet	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
187.	Stepper Motor with Digital Controller	4 wire bipolar Stepper Motor with stepper drive along with Digital controller: Stepper Motor: Configuration: 4 wire bipolar Step Angle : 1.8 deg Stepper Drive: Suitable for Stepper motor Digital Controller: Micro Controller based Stepper controller for above stepper drive and motor that allows to control the speed and direction of the motor along with display system. Front Panel programmable SET values, which generates necessary control output through Relays for any Process Application	<ul style="list-style-type: none"> • Speed control up to 200RPM • 12VDC input supply voltage • L293 based on board drive IC for stepper motor • Seven segments indication for speed and operation messages • Smooth slow ramp to desired speed 			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
188.	Synchronous motor along with	SYNCHRONOUS MOTOR 3 PHASE, 3 HP, 440V, 50HZ, 4	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled 	<ul style="list-style-type: none"> • Patch cords 	Spares: <ul style="list-style-type: none"> • One 	- User Manual	To be installed the designated	2 year Warranty for

	control panel.	<p>POLE, WITH ACCESSORIES and starting/ prime mover arrangement , excitation arrangements.</p> <p>1. MOTOR : SYNCHRONOUS MOTOR 3 PHASE, 3 HP, 440V, 50HZ, 4 POLE, WITH ACCESSORIES and starting/ prime mover arrangement , excitation arrangements.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-I</p>	<p>with the name of the component.</p> <ul style="list-style-type: none"> • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>for connecting Machine to panel</p> <ul style="list-style-type: none"> • Any other special tool required for assembling/deassembling the Setup supplied . 	<p>spare set of patch cords.</p> <ul style="list-style-type: none"> • One set of spare fuses. 	<p>/ Operation Manuals .</p> <ul style="list-style-type: none"> - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	<p>Generator, Motor and each component mounted on the Panel.</p>
189.	Analog Tachometer	<p>Tachometer - Analog type</p> <p>Analog Type - 10000 RPM</p>	<ul style="list-style-type: none"> • Hand held type • Latest ISO 9001 Certified factory product 	Standard Accessories Case		<p>*Manual</p> <p>*Test Certificates</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to 	2 Years

							be provided as required to the Institute faculty.	
190.	Digital Tachometer	Tachometer Digital Digital Photo Sensor Type - 10000 RPM (Tachometer - 5 Digit bright LED display of 10 mm height with memories of last ,highest and lowest readings , 60 to 10000 RPM for rotational speeds, Auto - ranging ,Resolution 0.1 RPM from 60 to 1000 RPM ,1 RPM from 1000 to 50000 RPM. 6 to 1000 MPM (meters per minute) for surface speeds with resolution of 0.1 RPM ,Choice of battery operation with 4 pen cells of 1.5 volts ,or mains voltage 230 + 10 % volts AC ,50/60 Hertz with the help of battery adaptor supplied , Auto power off facility.	<ul style="list-style-type: none"> • Portable Type with sensor • Display 5 Digital LCD Display • The Last Value/ Max Value/ Min Value will be Automatically Stored in Memory. • Surface Speed Sensor for Speed Measurement • Low Battery Indication. • Testing Parameters : RPM, m/min, ft/min 	Power Cords if applicable, Batteries If Applicable		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
191.	Temperature controlled Soldering Iron	<ul style="list-style-type: none"> • Type: Temperature controlled • Wattage: 50W at 230 Volts • Temperature: 750° F / 400° C • Cord length: 5 feet • Iron tip: MT1, conical, 0.125" • Peg hook for hanging the Soldering Iron, • Firm Stand for placing the soldering iron during use with built in Sponge for Tip Cleaning. 	Features: <ul style="list-style-type: none"> • Moulded, soft-grip handle design for reduced slippage. • Round shaped handle for easy rotation. • Stainless steel heater technology for heat up to 750o F • Cord Strain relief for extended life. • Latest ISO 9001 Certified factory product 	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • Screw driver or Allen key for replacing soldering Iron Tip • Tip 	<ul style="list-style-type: none"> • One spare Tip cleaning sponge. 	Instructional Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	<ul style="list-style-type: none"> • 2 years

				Cleaning Knife				
192.	Temperature controlled soldering/ desoldering station	<p>Temperature controlled soldering/ desoldering station with min. specifications as:</p> <ul style="list-style-type: none"> • Input Voltage : 180-240VAC,50Hz Fuse : Suitable rating • DEsolder pump :Suitable rating • Vacuum Pressure :Suitable rating • Min. Temp Range : 180 to 480°C • Temperature control accuracy +/- 1°C • Tip Leakage Current : < 2 mA • Temperature control Stability +/- 1°C • Tip to Ground Resistance : < 2 Ohms • Tip to Ground Leakage Voltage : < 2 mV 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product • Microprocessor based power control unit with built in vacuum pump. • Temperature Control for accurate and precise temperature • Digital Display for clear visibility with 7 segment display • Auto tune systems control • Closed loop temperature control • Soft On/Off Power switch • Modular and compact design • Quality nozzles for long life 	<ul style="list-style-type: none"> • Stand with cleaning sponge & Cellulose tip cleaning sponge • Power cord & Tool box: Fiber filters ,solder collector glass tube , Tip replace Spanner , • Cleaning spring, Silicon washers . 		<ul style="list-style-type: none"> • Operating manual, 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
193.	Thermometer Digital	<p>0° C - 150° C Industrial-grade digital thermometer with stainless steel probe for use with all hot and cold fluids and solids, including aquariums and hydroponics, ovens, refrigerators and freezers, ventilation systems, and heating systems</p> <p>Dual-reading display has -58 to +482 degree F/ -50 to +250</p>	<p>Includes wallet-style case</p> <ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	Probes		Instruction Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	2 Years

		degree C temperature range and 0.1 degree resolution 2-1/2" stainless steel probe with 20" cable Includes wallet-style case					faculty.	
194.	Three Phase 50 Hz, 5 HP AC squirrel cage induction motor with star delta starter	<p>A.C. SQUIRREL CAGE INDUCTION MOTOR 5 HP WITH Automatic STAR DELTA STARTER with Mechanical Load -</p> <p>AC MOTOR :- It should be A.C. 3 Phase 5 HP 415 volts, 50 Hz, Squirrel cage Induction Motor horizontal foot mounted. Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-F</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/deassembling the Setup supplied 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

195.	Three phase transformer, shell type oil cooled with Delta/ Star	THREE PHASE TRANSFORMER, SHELL TYPE OIL COOLED Working Model For Conducting Various Experiments. TECHNICAL SPECIFICATIONS:- 1) Capacity 3 phase, 3 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 Bakelite insulated banana terminals 30 Amp. With color code provided on the top of the transformer and on 6mm Bakelite sheet 9) The tank will be provided oil filling Hole with cap, oil level indicator, drain plug and earthing terminal, Conservator, Bucholz relay with alarm and tripping arrangement, Explosion vent, Breather , Bushings for Primary and secondary etc. 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 liters required) 13) Input and output terminals brought to the control panel with voltmeters, Wattmeter, Power factor meter, Frequency meter,	All Machines should be made of Copper windings. Circuit diagram shall be painted/printed on panel			Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
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		ammeters, MCBs etc. for measuring and protection.						
196.	Thyristor /IGBT controlled D.C. motor drive with tachogenerator feedback arrangement	<p>THYRISTOR /IGBT CONTROLLED D.C. MOTOR DRIVE WITH TACHO-GENERATOR FEEDBACK ARRANGEMENT.</p> <p>Motor : DC Motor rating 1 HP, 220 V. 4 Amp, 2 Pole.</p> <p>Drive Rating: 1 Hp, 4 Amp</p> <p>Tacho-Generator</p> <p>Output Voltage : 1 volt A.C. / 100 RPM (20V)</p> <p>Linearity : within +/- 0.5%</p> <p>Output Current : 20 mA Max.</p> <p>Internal Resistance : 45 ohm.</p> <p>Shaft : 8mm dia 30mm length</p> <p>Techo generator flexible coupled to D.C. Motor having Digital RPM meter suitable for operation upto 3000 RPM</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component</p>	<p>Main input voltage to operate at 230 V AC+/-1% 50 Hz. Fuse shall intact in the fuse carrier and shall be rated correctly. Easy variation of speed control through speed controller showing Digital Display Variation of armature voltage and corresponding RPM of motor on Digital RPM meter. Reverse and Forward Direction switch. Field Failure protection. Current Limiter</p> <p>DC Drive features</p> <p>1) Relay output (2 Nos.) for status of drive (fault & ON)</p> <p>2) speed reference 0-10V for speed control</p> <p>3) Under/over voltage, short circuit protection.</p> <p>• The components fitted on the Panel should be labelled with the name of the component.</p> <p>• All accessories should be connected with internal wiring ferrules etc.</p> <p>• Anti vibration mounts should also be provided.</p> <p>• Suitable sized insulation rubber mat for the operator for safe working.</p> <p>• All machines shall be copper wound</p> <p>• All Meters shall Be digital Type.</p> <p>• Diagrammatic</p>	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied . 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses. 	<p>Manuals / catalogues of standard products used in the Panel.</p> <p>- Experiment List cum Instructor Manual in soft and Hard Copy</p> <p>- Safety Test Reports</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		as given ELECTRICAL PANEL BOARD given in Appendix-L1	representation for the ease of connections and student can easily understand the concept of machine.					
197.	Thyristor/IGBT controlled A.C. motor drive with VVVF control 3 Phase, 2 HP	<p>Objective: Thyristor/IGBT Controlled AC Motor With VVVF Control has been designed to start & control of AC motor.</p> <p>AC Induction Motor 3 Phase 3HP with Sensor Arrangement (Induction Motor): Capacity :2HP Cage :Steel Body Terminal :6</p> <p>IGBT : Suitable Thyristor/IGBT AC Drive, Mounted on Control panel</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-M</p>	<p>Power requirement: 415~440V AC , 50Hz, 3 Phase.</p> <ul style="list-style-type: none"> The components fitted on the Panel should be labelled with the name of the component. All accessories should be connected with internal wiring ferrules etc. Anti vibration mounts should also be provided. Suitable sized insulation rubber mat for the operator for safe working. All machines shall be copper wound All Meters shall Be digital Type. Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> One spare set of suitable current capacity patch cords for interconnections required on the panel board. One set of spare fuses. 	<p>Spares:</p> <ul style="list-style-type: none"> One spare set of suitable current capacity patch cords for interconnections required on the panel board. One set of spare fuses. 	<p>Manuals / catalogues of standard products used in the Panel.</p> <ul style="list-style-type: none"> Experiment List cum Instructor Manual in soft and Hard Copy Safety Test Reports 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> Training to be provided as required to the Institute faculty. 	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>
198.	Tong Tester	<p>Digital Type Tong Tester / Clamp Meter 0 – 100 Amp.</p> <ul style="list-style-type: none"> Dial (aka rotary switch). 	<ul style="list-style-type: none"> Current-sensing jaw. Tactile barrier (to protect fingers from shocks). Hold button: Freezes the 	Test Leads Batteries		Product Catalogue	To be installed the designated training institute in	3 Years

		<ul style="list-style-type: none"> • Backlight button. • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and frequency modes. Shall comply to Safety standard IEC 1010 or IEC 61010 	display reading. Reading is released when button is pushed a second time. <ul style="list-style-type: none"> • Zero button (yellow): Removes dc offset from dc current measurements. Also serves as dial's shift button to select yellow functions scattered around the dial. • Jaw release lever. • Alignment marks: To meet accuracy specifications, a conductor must be aligned with these marks. • Common input jack. • Volts/ohm input jack. • Input for flexible current probe 	Soft carrying case			Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
199.	Transformer 0-12 V, 6-0-6 V, 1 Amp	Transformer 0-12 V, 6-0-6 V, 1 Amp	ISO 9001 Certified Factory Product/ CE mark Product			Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
200.	Under Voltage Relay	Under voltage Relay 360V-440V Technical Specifications: ·Relay Type : Over / Under Voltage Relay (Static Type) ·Terminals : 4mm Terminals for Trip, Voltage Output and Input ·Meters (Digital) : 1No. AC Voltmeter Meter 0 – 220V & 1 No. Digital Timer ..0001sec. to 9999sec. (Auto) ·Voltage Injector : Inbuilt variable voltage injector 220V to create Fault Voltage	Objective: ·To study the construction of relay ·Test an relay in over / under voltage protection scheme for operating characteristic using voltage injection ·To obtain the time & current characteristics of a over / under voltage type relay (Static) ·Switches : Provided on front panel for Mains, Timer	Standard Accessories: ·Power Cords, Patch Cords, Instruction Manual.		Instruction Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<ul style="list-style-type: none"> Indicators : Provided on front panel for Mains, Voltage, Trip and Alarm Power Requirement : 440VAC +10%, 50Hz 	Reset, Test Switch (ON/OFF) Relay Circuit Diagram : Screen Printed on front panel • Latest ISO 9001 Certified factory product					
201.	Universal Motor along with control panel.	<p>MOTOR UNIVERSAL 230 VOLT, 50CYCLES 1 HP WITH STARTER/SWITCH UNIVERSAL MOTOR : Universal Motor Single Phase, Capacity :1 HP, 230 volts A.C. / D.C. 1500 RPM (O.L.) 50 Hz, TEFC, class 'B' insulation, horizontal foot mounted.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-H</p>	<ul style="list-style-type: none"> The components fitted on the Panel should be labelled with the name of the component. All accessories should be connected with internal wiring ferrules etc. Anti vibration mounts should also be provided. Suitable sized insulation rubber mat for the operator for safe working. All machines shall be copper wound All Meters shall highly accurate Micro-controller based Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> Patch cords for connecting Machine to panel Any other special tool required for assembling/disassembling the Setup supplied . 	Spares: <ul style="list-style-type: none"> One spare set of patch cords. One set of spare fuses. 	<ul style="list-style-type: none"> User Manual / Operation Manuals . Test / Experiment list and procedure manual. (if applicable). Warranty Certificate of Motor and major components used on the control panel. Service providers 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

						contact details.		
202.	UPS trainer	<p>UPS trainer with PWM switching technology, Test points to measures the voltages of different sections Overall functioning of UPS Trainer, AVR transformer, UPS with load condition</p> <ul style="list-style-type: none"> •The trainer kit should be a versatile training system to explain frequently used switching based power supply in UPS. •With Provision of Various test point to easily measure the voltages of different sections. •With Provision of safety standards. <p>Input Voltage : 190 to 260V AC 10%, 50Hz (Single Phase) Output Voltage : 230V AC, 10%</p> <p>Transformer Input : 12-0-12V AC Outputs : 0, 190, 220, 240, 260V AC 18 - 0V AC for battery charging</p> <p>Battery Rating : 12V DC / 7.5 AH Type : SMF Rechargeable Battery Technology : MOSFET-PWM Output Power Capacity : 500VA</p> <ul style="list-style-type: none"> • Latest ISO 9001 certified factory product 	<ul style="list-style-type: none"> •Learning the PWM switching technology, which is one of the most important feature of UPS. •Able to demonstrate all basic concept of UPS. •Should be able to study and practice the following minimum; • Study of PWM Technology • To understand the overall functioning of UPS Trainer • Study of AVR transformer section of UPS. • To study the UPS circuit in load condition. •To identify different faults and to study the systematic procedure of their troubleshooting in UPS circuit. 			English language user manual with Operation and Maintenance instructions to be provided	In house training to be provided to the Instructors of the Institute.	2 Years
203.	Vacuum Cleaner	<p>Portable Vacuum Cleaner with Min. Desired specifications as :</p> <ul style="list-style-type: none"> • Power Supply: Single Phase 220 V, AC 50 Hz • Vacuum Pressure: 22kpa -34 kpa 	<p>Min. Desired Features:</p> <ul style="list-style-type: none"> • Flexible Hose • One-step click-off nozzle for easy emptying • Cyclonic airflow with filtration system 	<ul style="list-style-type: none"> • Crevice tool • Integrated 		Manual	To be installed the designated training institute in Himachal Pradesh.	2 Years

		<ul style="list-style-type: none"> Noise (dB): $\leq 82\text{dB (A)}$ Power Cord Length: 5m (min) Airflow: $> 1.8\text{m}^3/\text{min}$ or $> 30\text{ L/s}$ Power: 1200 W(min.) Dry type filtration system with mi. capacity of 1.5 L Action Radius: 8 Meter (min.) 	<ul style="list-style-type: none"> Soft touch handle Adjustable suction Rubber type wheel CE/ISI Mark Product 	<ul style="list-style-type: none"> brush Turbo brush MultiClean nozzle 			- Training to be provided as required to the Institute faculty.	
204.	Vacuum cleaner -Hand Held	Hand Held Vacuum Cleaner with Min. Desired specifications as : <ul style="list-style-type: none"> Power Supply: Single Phase 220 V, AC 50 Hz Vacuum Pressure: 15kpa -22 kpa Noise (dB): $\leq 86\text{dB}$ Power Cord Length: 5m (min) Power: 850 W(min.) Dry type filtration system with mi. capacity of 0.4 L 	Min. Desired Features: <ul style="list-style-type: none"> Flexible Hose One-step click-off nozzle for easy emptying Cyclonic airflow with filtration system Soft touch handle Adjustable suction 	<ul style="list-style-type: none"> Cord clip Flexible hose Shoulder strap Brush tool and flexible hose 		Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
205.	Variable resistance /potentiometer	Variable resistance boxes/varioc of Following Ohm Values each: 220 Ω , 150 Ω , 1k Ω , 33 Ω , 100 Ω , 1.2 Ω	<ul style="list-style-type: none"> Latest ISO 9001 Certified Factory Product 				To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
206.	Various Lamps	<ol style="list-style-type: none"> Halogen Incandescent Lamp: 100 Watts with fixture and all accessories. The applicable standard for lamp shall be as IEC 432 Fluorescent tube: Min 40 Watt with fixture fitted with choke(copper), starter and holder. HP mercury vapour Lamp : Min. 150 Watt with fixture and all accessories 				Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		4. High-pressure sodium Lamp : Min. 150 Watt with fixture and all accessories 5. Low-pressure sodium Lamp LED: Min. 150 Watt with fixture and all accessories						
207.	Voltage Stabilizer	Voltage Stabilizer with following specifications: • Type: Automatic Voltage Stabiliser, Single Phase • Type of Control: PWM Controlled AC to AC • Rating: 600 VA • Input : 150 – 260 volts Ac, 1-phase, 2 wire, 45 - 55Hz • Output : Stabilised 240 volt AC, 10 A 50 Hz • Output Regulation: Nominal +- 1% under 0 to 100% Load	<ul style="list-style-type: none"> • Efficiency: Better than 96% under 20-100% Load Conditions • Protection: Over-load Protection and Output Short circuit Protection. • Safety Standard: IP20 			Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
208.	Voltmeter (0-1V), (0-10V), (0-30V) (table model)	Table model Analog Voltmeter with range 0-1V : • Range: Voltage (V): 0 – 1 V Table model Analog Voltmeter with range 0-10V : • Range: Voltage (V): 0 – 10V Table model Analog Voltmeter with range 0-30V : • Range: Voltage (V): 0 – 130V	<ul style="list-style-type: none"> • Movement Type: Moving Iron type • Standards: IS-1248 • Accuracy: $\pm 1.5\%$ of Full Scale 			catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
209.	Wheat Stone Bridge	Wheat Stone Bridge with galvanometer and battery • Earth terminal to be provided for the connection of earth point • Range : 0.001 ohms to 11.11 Mohms • Multiplying factors of 0.001, 0.01, 1, 10, 100 and 1000 in the ratio arms for bridge and Varley circuit to be provided • For Murrey loop test,	<ul style="list-style-type: none"> • It should have facility for cable fault location by adopting Murray or Varley Loop Circuit Tests • It should be self contain with a dry battery and a galvanometer • It should be equipped with switches for the control of sensitivity • It should have facility to 	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		multiplying factor of 10, 100 and 1000 to be provided • 4 Decades in steps of thousands (1000), Hundreds (100), Tens (10) and units (1) of ohms to be provided to be used as a series resistance Box ISO 9001 of latest version certified Factory product	connect external battery or external galvanometer • It should be contained in a hard wooden box having carrying handle • It should have two Toggle switches for the selection of resistance, Varley and Murray modes of operation • It should use managing Coils having accuracy of $\pm 10.05\%$ or ± 1 milliohm to be used					
210.	Analog Component Trainer	Analog Component Trainer with following specifications: • Bread Board : Unique solder-less large size, spring loaded breadboard consisting of two Terminal Strips • Regulated DC Power Supply of suitable rating • AC Supply of suitable rating • Function Generator : Sine / Square / Triangular waveforms frequency. Variable in between steps. Sine / Square / Triangular waveform • Modulation Generator : Sine / Square / Triangular wave forms frequency. Variable in between (100 KHz) steps. Sine / Square / Triangular waveform • Digital Meter (3½Digit) : Dual range DC voltmeter / Ammeter • Continuity Tester : For testing the continuity. Provided with Beeper Sound • Potentiometers : 3 Potentiometers (1K, 100K and 100K) with terminals • On Board Switches : 2 Switches Single pole double	• Latest ISO 9001 Certified Factory Product • Completely self - contained Multi Experiment Unit covering various Characteristics & Applications • Housed in an elegant cabinet with a well spread intelligently designed multi-coloured functional block wise front panel • Shall perform Study of : Diodes in DC circuits, Light Emitting Diodes in DC Circuits, Half wave rectifier, Full wave rectifier, Zener Diode as a voltage regulator, transistor series voltage regulator, transistor shunt voltage regulator, Low pass filter, High pass filter., band pass filter, CE configuration of NPN transistor, CB configuration of NPN transistor, CE amplifier, Monostable multivibrator using transistor, Bistable	• Mains cord, • Red & Black patch cords (2mm with Pin) 10 each, • Red & Black patch cord (Pin to Pin) 10 each & Component Set		• Operating and Experimental manual,	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		through • Power : 230 V \pm 10%, 50 Hz	multivibrator using transistor, Astable multivibrator using transistor, CB Amplifier (PNP), CC Amplifier (PNP), Transistor Audio Amplifier, Two Stage R.C. Coupled Transistor, Inverting Amplifier, Non-inverting Amplifier, Integrating Amplifier for A.C input Signal, Differentiator Amplifier, Square Wave Generator					
211.	Hammering drilling machine	<ul style="list-style-type: none"> • Portable Hammering Drill (Electric) with min. 2 to 20mm Capacity • Input Voltage: 1 Phase 230 V AC • Suitable for drilling into masonry, concrete, wood and metal. • Auxiliary handle with adjustable depth stop can be rotated 360° • CE Mark product 	<ul style="list-style-type: none"> *Dual-mode selector – converts operation from rotation-only to hammer drilling *Variable-speed trigger with reversing – allows for accurate bit starting as well as removing fasteners or bound bits *Ball-and-roller bearing construction – provides smooth power transmission and extended tool life *Soft grip for a secure hold 	<ul style="list-style-type: none"> *Set of drill bits of different sizes (12 pieces) each for concrete, Steel, and wood. *Depth Gauge *Chuck Key *Carrying Case 		Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
212.	UPS 5 KV Online with 30 Minutes back up for 20 PC	UPS Type: Online double conversion Wave form: Pure sinewave Operating Voltage range: 150 V - 240V AC, Frequency: 50 Hz \pm 3 Hz Protection: Against Over Load / Short Circuit Indication (LED) : Low i/p voltage, UPS ON, UPS OFF,	Automatic change over from mains to UPS and vice versa.	Standard Accessories	Standard Spares	Operating Manual/ user Manual, General Maintenance manual System	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	2 Years Minimum

		Nominal Battery voltage : Up to 96 V . Battery Backup: 01 Hr (Minimum) for 20 Computers Recharge time: approximately 08 Hr's				Warrant y Card Local Service Provider details	faculty.	
213.	UPS 3 KVA with backup time minimum 30 minutes	UPS Type: Online double conversion Wave form: Pure sinewave Operating Voltage range: 150 V - 240V AC, Frequency: 50 Hz +/- 3 Hz Protection: Against Over Load / Short Circuit Indication (LED) : Low i/p voltage, UPS ON, UPS OFF, Nominal Battery voltage : Up to 48 V . Battery Backup: 01 Hr (Minimum) for 10 Computers Recharge time: approximately 08 Hr's	Automatic change over from mains to UPS and vice versa.	Standar d Accesso ries	Standar d Spares	Operati ng Manual/ user Manual, General Mainten ance manual System Warrant y Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years Minimum
214.	UPS - 650VA	UPS- 650 VA (Off Line) Wave form: Pure sinewave Operating Voltage range: 150 V - 240V AC, Frequency: 50 Hz +/- 3 Hz Battery Backup: 01 Hr (Minimum)	Automatic change over from mains to UPS and vice versa.	Standar d Accesso ries	Standar d Spares	Operati ng Manual/ user Manual, General Mainten ance manual System Warrant y Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years Minimum
215.	UPS Trainer kit	AC Input : 190 to 260 V 10%, 50 Hz Load Output : 230 V / 2.5A Transformer Used	Standard Features	Standar d Accesso ries	Standar d Spares	Operati ng Manual/ user	To be installed the designated training institute in	2 Years Minimum

		<ul style="list-style-type: none"> - Input : 12 - 0 - 12 V - Outputs : 0, 190, 220, 240, 260 V - Battery charging: 0-18 V -12V DC Battery -Test points are provided to analyze signals at various points. - 5 no's of Fault Switches Provided - All ICS are mounted on IC Sockets. - Bare board Tested Glass Epoxy SMOBC PCB with Block Diagram. 				Manual, General Maintenance manual System Warranty Card Local Service Provider details	Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
216.	LED/LCD Projector	<ul style="list-style-type: none"> o Display Type: LCD o Input: Video input, Audio input, HDMI input, Computer Input, Mic input o Output: Audio output, Monitor Output, USB Output. o Resolution: 1280 X 800 o Contrast Ratio: 10000:1 o Light Output: 3000 Lumens or above o Life of Lamp: 5000 Hours (Full Usage) o Power Supply: AC 100-120/AC 220-240 V 50 Hz o Connectivity: Ethernet enable, Wireless enable, USB Compatible 	Standard Features	<ul style="list-style-type: none"> • Remote control with 2 AA batteries, • Power Cord, • Adaptor Cover, • Lens Cover, • Computer Cable, • (USB Wireless Adaptor Optional) 	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years Minimum
217.	Screen for Projector (Matte Material) ant glare	<p>Motor: Tubular (with smooth and quieter operation)</p> <p>Control: Inline switches and wireless remote</p> <p>Material: White Anti Glare (matte material)</p>	Relay: Power synchronised relay to create a synchronised control with projector i.e. when the projector is turned on the screen will automatically	Standard Accessories	Standard Spares	Operating Manual/user Manual, General	To be installed the designated training institute in Himachal Pradesh.	2 Years Minimum

		Size: - 6x4 Ft. Viewing angle: 145 degree or higher Double layer Fabric Wall Mountable / Stand mountable Mounting stand Autolock (motorized)	lower and the Projector is off the screen will automatically retract			Maintenance manual System Warranty Card Local Service Provider details	- Training to be provided as required to the Institute faculty.	
218.	SMPS Tester	PC Power Supply Tester 20/24 Pin PSU ATX SATA HDD SMPS LED Display	Material: PVC/Metal Testing device for all PC SMPS	Standard accessories should be provided.	Standard spares, as suggested by the manufacturer	Operating Manual/ user Manual, General maintenance manual System Warranty Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years Minimum
219.	Digital SLR Camera with Video recording capability	Technology: SLR Sensor: Full-frame CMOS Megapixels: 24.3MP minimum Autofocus: 51-point AF, 15 cross-type Screen type: 3 inch minimum, tilting capability Connectivity: Wi-Fi Power: Rechargeable Li-ion batteries Video Recording: Yes, minimum 1080p	Full HD Movie 1080/60p/60i/24p and Clean Output via HDMI Three-way Tilt and Swivel LCD Screen Professional Rugged, Weather-Resistant Body Instant Sharing via Smartphone with Build-in Wi-Fi and NFC	Memory Card : 64 GB, Speed Class 4 Filters: Polariser UV Protection Filter Lenses: 28-300mm,	Standard spares, as suggested by the manufacturer	Operating Manual/ user Manual, General maintenance manual System Warranty Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years Minimum

				f/3.5-5.6G VR Prime 50mm, f/1.4G Wireless Remote Camera Pouch, Lens holder pouch Battery: Lithium ion battery with charger				
220.	SMPS Trainer kit	Input: 80 to 230 VAC $\pm 10\%$, 50 / 60 Hz Outputs: +12 V DC regulated : -12 V DC regulated : +5 V DC regulated Switching Transformer Input: 320 V DC switching at 132 KHz Output: 30 VAC (approx) Fuse: 500 mA (Slow blow, spare fuse is given with mains socket)	Standard Features	Connecting Leads, Power Cord	Standard spares, as suggested by the manufacturer	Operating Manual/ user Manual, General maintenance manual System Warranty Card Local Service Provider details	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years Minimum
221.	Electric PPR pipe welding machine	Electric PPR pipe welding machine with following specifications : • Welding Size 20, 25, 32, 40,50, 63 mm • Ambient humidity-20-80 degree Cen., • Voltage range: Ac-180-240	<ul style="list-style-type: none"> • Latest ISO Certified factory product • Copper head, • Welding Temperature regulator, • Two heating switches. 	Pipe cutter, measuring tape, Allen key, Holding stand,	As applicable	Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as	2 Years

		Voltage, 50Hz, • The heating head temperature- 240 degree centigrade or higher. • Wattage - 600-1000 W.		Carrying case.			required to the Institute faculty.	
222.	Digital Still SLR Camera	<ul style="list-style-type: none"> • Camera Technology: SLR • Sensor: Full-frame CMOS or better • Megapixels: 24MP minimum • Autofocus: 51-point AF, 15 cross-type or better • Screen type: 3 inch minimum • Connectivity: Wi-Fi • Power: Rechargeable Li-ion batteries • Video Recording: Yes, minimum 1080p 	<ul style="list-style-type: none"> • Professional Rugged, Weather-Resistant Body • Instant Sharing via Smartphone with Build-in Wi-Fi and NFC 	Memory Card : 64 GB, Speed Class 4 Filters: Polariser UV Protection Filter Camera Pouch, Lens holder pouch Battery: Lithium ion battery with charger	As applicable	Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
223.	Hot wire Ammeter	Hot Wire Ammeter of following specification: Current Range: 0-15 Amps	Standard features	Standard Accessories	As applicable	Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
224.	Voltmeter M.C.	Voltmeter MC- (0 - 300V) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of	<ul style="list-style-type: none"> • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , 	case and connection cords	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh.	2 Years

		range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,				- Training to be provided as required to the Institute faculty.	
225.	Voltmeter M.C/ Multi range	Voltmeter M.C. Type, Voltage range 0.70,150,300 & 600 volts Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
226.	Voltmeter M.C. Multi range	Voltmeter M.C. Type, Voltage range 0-15,30,50 & 70 volts Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
227.	Voltmeter centre zero	Voltmeter with centre zero Voltage range 15-0-15 volts Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
228.	Voltmeter M.I. multi- range	A.C. Voltmeter Multi range M.I. type A.C. Voltmeter M.I. 0-150,300,600 volts	portable box type housed in Bakelite case	Batteries, Case	As applicable	User Manual	To be installed the designated training institute in	2 Years

		Confirming to BS 89, IEC 51 & IS 1248					Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
229.	Voltmeter M.I multi-range	A.C. Voltmeter Multi range M.I. type A.C. Voltmeter M.I. : 0-50,75,150 volts Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
230.	Ammeter M.I	Ammeter M.I, panel board •0-30 Amp • IP Protection (Front): IP65	Panel Mounted Accuracy: $\pm 0.5\%$	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
231.	Ammeter M.I	Ammeter M.I, panel board •0-5 Amp • IP Protection (Front): IP65	Panel Mounted Accuracy: $\pm 0.5\%$	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
232.	Ammeter M.I	Ammeter M.I, panel board •0-10 Amp	Panel Mounted Accuracy: $\pm 0.5\%$	Standard	As applicable	Manual	To be installed the designated	2 Years

		<ul style="list-style-type: none"> IP Protection (Front): IP65 		Accessories	le		training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
233.	Ammeter M.C. Centre zero	Ammeter with centre zero Current range 5-0-5 Amps Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
234.	Ammeter MC	Ammeter MC - (0 - 1A) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension It should have banana terminals with permanent marking of range and terminals , it should have knife edged pointer and anti parallax mirror, it should be moving coil type	<ul style="list-style-type: none"> This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) , portable box type housed in Bakelite case Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords	As applicable	User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
235.	Field regular	Field Regulator of 0-1000 Ohms and 2 Amps	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

236.	Single phase K.W.H meter digital	Single phase K.W.H meter digital 5 A, 250 V AC • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	<ul style="list-style-type: none"> • 6 digits including one decimal digit display • LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Accuracy Class 1.0 	case and connection cords	As applicable	*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
237.	Single phase K.W.H meter analog	Single phase K.W.H meter Analog 5 A, 250 V AC • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	Standard features	case and connection cords	As applicable	*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
238.	Watt meter Dynamo meter type	Wattmeter which calculate and displays power of single phase 250 V, 5 Amps 1.25 KW Measurement 600 V CAT IV/1000V CAT III as per International Safety standard IEC61010-1- 2010	<ul style="list-style-type: none"> • Range change function. • Data Hold Function freezes the reading. • Continuity check. • Diode measurement. • Low battery indication • Auto Power Off (APO) function. • Active Reactive and Apparent Power • Horse Power Measurement 	*Batteries *Case	As applicable	*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
239.	Clamp on ammeter	Clamp on ammeter 0 – 25amp., 0-200 amps • Dial (aka rotary switch). • Backlight button. • Min Max button: On first push, display shows maximum input. On subsequent pushes, minimum and average inputs are shown. Works in current, voltage and	<ul style="list-style-type: none"> • Current-sensing jaw. • Tactile barrier (to protect fingers from shocks). • Hold button: Freezes the display reading. Reading is released when button is pushed a second time. • Zero button (yellow): Removes dc offset from dc 	Test Leads Batteries Soft carrying case			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	

		frequency modes. Shall comply to Safety standard IEC 1010 or IEC 61010	current measurements. Also serves as dial's shift button to select yellow functions scattered around the dial. • Jaw release lever. • Alignment marks: To meet accuracy specifications, a conductor must be aligned with these marks. • Common input jack. • Volts/ohm input jack. • Input for flexible current probe				the Institute faculty.	
240.	Three phase K.W.H meter analog	Three Phase KWH Analog Meter, 25 A , 415 V induction portable type AC Energy Meter Housed in Bakelite case	<ul style="list-style-type: none"> • 6 digits including one decimal digit display • LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case • Accuracy Class 1.0 	case and connection cords		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
241.	Three phase K.W.H meter digital	Three phase K.W.H meter digital Three Phase, 25 A , 415 V AC Energy Meter Housed in Bakelite case	<ul style="list-style-type: none"> • 6 digits including one decimal digit display • LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case • Accuracy Class 1.0 	case and connection cords			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
242.	D.C. compound motor	DC Compound Motor of 3 HP 250 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 4 point D.C. starter of suitable capacity having no volt	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any 	Spares: <ul style="list-style-type: none"> • One spare set of patch cords. • One set of 	<ul style="list-style-type: none"> - User Manual / Operation Manuals - Test / 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as	

		<p>& over load protective devices with field regulations</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D</p>	<p>should also be provided.</p> <ul style="list-style-type: none"> • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>other special tool required for assembling/disassembling the Setup supplied .</p>	<p>spare fuses. .</p>	<p>Experiment list and procedure manual. (if applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>required to the Institute faculty.</p>	
243.	D.C. shunt motor	<p>DC Shunt Motor of 3 HP 250 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 3 point D.C. starter of suitable capacity having no volt & over load protective devices with field regulation</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. 	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. . 	<ul style="list-style-type: none"> - User Manual / Operation Manuals . - Test / Experiment list and procedure 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	

		<p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D 	<p>copper wound</p> <ul style="list-style-type: none"> • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>assembling/disassembling the Setup supplied.</p>		<p>manual. (if applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 		
244.	D.C. series motor with 2 point starter	<p>DC series Motor of 3 HP 250 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 2 point D.C. starter of suitable capacity having no volt & over load protective devices with field regulator</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals. - Test / Experiment list and procedure manual. (if applicable). - 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	

		Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-C	representation for the ease of connections and student can easily understand the concept of machine.	supplied .		Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details.		
245.	DC Power supply	DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-250volts, 25 Amps • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits 	<ul style="list-style-type: none"> • Indications: LED indications • Controls: On/Off switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers • Terminations: Input through a power card Output will be brought on to binding terminals on front panel and also with remote sense terminals on to rear pane • Latest ISO 9001 Certified factory product 	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
246.	Capacitor motor	Single Phase Capacitor Motor of 1/2 HP 250 VOLT WITH STARTER/SWITCH 1. MOTOR : A.C. Single Phase Capacitor Start Induction Motor 1/2 HP 250 volts AC, 50 Hz, Starting winding,	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel 	Spares: <ul style="list-style-type: none"> • One spare set of patch cords. • One 	- User Manual / Operation Manuals .	To be installed the designated training institute in Himachal Pradesh. - Training to	

		<p>running winding with capacitor terminals brought out on terminal box Control Panel</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J</p>	<ul style="list-style-type: none"> • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Any other special tool required for assembling/disassembling the Setup supplied. 	<p>set of spare fuses.</p>	<ul style="list-style-type: none"> - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 	<p>be provided as required to the Institute faculty.</p>	
247.	Split phase motor	<p>Split Phase Motor of 1/2 HP 250 VOLT WITH STARTER/SWITCH</p> <p>1. MOTOR :</p> <p>A.C. Single Phase Capacitor Start Induction Motor 1/2 HP 250 volts AC, 50 Hz, Starting winding, running winding with capacitor terminals brought out on terminal box Control Panel</p> <p>Machine Control Panel &</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<ul style="list-style-type: none"> - User Manual / Operation Manuals. - Test / Experiment list and procedure 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	

		<p>Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-J</p>	<ul style="list-style-type: none"> • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	for assembling/disassembling the Setup supplied.		<p>re manual. (if applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 		
248.	Universal motor	<p>MOTOR UNIVERSAL 1/2 H.P AC/DC 250 V WITH STARTER/SWITCH UNIVERSAL MOTOR : Universal Motor Single Phase, Capacity :1/2 HP, 250 volts A.C. / D.C. 50 Hz, TEFC or better , class 'B' insulation, horizontal foot mounted.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement.</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<p>- User Manual / Operation Manuals .</p> <p>- Test / Experiment list and procedure manual. (if applicable).</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	

		Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-H	•Diagrammatic representation for the ease of connections and student can easily understand the concept of machine.	Setup supplied .		- Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details.		
249.	M.G. Set consisting of squirrel cage induction motor 5 H.P. 400 V cycle with directly coupled compound generator 3 K.W. 250 V with built In panel board consisting of:	M.G. Set consisting of squirrel cage induction motor 5 H.P. 400 V cycle with directly coupled compound generator 3 K.W. 250 V with built In panel board with following: 1. DC Compound Generator: 3 KW, 250V. Separately Excited with variac, Standard ISI Product. Insulation Class "B", Horizontal foot mounted 2. 3 phase 5 HP 400V foot mounted Squirrel cage AC Induction Motor: Motor Performance conforms to IS:325 and dimensions conform to IS:1231, Degree of Protection:- Motors are designed for degree of protection IP 55, Class F insulation class. Machine Control Panel & Operating Table:	• The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine.	• Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied .	Spares: • One spare set of patch cords. • One set of spare fuses.	- User Manual / Operation Manuals . - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		<p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-B</p>	<p>Further Features:</p> <p>1. 3 phase air circuit breakers</p> <p>2.Star Delta starter (contact type 8 point) & automatic type</p> <p>3. D.C circuit breaker</p> <p>4.Suitable voltmeter on A.C & D.C. Type</p> <p>5.Sunk filed regulator</p> <p>6.suitable line ammeters on A.C and D.C side</p> <p>7. field circuit ammeter</p> <p>8.Indicating Lamps on both the side (AC&DC)</p>			<p>Motor and major components used on the control panel.</p> <p>- Service providers contact details.</p>		
250.	Squirrel cage induction motor 3 H.P. 400 V with D.O.L starter	<p>A.C. SQUIRREL CAGE INDUCTION MOTOR 2 HP WITH DOL STARTER with Mechanical Load</p> <p>A.C. SQUIRREL CAGE INDUCTION MOTOR :-</p> <p>Rating: 3 HP 400 volts, 50 Hz, Squirrel cage Induction Motor horizontal foot mounted with Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for</p>	<p>• The components fitted on the Panel should be labelled with the name of the component.</p> <p>• All accessories should be connected with internal wiring ferrules etc.</p> <p>• Anti vibration mounts should also be provided.</p> <p>• Suitable sized insulation rubber mat for the operator for safe working.</p> <p>• All machines shall be copper wound</p> <p>• All Meters shall highly accurate Micro-controller based</p> <p>• Diagrammatic representation for the ease of connections and student can easily understand the concept of machine.</p>	<p>• Patch cords for connecting Machine to panel</p> <p>• Any other special tool required for assembling/disassembling the Setup supplied .</p>	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<p>- User Manual / Operation Manuals .</p> <p>- Test / Experiment list and procedure manual. (if applicable).</p> <p>- Warranty Certificate of</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	

		<p>standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given Appendix-F</p>				<p>Motor and major components used on the control panel.</p> <p>- Service providers contact details.</p>		
251.	Automatic Reverse Forward starter	Automatic Reverse Forward starter complete in all aspects	Standard Features	Standard Accessories			<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	
252.	Single phasing preventer	Single phasing preventer of 415 V rating	Standard Features	Standard Accessories			<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	
253.	Two point starter for DC series motor	2- point starter for DC series motor suitable to work on min. 2.5 KW. D.C. series motor, Voltage 230/250 with a maximum 15% full load current	Relay Operated, Under/Over voltage and overload Relay shall be included. Latest ISO 9001 Certified factory product.	Standard Accessories		<ul style="list-style-type: none"> Calibration certificate 	To be installed the designated training institute in Himachal	2 Years

		the starting period shall not exceed 30 seconds with under voltage and an intensions (Magnetic) over load release device.				• User's Manual	Pradesh. - Training to be provided as required to the Institute faculty.	
254.	Soft starter 1 ph	Single Phase soft starter complete in all aspects.	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
255.	2 KVA Alternator with 3 ph induction motor	<p>Specifications for above shall as follows:</p> <p>1. 3 phase 415V foot mounted Squirrel cage or Slip ring AC Induction Motor with suitable rating to perform as prime mover for Alternator: Motor Performance conforms to IS:325 and dimensions conform to IS:1231, Degree of Protection:- Motors are designed for degree of protection IP 55.</p> <p>2. ALTERNATOR :- 2 K.V.A.,440/230 Volts, 50 H.Z., 0.8 power factor, self-static field exciter, self-regulation, Horizontal foot mounting. Alternator is provided lifting bolt & earthling terminal.</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly accurate Micro-controller based • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disssembling the Setup supplied . 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. . 	<ul style="list-style-type: none"> - User Manual / Operation Manuals . - Test / Experiment list and procedure manual. (if applicable). - Warranty Certificate of Motor and major 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		<ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. Mechanical/ Electrical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-E 				<ul style="list-style-type: none"> components used on the control panel. - Service providers contact details. 		
256.	Lead Acid battery 75Ah	Lead Acid battery 75Ah, *Voltage :12 V, Capacity (Ah): 75 AH Battery Type: Sealed Acid Lead Battery	CE Mark or ISO 9001 Certified factory product or As per Relevant IS Standards	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
257.	Solar street light lamp set	Solar street light lamp set of 12 V 18 Watt and 12 V 24 Watts	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
258.	Hydraulic crimping tool for UG cable crimping with	Hydraulic crimping tool for UG cable crimping with bits ranging from 20 sq mm to 250sq mm	• Latest ISO 9001 Certified factory product	As applicable	As applicable	Product Catalogue	To be installed the designated training institute in	2 Years

	bits						Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
259.	Transformer Three phase (oil cooled)	THREE PHASE TRANSFORMER, SHELL TYPE OIL COOLED Working Model For Conducting Various Experiments. 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' or better 6) Tapping on Secondary Side 50% and 86.6% 7) Copper Wound 8) Educational type Bakelite insulated banana terminals 30 Amp. With color code provided on the top of the transformer and on 6mm Bakelite sheet 9) The tank will be provided oil filling Hole with cap, oil level indicator, drain plug and earthing terminal, Conservator, Bucholz relay with alarm and tripping arrangement, Explosion vent, Breather , Bushings for Primary and secondary etc. 10) Plain unidirectional M.S. Roller will be fitted to the tank for movement 11) Electrical performance would confirm 12) The transformer provided	* Circuit diagram shall be painted/printed on panel • Latest ISO 9001 Certified factory product	As applicable	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		with transformer oil. The oil confirm to (The tendered quote the grade and quantity in litters required) 13) Input and output terminals brought to the control panel with voltmeters, Wattmeter, Power factor meter, Frequency meter, ammeters, MCBs etc. for measuring and protection.						
260.	Transformer oil testing kit	<p>The technical characteristics of our High Voltage Oil Test Sets are as follows:</p> <ul style="list-style-type: none"> • NMC : Oil Test set is ideal for speedy and accurate testing of DI-i-electric strength of transformer and circuit breaker oil under test room condition in accordance with IS:6792-1972 for oil testing • Input : 230 Volts, Single Phase, 50 Hz, AC. • Output : Continuously variable from 0 to 60 Kv • Capacity: Min. 500 VA • Nature of cooling: The transformer will be epoxy resin cast type air-cooled type • The instrument should have step-less/continuous voltage incrementing ability from 0 to 50kV. User should be able to use as a breakdown test set or as withstand test set. • The instrument should have a 60-0-60 kV Vacuum Epoxy molded transformer for low-PD levels. • Test vessel: The test vessel (Oil Cell)fitted with two brass spheres on sides of test vessel 	<ul style="list-style-type: none"> • Automatic tripping mechanism for protection of H.T Transformer • One zero start inter locking device • Three pilot lamps to indicate mains 'ON' , H.T. circuit 'ON' & H.T. circuit 'OFF' • One memory effect volt meter show the break down voltage even after the high voltage circuit stripped off • Mode of operation: sets are available either in manual or in motor; operated mode. Besides, motorized auto-transformer regulator can be operated in manual through switch • The centre-point of the secondary winding should be Earthed via measuring circuit to detect the current level flowing through the HV side. • Continuously variable Auto-Transformer for smooth variation of output voltage • Safety Standards to 	It should be supplied with carrying case with Oil and oil Vessel and other accessories.	As applicable	The instruction manual and calibration certificate having traceability to NABL accredited lab should be supplied along with the instrument)	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		made from non-absorbent insulating material • Cover: Sets shall be provided with transfer and high impact acrylic sheet cover for covering the H.T. side with suitable inter-locking device	Meeting IEC 61010 • Latest ISO 9001 Certified factory product					
261.	Autotransformer	Single Phase Variable Auto Transformer with min specifications: 1 KVA, 0 - 300 V, (Air cooled) with safety fuses and line indicators	ISO 9001 of latest version certified Factory product	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
262.	Autotransformer	Three Phase Variable Auto Transformer with min specifications: 1 KVA, 0 - 500 V (Air cooled) with safety fuses and line indicators	ISO 9001 of latest version certified Factory product	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
263.	Current transformer	Current Transformer Test Set - Educational panel type arrangement for studying Current Transformer of Following Ranges: 10/1, 20/1, 30/1, 50/5, 100/5 and 300/5A Measurement is on principal of comparison and null indication on magnetic balance bridge. C.T.BURDEN BOX Min. of 30VA , 0.8 PF Variable Current Source	The Current Transformer Test set provides the following Features- 1. Separate terminals to connect standard C.T. and Test C.T. secondary's. 2 Ratio error and phase angle error calibrated dials 3 Range selecting Switch 4 Polarity check indicator 5 Ammeter to measure current injected in percentage	standard		Operational Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		Model Single ph. Complete with control panel Accuracy : + 1% of reading Min. Indications on panel : a) Reverse Polarity : b) 'Std' C.T. Sec. open : c) 'X' C.T. Sec. Open : d) Difference Ratios of 'Std' & 'X' CT Hi-imbalance : e) Over Current : f) Ratio Error Polarity : g) Phase lag-lead : h) Phase Error Over Range	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					
264.	Potential transformer	Educational panel type arrangement for studying Potential Transformer Test Set with 415 V, 50Hz, Mi. range of PT Ratio shall be as follows: 220/110,300/110,440/110,600/110, 440V/110V, It shall be Complete with control panel	PT Test Set shall provides the following:- 1. Separate terminals to connect standard P.T. and P.T. under test 2. Ratio error and phase angle error calibrated dials 3. Range selecting Switch 4. Polarity check indicator 5. Voltmeter to indicate percentage voltage injected 6. Null detector with sensitivity control 7. Terminal to connect burden box 8. Power supply to energies electronic null detector 9. high permeability magnetic core	Standard accessories		Operational Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
265.	Digital and Analog IC Tester	Digital and analog IC Tester (Portable) with following Specifications: • VOLTAGE: 230V 50Hz +/- 10% • Automatic testing of variety of ICs. • Potential free 40 pin universal ZIF socket.	1. • Digital and analog IC Tester (Portable) with following Features: • KEYBOARD: 24 keys Membrane Keyboard • Tests most of the 6 to 40 pin ICs in DIP package. • Portable size Mains operation	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	2 Years

		<ul style="list-style-type: none"> • Six Seven Segment Display to show IC number, PASS & FAIL Status, Operations display. • Audio alarm to user whenever it is required. • ANALOG IC RANGE : Operational Amplifiers, Comparators, Transistor Arrays, Optocouplers, Analog Switches, Multiplexers, Voltage followers, timers, cross point switches, ADC, DAC etc. • DIGITAL IC RANGE: • 74 series of TTL ICs, 40 and 45 series of CMOS ICs, Microprocessors (8085,8086,8088, Z80,6502) Peripheral ICs (8255,8253,8251,8259,8155,8279,Z80 PIO) EPROMs (blank check only), RAM ICs 6116,6264,62256 etc., 	<ul style="list-style-type: none"> • Self Diagnosis <p>Note: The product shall strictly be Latest ISO 9001 certified factory product</p>				the Institute faculty.	
266.	Jacket stripper/ Coring tool for 500 series cable	Jacket stripper/ Coring tool for 500 series cable	Standard features	Standard Accessories	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
267.	Universal drop trimmer for RG 6/11 cables	Universal drop trimmer for RG 6/11 cables	Standard features	Standard Accessories	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh.	2 Years

							- Training to be provided as required to the Institute faculty.	
268.	F - connector tool for RG 6/11 cables	F - connector tool for RG 6/11 cables	Standard features	Standard Accessories	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
269.	F – connector compression tool for RG 6/11 cables	F – connector compression tool for RG 6/11 cables	Standard features	Standard Accessories	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
270.	DC shunt motor	<p>DC Shunt Motor of 1 HP 220 V, Screen protected, Horizontal foot mounted, Internal fan cooled. Motor should be Strictly copper wound & confirmed to IS 4722 with 3 point D.C. starter of suitable capacity having no volt & over load protective devices</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall highly 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. 	<p>- User Manual / Operation Manuals .</p> <p>- Test / Experiment list and procedure manual. (if</p>	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		<p>standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. - Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D 	<p>accurate Micro-controller based</p> <ul style="list-style-type: none"> • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<p>assembling the Setup supplied.</p>		<p>applicable).</p> <ul style="list-style-type: none"> - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details. 		
271.	Rheostat	Rheostat (Sliding type) 0 -1 Kohm	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
272.	3 phase induction motor	<p>A.C. SQUIRREL CAGE or slip ring INDUCTION MOTOR 1 HP WITH DOL Starter with Mechanical Load - AC MOTOR :- It should be A.C. 3 Phase 1 HP 415 volts, 50 Hz, Squirrel cage/ Slip Ring Induction Motor, class 'F' insulation or better, horizontal</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare 	<ul style="list-style-type: none"> - User Manual / Operation Manuals. - Test / Experim 	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		<p>foot mounted. Six terminals are brought out on terminal box.</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none">- Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none">- Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none">- Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-F</p>	<ul style="list-style-type: none">• Suitable sized insulation rubber mat for the operator for safe working.• All machines shall be copper wound• All Meters shall highly accurate Micro-controller based• Diagrammatic representation for the ease of connections and student can easily understand the concept of machine.	special tool required for assembling/disassembling the Setup supplied .	fuses. .	ent list and procedure manual. (if applicable). - Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details.	the Institute faculty.	
273.	1hp motor	<p>DC drives trainer with phase control method</p> <p>Motor : DC Motor rating of Min. 1 HP, 220 V.</p> <p>Drive Rating: 1 Hp</p> <p>Controller Details: suitable Phase controlled based controller complete in all aspects</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none">- Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p>	<ul style="list-style-type: none">• The components fitted on the Panel should be labelled with the name of the component.• All accessories should be connected with internal wiring ferrules etc.• Anti vibration mounts should also be provided.• Suitable sized insulation rubber mat for the operator for safe working.• All machines shall be copper wound	<ul style="list-style-type: none">• Patch cords for connecting Machine to panel• Any other special tool required for assembling	Spares: • One spare set of suitable current capacity patch cords for interconnections required on the	Manuals / catalogues of standard products used in the Panel. - Experiment List cum	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		<p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-Q</p>	<ul style="list-style-type: none"> • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	ing/disassembling the Setup supplied .	panel board. • One set of spare fuses. .	Instructor Manual in soft and Hard Copy - Safety Test Reports		
274.	1hp motor	<p>Programmable DC drive trainer with SCR chopper circuit</p> <p>Motor : DC Motor rating of Min. 1 HP, 220 V.</p> <p>Drive Rating: 1 Hp, 4 Amp</p> <p>Controller Details: SCR chopper circuit based suitable controller</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p> <p>- Refer Appendix "N" for standard mounting arrangement.</p> <p>Mechanical Loading Arrangement:</p> <p>- Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied . 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses. . 	<p>Manuals / catalogues of standard products used in the Panel.</p> <p>- Experiment List cum Instructor Manual in soft and Hard Copy - Safety Test Reports</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>

		Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-P						
275.	Programmable DC drive with motor	<p>Programmable DC drive with motor and (Simoreg DC master) 6RA70 controller Motor : DC Motor rating of Min. 1 HP, 220 V. Drive Rating: 1 Hp, 4 Amp Controller Details: Simoreg DC Master 6RA70</p> <p>Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-L</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disassembling the Setup supplied . 	Spares: <ul style="list-style-type: none"> • One spare set of suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses. 	Manuals / catalogues of standard products used in the Panel. - Experiment List cum Instructor Manual in soft and Hard Copy - Safety Test Reports	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.
276.	Solar panel based Inverter	Solar panel based Inverter with following specifications: <ul style="list-style-type: none"> • Type : Solar Inverter • Rating in VA : 500 VA • Solar PV Module Compatibility : 400 Watts • Waveform : Pure Sine Wave 	CE/BIS /ISI Mark product	Standard Accessories	As applicable	Catalogues	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		<ul style="list-style-type: none"> • Battery Module : External Battery Module • Battery Capacity : 135 AH - 180 AH • DC Voltage : 12V • Charge Controller : PWM, 20Amp - 12V 					be provided as required to the Institute faculty.	
277.	3 phase motor	<p>Objective: Thyristor/IGBT Controlled AC Motor With VVVF Control has been designed to start & control of AC motor.</p> <p>AC Induction Motor 3 Phase 1 HP with Sensor Arrangement (Induction Motor):</p> <p>IGBT : Suitable Thyristor/IGBT AC Drive, Mounted on Control panel</p> <p>Machine Control Panel & Operating Table:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for General requirements. <p>Machine Mounting arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard mounting arrangement. <p>Mechanical Loading Arrangement:</p> <ul style="list-style-type: none"> - Refer Appendix "N" for standard Mechanical loading arrangement for Motors. <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-M</p>	<p>Power requirement: 415~440V AC , 50Hz, 3 Phase.</p> <ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	<ul style="list-style-type: none"> • One spare set of suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses. 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses. 	<p>Manuals / catalogues of standard products used in the Panel.</p> <ul style="list-style-type: none"> - Experiment List cum Instructor Manual in soft and Hard Copy - Safety Test Reports 	<p>To be installed the designated training institute in Himachal Pradesh.</p> <ul style="list-style-type: none"> - Training to be provided as required to the Institute faculty. 	<p>2 year Warranty for Generator, Motor and each component mounted on the Panel.</p>
278.	AC motor	<p>Objective: AC Motor drive With Siemens Micro Master 420 controller designed to start &</p>	<p>Power requirement: 415~440V AC , 50Hz, 3 Phase.</p>	<ul style="list-style-type: none"> • One spare set of 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare 	<p>Manuals / catalogues</p>	<p>To be installed the designated training</p>	<p>2 year Warranty for Generator,</p>

		<p>control of AC motor. AC Motor 3 Phase 1 HP with AC Motor Siemens Micro Master 420 controller: Mounted on Control panel Machine Control Panel & Operating Table: - Refer Appendix "N" for General requirements. Machine Mounting arrangement: - Refer Appendix "N" for standard mounting arrangement. Mechanical / Electrical Loading Arrangement: - Refer Appendix "N" for standard Mechanical loading arrangement for Motors.</p> <p>- Control panel shall consist of all necessary electrical and non-electrical items required to start, Run and test the working of the Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-O</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories should be connected with internal wiring ferrules etc. • Anti vibration mounts should also be provided. • Suitable sized insulation rubber mat for the operator for safe working. • All machines shall be copper wound • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine. 	suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses.	set of suitable current capacity patch cords for interconnections required on the panel board. • One set of spare fuses.	es of standard products used in the Panel. - Experiment List cum Instructor Manual in soft and Hard Copy - Safety Test Reports	institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	Motor and each component mounted on the Panel.
279.	PLC Systems with digital I/P, O/P modules Trainer kit and software	<p>PLC Systems with digital I/P, O/P modules Trainer kit and software with following specifications:</p> <p>6 Digital Inputs (24V DC). 4 Digital Outputs (24V DC) 2K Words of memory, 256 words of register. Powerful features like built in Floating Point, Sub Routines etc. One RS232 C communication facility for PC interface. Three channels can be configured</p>	Standard features	Standard Accessories	As applicable	Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

		as follows, Pulse width modulation output or Pulse train output or High speed counter input.						
280.	Solenoid	Educational Solenoid and Electromagnet with Iron Core with following specs: - Voltage rating : 24 V AC	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product 	Standard Accessories	As applicable	Instruction Sheet	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
281.	AC power supply	Regulated AC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type AC Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-24 volts, 2 Amps, at 50 Hz • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits 	<ul style="list-style-type: none"> • Indications: LED indications for ac input CV,CC operations. • Controls: On/Off switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers • Terminations: Input through a power card Output will be brought on to binding terminals on front panel and also with remote sense terminals on to rear pane • Latest ISO 9001 Certified factory product 	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
282.	DC power supply	Regulated DC Power Supply with following specifications: <ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-5volts, 2 Amps • Line & load regulation: $\pm 0.05\%$ for variations in input and load variations 	<ul style="list-style-type: none"> • Indications: LED indications for ac input CV,CC operations. • Controls: On/Off switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers • Terminations: Input through a power card 	Standard Accessories		*Manual *Test Certificates	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute	2 Years

		<ul style="list-style-type: none"> • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits 	<p>Output will be brought on to binding terminals on front panel and also with remote sense terminals on to rear pane</p> <ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 				faculty.	
283.	Electronic Pneumatics Trainer kit	<p>Electronic Pneumatics Trainer kit designed to demonstrate the design, construction and application of Pneumatic components and circuits with following specifications:</p> <p>- Programmable Logic Controller</p> <p>Digital Inputs : 12 nos., Digital Outputs : 8 nos., Interfacing : USB, Input & Output Voltage : 24 V DC, Power Supply : 110V - 260V AC, 50/60Hz</p> <p>- Other components on panel:</p> <p>Toggle Switches, Push to On Switch, Visual Indicators, Audio Indicator</p> <p>- Min. Pneumatics Components mounted on panel:</p> <ul style="list-style-type: none"> • Double Acting Cylinder : 2 nos., • Single Acting Cylinder: 1 no. , • 5/2Hand lever Valve : 1 no. • Min 4 Port Manifold : 1 no. , • Flow control Valves : 2 nos. , • 5/2 Solenoid Valves : 2 nos. , • 3/2 Solenoid Valve : 1 no. , • 3/2 Push Button (Palm Actuator): 1 no., • Shuttle Valve (OR Valve) : 1 no. , • Roller lever Valve : 1 no. ,, • Inductive Proximity Sensor : 1 no., Limit Switch : 1 no. • Pressure Gauge : 1 no. with following min. specs: Pressure 	<p>Min. Features:</p> <ul style="list-style-type: none"> • PLC operated Pneumatic platform • WorkStation with wheels, for suitable movement and installation • Storage drawers with locking facility, Place in drawers for patch cords, and other accessories for storage, and easy identification. • 4 mm patch cord connections • Mounting panel for Pneumatic Components <p>Min. Experiments to be performed:</p> <ul style="list-style-type: none"> - Construct and control single/double acting cylinder using series/ parallel circuits. - Construct and perform bidirectional control of a cylinder - Construct and control, automatic return of a double acting cylinder - Construct and control the oscillating motion of a double acting cylinder - Construct and control a latching circuit using single or double acting cylinder. - Construct and control, automatic return initiated by a limit switch. 	Standard Accessories		catalogue	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	

		Range : 0 to 150 Psi • Air Compressor : 1 no. with following min. specs: Voltage : 220V/50Hz, Power : Min. 0.7 HP, Pressure : 100 Psi (maximum), Min. Tank Capacity : 20 Liter	- Throttle a cylinder to adjust forward and return strokes. - Adjust the pressure as per the requirements. - Identify different pneumatic and electro pneumatic components. - Construct and control a single acting cylinder. - Construct and control a double acting cylinder					
284.	Servo Motor drives Trainer kit	Educational model of Servo Motor drive trainer kit complete in all aspects with min. following Experiments to be performed: - Construct a simple circuit to control servo motor using IC 555 - Connect servo motor with drive & control its parameters. - Connect the servo motor to computer for monitoring & controlling of various parameters. - Parameter programming of servo motor. - Various control method for controlling velocity & torque.	Standard Features	Standard Accessories	As applicable	Catalogues	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
285.	Autotransformer	•Single Phase Variable Auto Transformer •0 - 270 V, 15 Amp (Air cooled) Specification:- •Type :Single Phase Auto Transformer Amperage 15 Amp input voltage 0-270 V with safety fuses and line indicators	•ISO 9001 of latest version certified Factory product	Standard Accessories		• Calibration certificate • User's Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

286.	Digital and Analog IC Tester	Digital and analog IC Tester (Portable) with following Specifications: <ul style="list-style-type: none"> • VOLTAGE: 230V 50Hz +/- 10% • Automatic testing of variety of ICs. • Potential free 40 pin universal ZIF socket. • Six Seven Segment Display to show IC number, PASS & FAIL Status, Operations display. • Audio alarm to user whenever it is required. • ANALOG IC RANGE : Operational Amplifiers, Comparators, Transistor Arrays, Optocouplers, Analog Switches, Multiplexers, Voltage followers, timers, cross point switches, ADC, DAC etc. • DIGITAL IC RANGE: • 74 series of TTL ICs, 40 and 45 series of CMOS ICs, Microprocessors (8085,8086,8088, Z80,6502) Peripheral ICs (8255,8253,8251,8259,8155,8279,Z80 PIO) EPROMs (blank check only), RAM ICs 6116,6264,62256 etc.,	1. • Digital and analog IC Tester (Portable) with following Features: <ul style="list-style-type: none"> • KEYBOARD: 24 keys Membrane Keyboard • Tests most of the 6 to 40 pin ICs in DIP package. • Portable size Mains operation • Self Diagnosis Note: The product shall strictly be Latest ISO 9001 certified factory product	Standard Accessories		Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
287.	AM/FM Commercial radio receivers	AM/FM Commercial radio receivers with following min. requirements: <ul style="list-style-type: none"> • An Experimental board for understanding the theory and practice of active circuits used in analog telecommunication related to AM/FM radio receivers 	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as	

		<ul style="list-style-type: none"> The trainer kit shall also provide descriptive approach for AM receiver in which all the block can be studied individually 					required to the Institute faculty.	
288.	CCTV set up	CCTV Camera System complete in all aspects with minimum following equipments to be supplied: <ul style="list-style-type: none"> - 8-Channel DVR - 8 Number of Min. 4 MP HD Night vision Cameras (4 dome and 4 Bullet Type cameras) of Min. of 1080p - Power supply - 2 TB hard Drive - Min. 100 Meter and all required BNC & DC Connectors 	CE mark products	Connectors and cables			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
289.	Microwave oven	Grill Type conventional Microwave with following specifications: Power Output • 700 W(Min.) Power Requirement • AC 230 V, 50 Hz Capacity • 20 Litre (Min) Technology • Grill- conventional Type Other functions: • Grilling along with defrosting, reheating and cooking food Convection Microwave with following specifications: Power Output • 700 W(Min.) Power Requirement • AC 230 V, 50 Hz Capacity • 20 Litre (Min) Technology • Convection Type	Features: <ul style="list-style-type: none"> • Touch Key Pad (Membrane) is sensitive to touch and easy to clean • Child Lock : Ensures complete safety especially for homes with small children • CE/ BIS/ ISI Certified product • LED Display 	As applicable	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
290.	Electric rice cooker	Electric rice cooker with following Min. Specifications: Power supply: 220V 50 Hz Capacity: Min. 2.5 Litre	Auto cooking Auto cut-off, Comes with Cooking Plate Anodized aluminium cooking pan	As applicable	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh.	

			Scoop holder ISI/CE mark product				Pradesh. - Training to be provided as required to the Institute faculty.	
291.	Water purifier	<p>UV Type Water Purifier with following specifications: Purifying Technology • UV Power Requirement • 230 V AC, 50 Hz Power Consumption • 40 W (Min) Electrical Type • Electrical Electrical & Non - Storage : • Electrical purification - suitable for direct water supply Filter Type • Sediment</p> <p>RO Type Water Purifier with following specifications: Purifying Technology • Reverse Osmosis (RO) Power Requirement • 230 V AC, 50 Hz Power Consumption • 40 W (Min) Electrical & Storage with Min. 8 Litre of storage : • Electrical purification - suitable for direct water supply Filter Type • Pre-filter, Pre Carbon Filter, ZX Double Protection Dual Filter (Silver Activated Post Carbon Block and SCMT), Patented Side Stream RO Membrane</p>	<p>UV Type Water Purifier with Features • Filtration / Purification Modules: Clarity Cartridge, Chemi Block, UV Chamber, Forward Flush Other Features • Ultraviolet Lamp, Smart Indicators, Dual Cartridge Life, Energy Saver Mode, In-built Voltage Stabilizer, Buzzer Indication, Smart Cartridges</p> <p>RO Type Water Purifier with Features • Removable Drip Tray, Cartridge Life Indicator, Alarms</p> <p>CE/ISI /BIS Standard Product</p>	As applicable	As applicable	catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
292.	Induction cooktop	Electric Induction plate with min 1500 Watt, 240V having Ceramic cook top. •ISI mark product	<p>• Touch panel • Automatic Whistle counter, • Timer with temp. control facility • Automatic Keep warm Function • Automatic voltage regulator • Anti-</p>	As applicable	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh.	2 Years

			magnetic wall • Feather-touch buttons, High/Low Voltage protection. Safety sensor Auto switch-off Auto heat-up Booster Protection against overflows				- Training to be provided as required to the Institute faculty.	
293.	DTH with accessories	DTH with following equipments: Set Top Box, HDMI cable, Remote, Out Door Unit, Upto 10 meter cable Display Technology HD Display Resolution Maximum 1080i	CE/BIS /ISI Mark product	As applicable	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
294.	SAT meter	SAT Meter with following specifications: Measurement Range •DVB -S, DVB-S2 Type • Digital Body Material • ABS Plastic	SAT Meter with Following Features: - Build in highlight LED light - Show the Signal Quality - Build in buzzer - Support to check the power cable automatically - Support to reset to defaults - LCD Screen shows signal strength quality, Power, MER, - The unit of Signal power support dbm, dbuv - USB 2.0 for software update, backup satellite parameters	As applicable	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
295.	Co- Axial cable cutter	Co- Axial cable cutter	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as	

							required to the Institute faculty.	
296.	Jacket stripper/ Coring tool for 500 series cable	Jacket stripper/ Coring tool for 500 series cable	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
297.	Universal drop trimmer for RG 6/11 cables	Universal drop trimmer for RG 6/11 cables	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
298.	F - connector tool for RG 6/11 cables	F - connector tool for RG 6/11 cables	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
299.	F – connector compression tool for RG 6/11 cables	F – connector compression tool for RG 6/11 cables	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh.	

							- Training to be provided as required to the Institute faculty.	
300.	Load Bank (variable)	Load Bank - (Lamp/ heater Type) 1.2 KW, Frequency: 50Hz	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
301.	Rooftop Mounting Structure	Rooftop Mounting structure For 4 x 250 W solar panels mounting for practice along with tilt adjustment	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
302.	Electrical wiring and switch gear rack	Electrical wiring and switch gear rack with Electrical control elements suitable for practice of control circuits using banana plugs and socket	Standard Features	Standard Accessories	As applicable	Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
303.	Solar Insulation meter	Solar Insulation Meter: Insulation resistance measurement for Photo Voltaic Module with following	Features: <ul style="list-style-type: none"> • Safely and accurately measure PV insulation resistance even while 	<ul style="list-style-type: none"> • Test Lead • Neck strap 	As applicable	Manual	To be installed the designated training institute in	

		<p>specifications: Rated output voltage: 50 V DC/ 125 V DC/ 250 V DC /500 V DC/ 1000 V DC (• Five ranges (50/125/250/500/1000V) built in for normal insulation resistance measurement) Effective corresponding maximum indicated value against output voltages : 100 MΩ/ 250 MΩ/ 500 MΩ/ 2000 MΩ/ 4000 MΩ Display Semi-transmissive: LCD/TFT or better with back lighting Power supply :AA alkaline batteries</p>	<p>generating solar power</p> <ul style="list-style-type: none"> • Built-in 1000 VDC voltage measurement for open voltage tests of PV systems that support 1000 V • Built-in comparator function • Drop proof design withstands drop onto concrete from a height of 1 meter • CAT III 600 V safety standard • CE Mark product 	<ul style="list-style-type: none"> • Instruction manual • AA alkaline batteries (LR6) as applicable 			<p>Himachal Pradesh. - Training to be provided as required to the Institute faculty.</p>	
304.	Pyranometer	<p>SPECIFICATIONS OF PYRANOMETER:</p> <ul style="list-style-type: none"> • Classification : Classified as Secondary Standard • Sensor Type : Circular Multi-junction wire wound thermopile • Type of the Dome : Double Dome Type • Material of the Dome : High Quality Glass- WG295 Glass or Equivalent • Sensitivity : 7-10 micro V/Wm-2 • Spectral Range : 300 -2800 nm • Response Time : One second (Max) • Linearity : ±0.5% from 0 to 2800 W/m2 • Tilt Error : < 0.5% • Zero Offset: Response to 200 W/m2 net thermal radiation : < 5 W/m2 • Resolution : ±1 W/m2 • Output Signal : Analog Voltage 	<p>Min. Experiments to be performed are as follows:</p> <ul style="list-style-type: none"> • Measure intensity of solar radiation using Pyranometer and radiometers. • To be able to analyze shadow effect on incident solar radiation and find out contributors. • Ability to plot curve of radiation measured with respect to time for a location. • Ability to draw a solar map by collecting data of solar radiation in a location for one year. 	Standard Accessories	As applicable	Catalogues	<p>To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.</p>	

		<ul style="list-style-type: none"> • Environmental withstanding Condition : Temperature range: -20 degC to 60 deg C Relative humidity range: 0-100% • Cable : 10 metres • Certificate : Calibration certificate is needed 						
305.	Pyrheliometer	<p>SPECIFICATIONS OF PYRANOMETER:</p> <ul style="list-style-type: none"> • Classification - High quality Normal Incidence Pyrheliometer • Spectral Range - 300 -2800 nm • Response Time - One second or better • Stability - 1% Full Scale or better • Temperature Dependence - $\pm 1\%$ or better • Linearity - $\pm 0.5\%$ from 0 to 1400 W/m² or better • Sensitivity - 7MicroV/Wm⁻² or more • Impedance - 200 Ohm or better • View Angle - 5 deg ± 1 deg • Output Signal - Analog Voltage • Environmental withstanding Condition - Temperature range: -20 deg C to 60 deg C Relative humidity range: 0-100% • Cable - 10 metres (Min) • Certificate - Calibration certificate is needed with reference to WRR/WRC 	<p>Min. Experiments to be performed are as follows:</p> <ul style="list-style-type: none"> • To be able to find out relations between sunlight and earth motion by globe model. • To be able to Observe and compare sunlight and angle of inclination during 12 hours of a day on different days. 	Standard Accessories	As applicable	Catalogues	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
306.	Sun Shine recorder	<p>Sunshine recorder with following requirements:</p> <ul style="list-style-type: none"> • Measuring element Cut glass sphere burning glass optical principle • Range of application: In northern and southern equatorial 	<p>Min. Experiments to be performed are as follows:</p> <ul style="list-style-type: none"> • To be able to plot sun chart and locate the sun at your location for a given time of the day. • To be able to Observe and 	Standard Accessories	As applicable	Catalogues	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		zones between 0...40° • Housing: non-corrosion materials integrated circular spirit level on the base plate with additional mounting plate	compare sunlight and angle of inclination during 12 hours of a day on different days.				be provided as required to the Institute faculty.	
307.	Weather monitoring station	Weather monitoring station complete in all aspects to monitor and record Sunshine, wind velocity, temperature, rainfall etc with software. Wirth following mi. Specifications: • Air Temperature - Operating Range : 0°C to 100°C - Resolution : 2°C Max • Relative Humidity - Operating Range : 5% to 95%RH - Resolution : 1% or better • Solar Radiation sensor - Output : 0-2VDC or suitable - Range : 0 to 2000W/m2 • Atmospheric Pressure Sensor - Detection Range : 15- 115kPa suitable - Response time : 5 Sec or better • Air Quality Sensor (PM2.5) - Detection Range : 10 - 500 ppm - Response time : 5 Sec or better • Wind Speed Sensor - Speed : 0 to 20m/S - Resolution : 1m/S or better • Wind Direction Sensor : North, East, West, South, North-East, East-South, North-West, South-West • Rainfall : Tipping bucket in mm • UV Index Sensor - Response wavelength : 200nm-370nm- Response time : 5 seconds or better	• Real time Data Access on Web • Data Storage Memory • Application software for Dashboard for remote monitoring and analysis. Further, Min. Experiments to be performed at workshop: • To be able Observe on Globe, which countries are in the Northern hemisphere and which on the Southern hemisphere. • To be able Prepare a list of places around India, their latitude and longitude.	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		<ul style="list-style-type: none"> • Power Supply - Battery : 12V/40AH or better - Solar Panel : 75W or better • Wireless Transmission : GPRS Based • Cloud Services : 1 Year min. 						
308.	Solar cell based sunlight radiation meter	Solar cell based sunlight radiation meter for Solar power measurement up to 2000 w/square meter	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
309.	Lead Acid battery	1. Lead Acid battery 75Ah, *Voltage :12 V, Capacity (Ah): 75 AH Battery Type:Sealed Acid Lead Battery 2.1. Lead Acid battery 40Ah, *Voltage :12 V, Capacity (Ah): 40 AH Battery Type:Sealed Acid Lead Battery	CE Mark or ISO 9001 Certified factory product or As per Relevant IS Standards	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
310.	Lead Acid battery	Lead Acid battery 100Ah, *Voltage :12 V, Capacity (Ah): 100AH Battery Type:Sealed Acid Lead Battery	CE Mark or ISO 9001 Certified factory product or As per Relevant IS Standards	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
311.	Solar simulator for solar cell	A Solar Simulator complete in all aspects which provides illumination Spectrum	• Complete system to study fundamentals of Solar Simulation	Standard Accessories			To be installed the designated training	

	characteristic study	<p>approximately similar to Sunlight. And further be able To study IV curve of a solar cell of minimum 2 watt under variable illumination, temperature and suitable load The Solar simulator shall provide controlled test facility inside laboratory and to allow trainer to test Solar system independent from current weather conditions and time of day. Following shall be he Specifications:</p> <ul style="list-style-type: none">• Supply Voltage : 220V AC $\pm 10\%$, 50Hz• Solar Cell characterizations: Open Circuit Voltage (Voc) : 2V DC Short Circuit Current (Isc) : suitable size• Quartz Halogen Lamp : suitable size• Voltmeter : suitable size• Ammeter :suitable size• Intensity Control : Variable• Temperature Controller : up to 99°C• Heater : Suitable size• Load Resistance : Suitable size• Fuse : Suitable size	<ul style="list-style-type: none">• Digital display for Voltage and Current measurement• Quartz Halogen Lamp as a Light source• Programmable Temperature Controller• Heater for heating test of Solar cell• Variable Intensity available for testing• Latest ISO Certified Factory product	ries			institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
312.	IV Curve tester	<p>IV Curve tester complete in all aspects with Interface software having following min. specifications :</p> <ul style="list-style-type: none">• Power Supply : +5V DC or suitable• DC Voltage Range : 0-50V or suitable• DC Current Range : 10A (min)• Measurement Max. Voltage(V) : at Pmax Max. Current(I) : at Pmax	<ul style="list-style-type: none">• Instrument to determine characteristics of Solar PV modules• Microcontroller based design• Mains and Battery operation• User interactive software <p>Further, Following Mi. Experiments to be able to be performed:</p>	Standar Accesso ries	As applicab le	Product Catalog ue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<p>Voltage at Open Circuit : Voc Current at Short Circuit : Isc Instant Power : W</p> <ul style="list-style-type: none"> • Battery : suitable rating • RS232 connectivity • LCD/TFT or better display • CE/ISI/IS or relevant certified product or ISO Certified factory product 	<ul style="list-style-type: none"> • To be able to Plot I-V curve for photovoltaic cell based on temperature at constant illumination. • To be able Test photovoltaic cell in sunlight at various angles of inclination and direction. • To be able to Test different rated Photovoltaic modules (Panels) and plot I-V curve. 					
313.	Sun path finder	Sun path finder complete in all aspects.	<p>Min. Experiments to be performed in workshop by instructor:</p> <ul style="list-style-type: none"> • To be able to Observe and compare sunlight and angle of inclination during 12 hours of a day on different days. • To be able to Locate magnetic poles (North and South) with the help of magnetic compass. • to be able to observe on Globe, which countries are the Northern hemisphere and which on the Southern hemisphere. 	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
314.	Solar energy trainer with grouping of solar cells	<p>Solar Energy Trainer complete in all aspects for training system for use in workshops. System shall be able to demonstrate the basic concept of Solar cell (photovoltaic cell) for converting sunlight into electrical energy. The system shall work as a live demonstration unit of Solar cells in terms of its concepts and applications.</p> <p>System must consists of Solar</p>	<ul style="list-style-type: none"> • Complete training system to study fundamentals of photovoltaic system • The system has two modes for study: Characteristics and Application Modes • On board voltmeter and ammeter are provided to measure the voltage and current respectively during various modes of operation 	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<p>Energy Trainer and a Solar Panel. Following are min. specifications involved:</p> <ul style="list-style-type: none"> • Solar Panel : Consists of 6 Solar cells each with minimum 2 W with suitable loads • Maximum Voltage of each Solar cell : 1.5V or better • Maximum Current of each Solar cell : 150mA or suitable • Voltmeter : suitable rating • Ammeter : suitable rating • Potentiometer : suitable rating • AA Rechargeable NiCd Battery : suitable rating • Bulb : suitable rating • Fan : suitable rating • FM Band Radio : suitable rating <p>Note: Latest ISO Certified factory product</p>	<ul style="list-style-type: none"> • Charging of batteries using Solar energy • Weather proof Solar cells <p>Further Min. experiments to be performed at Workshop by instructor are:</p> <ul style="list-style-type: none"> • To be able to Connect suitably rated wires in the terminal box of a solar panel and connect end terminals using MC4 connectors. • To be able to Connect solar panels in series and measure voltage and current. Repeat with different rated panels. • To be able to Connect solar panels in parallel and measure voltage and current Repeat with different rated panels. 					
315.	Solar tracker demonstrator kit	<p>Solar Tracking System complete in all aspects for study and demonstration of solar tracking. And, further be able to study manual and automatic control of 10 W solar panel in East- west and North-south & back. Also, tracks the motion of the Sun and ensuring that the maximum amount of Sunlight strikes the panels throughout the day. Following Mi. Specifications involved are:</p> <ul style="list-style-type: none"> • Supply Voltage : 12V DC • Solar Panel • Maximum Output Power (Pm): 10W(Min.) • DC Motor : Suitable rating • Rechargeable Battery : Suitable rating 	<ul style="list-style-type: none"> • Microcontroller based Tracking System • Single-axis and Dual-axis Tracking • Manual, Time and Auto Modes of operation in Single-axis Solar Tracking • Manual mode of operation in Dual-axis Solar Tracking • Master Reset Switch for recovery of System • Emergency Motor Stop Switches • Tilt Sensors for sensing angle of panel with respect to horizontal plane • Facility for charging battery using Solar energy as well as DC supply 	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		<ul style="list-style-type: none"> • Display : LCD/TFT or better with easy visual for person accessing trainer • Light Sensor : Phototransistor or better • Acceleration/Vibration : Suitable rating • /Tilt Sensor – 3 Axis • Fuse : Suitable rating • DC Adaptor : Suitable rating 						
316.	Solar PV e-learning software using animations for training	<p>Solar PV e-Learning Software using Animations for training with some of the topics to be covered:</p> <ul style="list-style-type: none"> • Basics of electricity and related concepts • Basics of energy, its units, quantities of energy • Concepts of solar cells • Interconnection of solar cells in PV modules • Design of PV array • Fundamentals of batteries • Interconnection of batteries(series and parallel connections) • Electronics that are used in PV systems • Details about wires, their physical sizes • Design of standalone solar PV system • Grid connected PV system • Maintenance and troubleshooting of PV components and PV system as a whole. etc. 	Language of e-learning shall be hindi/english Animations based learning Must be compatible with Windows98and higher versions of Windows	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
317.	Halogen lamp with stand for illumination of	Halogen lamp of suitable size with stand for illumination of solar panels in lab with following requirements:	Standard Features	Standard Accessories			To be installed the designated training institute in	

	solar panels in lab	Power supply: 220 V AC 0 to 1000 watts per meter square					Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
318.	Solar photovoltaic module	Solar photovoltaic module of following specifications: 1. 75 W mono crystalline module 2. 275 W amorphous silicon module 3. 50 W thin film module 4. 5W, 10W, 40W poly crystalline module	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
319.	Solar panels	Solar Panel of 250 Wp	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
320.	Solar Charge controller with Dusk to Dawn automatic switching	Solar Charge controller with Dusk to Dawn automatic switching shall be a microcontroller based controller. It Shall be designed to monitor the battery voltage during charging and discharging. It shall disconnect the Solar panel when battery is fully charged and disconnects the load when battery is discharged up to a predefined voltage. It shall again connects the Solar panel when	Overload protection Short circuit protection	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

		battery voltage decreases, and connects the load when battery voltage increases. Following are the specification intended for the product: <ul style="list-style-type: none"> • Maximum charging current : 10A or better • LED Indications : (A) Charging (B) Battery Low • System operating voltage : 12V DC 						
321.	Solar charge controller with manual switch (Day lighting)	Solar Charge controller with manual switching (day lighting)with Following are the specification intended for the product: <ul style="list-style-type: none"> • Maximum charging current : 10A or better • LED Indications : (A) Charging (B) Battery Low • System operating voltage : 12V DC 	Overload protection Short circuit protection	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
322.	Array junction box	Array junction box of suitable material for connecting 250W x 4 Nos. solar panel with DC fuse, DC MCB, and surge suppressor protection		Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
323.	Solar lantern	<ul style="list-style-type: none"> • Solar LED Porta Lantern as a portable lighting system with sealed maintenance free battery and a Solar PV module. • The battery shall be charged by electricity generated by PV module. Shall be suitable for 	• MNRE Approved	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to	2 Years

		indoor and outdoor lighting applications and covers 360 degrees to spread light. • Type of Load LED-3W or better • Battery 12V, 7Ah (SMF) or suitable • Charging time 7-8 hours/Day or better • Solar Panel wattage 10Wp or better • Solar Panel Voc 21V or better • Back up 4-5 Hours or better					be provided as required to the Institute faculty.	
324.	Solar lantern	• Solar CFL Porta Lantern as a portable lighting system with sealed maintenance free battery and a Solar PV module. • The battery shall be charged by electricity generated by PV module. Shall be suitable for indoor and outdoor lighting applications and covers 360 degrees to spread light. • Type of Load CFL-7W or suitable • Battery 12V, 7Ah (SMF) or better • Charging time 7-8 hours/Day or better • Solar Panel wattage 10Wp or better • Solar Panel Voc 21V or better • Back up 4-5 Hours or better	• MNRE Approved	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
325.	Solar lantern assembly sets	• Solar CFL Porta Lantern as a portable lighting system with sealed maintenance free battery and a Solar PV module. • The battery shall be charged by electricity generated by PV	• MNRE Approved	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh.	2 Years

		module. Shall be suitable for indoor and outdoor lighting applications and covers 360 degrees to spread light. <ul style="list-style-type: none"> • Type of Load CFL-7W or suitable • Battery 12V, 7Ah (SMF) or better • Charging time 7-8 hours/Day or better • Solar Panel wattage 10Wp or better • Solar Panel Voc 21V or better • Back up 4-5 Hours or better 					- Training to be provided as required to the Institute faculty.	
326.	Home light system	Home light system 12 V DC with FM receiver, LED bulb and mobile charger as loads	Standard Features	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
327.	Solar cell kit	Solar Cell kit complete in all aspects.	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
328.	DC table fan	12 V DC Table Fan Directly Run Through Solar Panel or Any 12 Volts Battery	Material of the Motor is pure copper Min. 3 Speed Modes Oscillation Control Lock	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh.	2 Years

							- Training to be provided as required to the Institute faculty.	
329.	A.C. Voltmeter M.I	A.C. Voltmeter M.I. , Multi Range A.C. Voltmeter M.I. 0V - 500 V A.C Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
330.	Volt meter	Voltmeter 0V - 30 V Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
331.	Volt meter	Voltmeter 0V - 100 V Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
332.	Ammeter MC	•Ammeter MC - (0-1 A- MC) with Moving Coil with Central Magnetic Core	• This precision grade portable laboratory type direct indicating meter should be housed in	case and connection cords		User Manual	To be installed the designated training institute in	2 Years

			electrical grade phenolic (plastic molded case) •portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,				Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
333.	Ammeter MC	•Ammeter MC - (0-5A- MC) with Moving Coil with Central Magnetic Core	• This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic molded case) •portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010,	case and connection cords		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
334.	Ammeter MC centre zero	Ammeter MC centre zero •Centre - zero analog, •Milli Voltmeter centre zero 20-0 – 20 Amps •Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
335.	Ammeter MC centre zero	Ammeter MC centre zero •Centre - zero analog, •Milli Voltmeter centre zero 50-0 – 50 Amps •Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
336.	A.C. Energy Meter	A.C. Energy Meter- induction type	• 6 digits including one decimal digit display	case and		*Manual *Test	To be installed the designated	2 Years

		Single Phase, 10 A, 240 V • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case	• LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Accuracy Class 1.0	connecti on cords		Certifica tes	training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
337.	A.C. Energy Meter	AC energy meter Three Phase, 15 A , 440 V induction portable type AC Energy Meter Housed in Bakelite case	• 6 digits including one decimal digit display • LED indication for Calibration, phase indication, earth load tamper and reverse tamper. • Conforming to IEC 62052 or IS 13779 • portable type Housed in Bakelite case • Accuracy Class 1.0	case and connecti on cords		*Manual *Test Certifica tes	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
338.	DC LED Lamp	DC LED Lamps of three wattages: 1. 3W 2. 5W 3. 10W		Standar d Accesso ries	As applicab le	Product Catalog ue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
339.	DC Pump	24 V DC Pump	Standard Features	Standar d Accesso ries			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

340.	PWM Controller	PWM Solar Charge Controller with following Min. Specifications: • System voltage : 12 Volt or 24 Volt • Charging capacity : 60 amps or better • Peak Charger efficiency : 99% or better	Standard Features CE/ISI/Relevant standard Certified	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
341.	MPPT Charge Controller	MPPT Solar Charge Controller with following Min. Specifications: • System voltage : 12 Volt or 24 Volt • Charging capacity : 30 amps or better • Peak Charger efficiency : 99% or better	Standard Features CE/ISI/Relevant standard Certified	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years
342.	Solar PCU	Off Grid Solar Power conditioning unit with inbuilt MPPT charge controller are specially designed for solar applications with following specifications: • Rated AC power (W) : 230V, 4.3A, Single phase Max Supported Panel Power - 1100 Wp Output Waveform - Pure Sinewave • DC input Range (V) : 60-130 • Nominal battery bank voltage : 48 • Usable current from grid (A) : 24 or suitable • Max. supported panel power (Wp) : 1100 or suitable • Technology (Solar) : With Battery	• Inbuilt isolation transformer to protect from grid surges and noise • Hybrid charging : Charging from both mains and solar • Selectable source priority: Choose source priority from solar, battery and grid • Compliance to IEC standards for safety, reliability and quality	Standard Accessories	As applicable	Product Catalogue	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

343.	Solar Grid tied inverter Demonstrator kit	<p>Solar Grid tied inverter Demonstrator kit complete in all aspect with following equipment specifications:</p> <ul style="list-style-type: none"> • Solar Panel of 300 Watt <ul style="list-style-type: none"> - Cell Type : Poly (multi) crystalline • Inverter <ul style="list-style-type: none"> - Capacity : suitable - DC Input voltage : 24V - Input Voltage : 190~260V AC (Grid) - Technology : Microcontroller Based Design - LED Indication : Mains ON, UPS ON, Low • MPPT Charge Controller <ul style="list-style-type: none"> - PV Module Input Voltage : suitable rating - Max Current : Suitable rating - Battery voltage : 24V - Technology : MPPT - Display type : LCD/ Better - Charging Stage : Bulk, Absorptions and Float • Battery <ul style="list-style-type: none"> - Make : Tubular - Capacity : Suitable - Quantity : Suitable • Meters <ul style="list-style-type: none"> - DC Voltmeter& Ammeter : Suitable rating and number. - AC Multi Function Meter (Voltage, Current, Watt, Frequency) of suitable rating and number • Structure for Solar Panel <ul style="list-style-type: none"> - Material : MS - Tracking Type : Manual, Dual Axis Seasonal and day wise - Assembly : Detachable and easy to install • Safety and Protection 	Latest ISO Certified Factory product	Standard Accessories				<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	
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		<ul style="list-style-type: none"> - MCB (DC) for solar panels and battery: suitable rating . - MCB (AC) for AC output load protection & Grid charging of suitable rating - Fuse of suitable rating of solar panel and battery for Individual protection - Banana Terminals : suitable rating for (shock proof connections) 						
344.	Solar Street Light	Solar Street Light complete in all aspects along with : 12V, 75Ah battery, 75 Wp solar panel, 12V, 10A dusk to dawn charge controller, 60 W LED lights with suitable colors and Min. 9 m height suitable pole all dismountable	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
345.	Solar, wind and hybrid power plant	Demonstration kit for solar and wind generation (Wind turbine with blower) hybrid setup for laboratories to understand the conversion of wind energy, solar energy combined into electrical energy. It shall introduce the basic concept of wind turbine and Solar PV, of converting kinetic energy of wind into mechanical energy and then this mechanical energy into electrical energy and solar energy to electrical energy. The setup shall work as a live demonstration unit of solar pV and wind turbine and generator in terms of its concepts and applications. It must contain solar PV and Wind Turbine Setup and Trainer. The following are	Latest ISO Certified Factory Product	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

		some min. specifications for equipment to be included: • cumulative Power output: 1000 Watt(Min.) • Solar Cells: Suitable rating and number • Wind Turbine Setup : Contain 3 blades Maximum Open Circuit Voltage : suitable rating Maximum Short Circuit Current : suitable rating • Voltmeter Ammeter Potentiometer of suitable rating • AA Rechargeable NiCd Battery : suitable rating						
346.	Solar Traffic Light	Solar Traffic light complete in all aspects along with: 12V, 75Ah battery, 75 Wp solar panel, 12V, 10A dusk to dawn charge controller, 15 W LED lights with suitable colors and 9 m height suitable pole all dismountable	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
347.	Used water treatment solar plant demonstrator kit	Used water treatment solar plant demonstration kit complete in all aspects with Min. 1 Litre capacity	Standard Features	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
348.	Solar DC pump	1HP Solar DC Pump Specifications - Solar Panel Rating : 1000Wp array or suitable	Standard Features	Standard Accessories			To be installed the designated training institute in	

		- Type : DC centrifugal Pump - Rating : 1HP - Operating Voltage : 30V or suitable - Current : 25A or suitable - Inlet Caliber : 2" inch or suitable - Outlet Caliber : 1.5" inch or suitable					Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
349.	Demonstration kit for wind generation (Wind turbine with blower)	Demonstration kit for wind generation (Wind turbine with blower) setup for laboratories to understand the conversion of wind energy into electrical energy. It shall introduce the basic concept of wind turbine, of converting kinetic energy of wind into mechanical energy and then this mechanical energy into electrical energy. The setup shall work as a live demonstration unit of wind turbine and generator in terms of its concepts and applications. It must contain Wind Turbine Setup and Wind Energy Trainer. The following are some min. specifications for equipment to be included: • Power output: 300 Watt(Min.) • Wind Turbine Setup : Contain 3 blades Maximum Open Circuit Voltage : suitable rating Maximum Short Circuit Current : suitable rating • Voltmeter Ammeter Potentiometer of suitable rating • AA Rechargeable NiCd Battery : suitable rating	Latest ISO Certified Factory Product	Standard Accessories			To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	

3.a Appendices

Appendix-A				
Electric Panel Board for DC Shunt/compound Generator				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
	AC Side			
1	Voltmeter	0-500 volts	1	IEC 61010
2	Ammeter	0-20 Amp.	1	IEC 61010
3	Rotary Switch for Voltmeter Selection for OFF/R/Y/B/BR	16 Amp, 440 Volts	1	ISI Mark
4	Automatic Star/Delta Starter with overload relay for motor	Suitable rating	1	IS/IEC 60947-4-1 & IEC 60947-4-1.
5	Neutral(TPN) MCB for AC Motor input	Suitable Rating	1	IS/IEC 60898-1
6	Indicating Lamp LED red, yellow and Blue colour :	Suitable rating	1 No each	ISI Mark
	DC Side			
7	Voltmeter	0-300 volts,	1 no	IEC 61010
8	Ammeter for DC output	0-15 Amps	1 no	IEC 61010
9	Ammeter for Field current	0-1.5 Amps	1 no	IEC 61010
10	Field regulator suitable to decrease field current	Suitable rating	1 no	An ISO 9001 Certified factory product
11	DP MCB	Suitable rating	1 no	IS/IEC 60898-1
12	Indicating lamp LED type Red, colour	Suitable rating	1 no	ISI Mark
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-B				
Electric Panel Board for Motor Generator Set(AC-DC)				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
	AC Side			
1	Voltmeter	0-500 volts	1	IEC 61010
2	Ammeter	0-20 Amp.	1	IEC 61010
3	Rotary Switch for Voltmeter Selection for OFF/R/Y/B/R	16 Amp, 440 Volts	1	ISI Mark
4	Automatic Star/Delta Starter with overload relay for motor	Suitable rating	1	IS/IEC 60947-4-1 & IEC 60947-4-1.
5	Iron clad triple pole switch (ICTP) with fuses and neutral link for AC Motor input	Suitable Rating	1	An ISO 9001 Certified factory product
6	Indicating Lamp LED red, yellow and Blue colour :	Suitable rating	1 No each	An ISO 9001 Certified factory product
	DC Side			
7	Voltmeter for DC output	0-300 volts,	1 no	IEC 61010
8	Ammeter for DC output	0-15 Amps	1 no	IEC 61010
9	Ammeter for Field current	Suitable rating	1 no	IEC 61010
10	Field regulator suitable to decrease field current	Suitable rating	1 no	ISI Mark
11	DP MCB for output and Excitation	Suitable rating	2 no	IS/IEC 60898-1
12	Indicating lamp LED type Red, colour	Suitable rating	1 no	An ISO 9001 Certified factory product
13	Voltmeter for DC excitation voltage	Suitable rating	1 no	IEC 61010
14	DC supply(AC to DC) with variac for excitation	Suitable rating	1 no	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-C				
Electric Panel Board for DC Series Motor coupled with spring balance load				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	2 point starter for DC series Motor	Suitable rating	1	ISI product
2	MCB two pole min. 16 amp	Suitable rating	1	IS/IEC 60898-1
3	Digital DC Ammeter	Suitable rating	1	Safety rating: IEC 1010-1
4	Digital DC Volt Meter	Suitable rating	1	Safety rating: IEC 1010-1
5	Indicating Lamps LED	Suitable Rating	1	
6	HRC Fuses Bakelite type base	16 Amps	1 No each	IS 13703 / IEC 60269
7	Built in DC source to feed the DC Motor	Suitable Rating	1	An ISO 9001 Certified factory product
8	Variac for field and armature(Arrangement for DC Field variation)	Suitable Rating	1 each	An ISO 9001 Certified factory product
9	RPM Inductor with Sensor	Suitable Rating	1	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-D				
Electric Panel Board for DC Shunt Motor / DC Compound Motor				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Suitable starter for DC Motor in line with specifications	Suitable rating	1	An ISO 9001 Certified factory product
2	MCB two pole min. 16 amp	Suitable rating	1	IS/IEC 60898-1
3	Digital DC Ammeter	Suitable rating	1	Safety rating: IEC 1010-1
4	Digital DC Volt Meter	Suitable rating	1	Safety rating: IEC 1010-1
5	Indicating Lamps LED	Suitable Rating	1	ISI product
6	HRC Fuses Bakelite type base	Suitable Rating	1 No each	IS 13703 / IEC 60269
7	Built in DC source to feed the DC Motor	Suitable Rating	1	An ISO 9001 Certified factory product
8	Variac for field and armature(Arrangement for DC Field variation)	Suitable Rating	1 each	An ISO 9001 Certified factory product
9	RPM Inductor with Sensor	Suitable Rating	1	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-E				
2 KVA Alternator with 3 ph induction motor				
Sl.No	Item	Rating	Min. Quantity	Min. Standard to conform
	AC generator Side			
1	Voltmeter For Output and Field Excitation	Suitable rating	1 each	IEC 61010
2	Ammeter For Output and Field Excitation	Suitable rating	1 each	IEC 61010
3	Rotary Switch for Voltmeter Selection for OFF/R/Y/B/R	Suitable rating	1	IS 13947
4	Indicating Lamp LED red, yellow and Blue colour :	Suitable rating	1 No each	ISI Product
5	Field regulator suitable to decrease field current	Suitable rating	1	An ISO 9001 Certified factory product
6	Ammeter Selector Switch, Rotary type, Off/R/Y/B	Suitable rating	1	An ISO 9001 Certified factory product
7	3 ph. Power Factor Meter(Analog Type)	Suitable rating	1	IEC 61010
8	Frequency meter 45-50-55 Hz.	Suitable rating	1	IEC 61010
9	Built in DC source to feed the Generator Excitation	Suitable Rating	1	An ISO 9001 Certified factory product
10	RCCB for AC Generator	Suitable rating	1	IEC 61008-1/IS 12640-1:2008/EN 61008-1
11	DP MCB for Excitation	Suitable Rating	1	IS/IEC 60898-1
	AC Motor Side			
1	Voltmeter with selector switch Off/R/Y/YB/BR	Suitable rating	1	IEC 61010
2	Ammeter	Suitable rating	1	IEC 61010
3	Automatic Star/Delta Starter	Suitable rating	1	IS: 13947
4	ICTP Iron clad triple pole with neutral Link with HRC fuses Bakelite base	Suitable rating	1	An ISO 9001 Certified factory product
5	Indicating lamp LED type 12mm size for incomer & Motor starting in color code	Suitable Rating	1 No each	ISI Product
6	HRC fuses Bakelite type base	Suitable rating	3 Nos	IS 13703 / IEC 60269
7	RPM Inductor with Sensor	Suitable Rating	1	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-E1				
Electric Panel Board for Motor Generator(DC to AC) set				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
AC generator Side				
1	Voltmeter For Output and Field Excitation	Suitable rating	1 each	IEC 61010
2	Ammeter For Output and Field Excitation	Suitable rating	1 each	IEC 61010
3	Rotary Switch for Voltmeter Selection for OFF/R/Y/B/BR	Suitable rating	1	IS 13947
4	Indicating Lamp LED red, yellow and Blue colour :	Suitable rating	1 No each	ISI Product
5	Field regulator suitable to decrease field current	Suitable rating	1	An ISO 9001 Certified factory product
6	Ammeter Selector Switch, Rotary type, Off/R/Y/B	Suitable rating	1	An ISO 9001 Certified factory product
7	3 ph. Power Factor Meter(Analog Type)	Suitable rating	1	IEC 61010
8	Frequency meter 45-50-55 Hz.	Suitable rating	1	IEC 61010
9	Built in DC source to feed the Generator Excitation	Suitable Rating	1	An ISO 9001 Certified factory product
10	RCCB for AC Generator	20 Amp, 3 Ph.440 volts	1	IEC 61008-1/IS 12640-1:2008/EN 61008-1
11	DP MCB for Excitation	Suitable Rating	1	IS/IEC 60898-1
DC Motor Side				
7	Voltmeter	0-300 volts,	1 no	IEC 61010
8	Ammeter for DC output	0-15 Amps	1 no	IEC 61010
7	Built in DC source to feed the DC Motor	Suitable Rating	1	An ISO 9001 Certified factory product
9	Field regulator suitable to decrease field current	Suitable rating	1 no	An ISO 9001 Certified factory product
10	D.P.S.T. Knife Switch	Suitable rating	1 no	An ISO 9001 Certified factory product
11	Indicating lamp LED type Red, colour	Suitable rating	1 no	ISI Product
12	Three Point D.C. Motor Starter	Suitable rating	1 no	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-F				
Electric Panel Board for AC Induction Motor				
Sl.No	Item	Min. Rating	Quantity	Min. Standard to conform
1	Voltmeter with selector switch Off/R/Y/B/R	Suitable rating	1	IEC 61010
2	Ammeter	Suitable rating	1	IEC 61010
3	Starter in line with specifications	Suitable rating	1	IS: 13947
4	ICTP Iron clad triple pole with neutral Link with HRC fuses Bakelite base	Suitable rating	1	An ISO 9001 Certified factory product
5	Indicating lamp LED type 12mm size for incomer & Motor starting in color code	Suitable Rating	1 No each	ISI Product
6	HRC fuses Bakelite type base for backup protection	Suitable rating	3 Nos	IS 13703 / IEC 60269
7	RPM Inductor with Sensor	Suitable Rating	1	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-G				
Electric Panel Board for AC PHASE-WOUND SLIP RING MOTOR				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeter on each supply phases and armature	Suitable rating	1 Each	IEC 61010
2	Ammeter on each motor phase load and armature	Suitable rating	1 Each	IEC 61010
3	D.O.L. Starter	Suitable rating	1	IS: 13947
4	Resistance type Starter for motor Armature	Suitable rating	1	An ISO 9001 Cerified factory product
5	TPN MCB mounted on panel board for main supply and armature	Suitable rating	1 Each	IS/IEC 60898-1
6	Indicating lamp for incoming & outgoing, LED type.	Suitable Rating	1 Each	An ISO 9001 Cerified factory product
7	RPM Inductor with Sensor	Suitable Rating	1	An ISO 9001 Cerified factory product
8	HRC fuses Bakelite type base	Suitable Rating	For 3 Phase	IS 13703 / IEC 60269
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix H				
Electric Panel Board for Universal Motor with starter/switch				
Sl.No	Item	Rating	Quantity	Standard to conform
	DC Side			
1	Voltmeters	Suitable rating	1	IS 1248
2	Ammeters	Suitable rating	1	IS 1248
3	Starter Switch	Suitable rating	1	An ISO 9001 Certified factory product
4	DP MCB	Suitable Rating	1	IS/IEC 60898-1
5	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI Product
6	Built in DC source to feed the Motor	Suitable Rating	1	An ISO 9001 Certified factory product
7	HRC fuses Bakelite type base for backup protection	Suitable Rating	1	IS 13703 / IEC 60269
	AC Side			
1	Voltmeters	Suitable rating	1	IS 1248
2	Ammeters	Suitable rating	1	IS 1248
3	Starter Switch	Suitable rating	1	An ISO 9001 Certified factory product
4	DP MCB	Suitable Rating	1	IS/IEC 60898-1
5	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI Product
6	HRC fuses Bakelite type base for backup protection	Suitable Rating	1	IS 13703 / IEC 60269
7	RPM Meter	Suitable Rating	1	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix I				
Electric Panel Board for Synchronous motor				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Ammeters for sensing and indicating excitation	Suitable rating	As Required	IEC 61010
2	Ammeters for sensing and indicating motor current in all phases separately.	Suitable rating	As Required	IEC 61010
3	Voltmeters for AC Excitation in all phases separately	Suitable rating	As Required	IEC 61010
4	Voltmeters for DC excitation.	Suitable rating	As Required	IEC 61010
5	Frequency Meter for supply frequency	Suitable rating	As Required	IEC 61010
6	Miniature Circuit Breaker of Range (MCB/ TPN) Provided on the Input Side	Suitable rating	As Required	IS/IEC 60898-1
7	Variable Rheostat of suitable Range with SPST Switch for excitation arrangement.	Suitable rating	As Required	An ISO 9001 Certified factory product
8	Direct On Line Starter of suitable Range Provided on the Front Panel.	Suitable rating	As Required	IS: 13947
9	TPN MCB for motor stator circuit	Suitable rating	As Required	IS/IEC 60898-1
10	DP MCB for Excitation circuit	Suitable rating	As Required	IS/IEC 60898-1
11	Indicators provided for both AC and DC side..	Suitable rating	As Required	ISI Product
12	Three phase power factor meter	Suitable rating	As Required	IS-13779
13	Digital RPM meter arrangement mounted on panel front for displaying Motor Speed	Suitable rating	As Required	An ISO 9001 Certified factory product
14	DC power supply arrangement for Excitation	Suitable rating	As Required	An ISO 9001 Certified factory product

NOTE:

The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.

Appendix J				
Electric Panel Board for AC Single Phase Capacitor Motor				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeter	Suitable rating	1	IEC 61010
2	Ammeter	Suitable rating	1	IEC 61010
3	Digital tachometer	Suitable rating	1	Relevant IEC/IS
4	D.O.L. Starter Single Phase with Thermal overload Relay	Suitable rating	1	IS: 13947
5	DP MCB	Suitable Rating	1	IS/IEC 60898-1
6	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI Product
7	HRC fuses Bakelite type base for backup protection	Suitable Rating	1	IS 13703 / IEC 60269
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix K		
Electrical Machine Trainer		
Sl.No	Item	Quantity
	Machines	
1	Single Phase Capacitor run AC Motor, 1 HP ,250V,1440 RPM	1 PC
2	Three Phase Squirrel Cage AC Motor, 1 HP ,440V,1440 RPM	1 PC
3	Three Phase Slip-Ring AC Motor,1 HP 1440 RPM	1 PC
4	Three Phase Auto-Synchronous AC Motor, 1 HP with DC Excitation, 1440 RPM	1 PC
5	Single Phase Repulsion AC Motor: 1 HP , 250 V	1 PC
6	DC Compound Motor, 1KW, 220VDC	1 PC
7	DC Shunt Motor, 1KW, 220VDC	1 PC
8	DC Series Motor, 1KW, 220VDC	1 PC
9	DC compound Generator, 1KW, 440VDC, suitable field variac, coupled with suitable primemover/ AC Motor .	1 PC

10	Three Phase AC Alternator , 1 KVA, 440 V, separately excited with rotating field type, with star and delta connections, Six terminal brought on the terminal box coupled with suitable DC Motor. Excitation and starting arrangement along with alternator.	1Set
11	DC Shunt Generator of 1 KW, Separately excited with field variac coupled with Suitable AC motor.	1Set
12	Unit Control Brake Machine , For supply, control & regulation of the magnetic power brake, the recording of characteristic (speed/torque) is possible in automatic operation. Torque 0-6Nm-.	1 For Each Motor
13	Single Phase Load , Nominal power 30W-300W continuously variable-.	1 PC
14	Suitable variable Resistive load, Inductive load & Capacitive load for Generator / alternator Loading.	1 PC each
15	Control Panel Details:	
	<p>Bench Power Supply-</p> <p>Main source supply 3 phase 440V</p> <p>· AC 3ph fixed 440 V.</p> <p>· Phase control lamps, L1, L2, L3.</p> <p>· Push button emergency.</p> <p>· Each AC or DC source complete with main switches and safety devices such as TPN MCB or DP MCB.</p> <p>Starting arrangement for all AC DC Motors Generators supplied shall be provided on the control panel with digital measuring instruments for measurement of voltage, current, frequency, VAR and power factor with basic measuring equipments like Torque Meter, RPM Meter, Volt Meter, Ammeter, & Power Meter. Output terminals for Alternator and DC Generators shall be provided with safety devices such as TPN or DP MCBs of suitable ratings as required Inbuilt suitable variable DC Supply arrangement for Machines supplied with Trainer shall be provided.</p>	As Required
	Digital RPM meter with sensor system	1 for Each Motor/generator
<p>NOTE:</p> <p>The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.</p>		

Appendix L				
Electric Panel Board for Programmable DC drive with motor				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeters	Suitable rating	As required	IEC 61010
2	Ammeters	Suitable rating	As required	IEC 61010
3	Starter Switch	Suitable rating	As required	An ISO 9001 Certified factory product
4	DP MCB	Suitable Rating	As required	IS/IEC 60898-1
5	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	As required	ISI product
6	HRC fuses Bakelite type base	Suitable Rating	As required	IS 13703 / IEC 60269
7	RPM Meter	Suitable Rating	As required	An ISO 9001 Certified factory product
8	(Simoreg DC master) 6RA70 controller drive	Suitable Rating	As required	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix L1				
Electric Panel Board for Thyristor /IGBT controlled D.C. motor drive with tacho-generator feedback arrangement				
Sl.No	Item	Rating	Quantity	Standard to conform
	DC Side			
1	Voltmeters	Suitable rating	1	IS 1248
2	Ammeters	Suitable rating	1	IS 1248
3	Starter Switch	Suitable rating	1	An ISO 9001 Certified factory product
4	DP MCB	Suitable Rating	1	IS/IEC 60898-1
5	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI product
6	HRC fuses Bakelite type base for Backup protection at Panel.	Suitable Rating	1	IS 13703 / IEC 60269
	AC Side			
1	Voltmeters	Suitable rating	1	IS 1248
2	Ammeters	Suitable rating	1	IS 1248
3	DP MCB	Suitable Rating	1	IS/IEC 60898-1
4	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI product
5	HRC fuses Bakelite type base for Backup protection at Panel.	Suitable Rating	1	IS 13703 / IEC 60269
6	RPM Meter	Suitable Rating	1	An ISO 9001 Certified factory product
7	DC Drive suitable for 1 HP DC Motor	Suitable Rating	1 set	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix M				
Electric Panel Board for Thyristor/IGBT controlled A.C. motor drive with VVVF Control				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeter with selector switch Off/R/Y/B/BR (main supply)	Suitable rating	1	IEC 61010
2	Ammeter with selector switch for three Phase(main supply)	Suitable rating	1	IEC 61010
3	TPN MCB	Suitable Rating	1	IS/IEC 60898-1
4	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI Product
5	HRC fuses Bakelite type base for backup protection	Suitable Rating	1	IS 13703 / IEC 60269
6	RPM Meter	Suitable Rating	1	An ISO 9001 Certified factory product
7	Thyristor/IGBT based AC Drive suitable for 3 HP 3 phase AC Motor	Suitable Rating	1 set	An ISO 9001 Certified factory product
8	Digital Voltmeter for motor input	Suitable Rating	1 for each phase	Safety standard IEC61010
9	Digital Frequency meters for Motor input	Suitable Rating	1	Safety standard IEC61010
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix-N

This appendix includes the basic requirements of Machine control panel, Operating area, Foundation bed and Mechanical/Electrical loading arrangement.

Machine Control Panel & Operating Area:

- Control panel board shall consist of high grade FRP or better material in compliance with **IS 302** or **IEC60335** or equivalent IS /IEC safety standards.
- The Electrical Control Panel dimensions: Minimum size of size Length = 900 mm; Depth = 250 mm; Height = 750 mm. **However, for a standard manufactured product of standardized size, bidder to provide test reports complying IS/IEC safety standards.**
- Control panel shall be mounted and to be fixed on a Frame stand via Nut bolt or any arrangement through which the panel can be removed easily.
- The MS Frame/stand shall be made of suitable size of MS channel/angle/Square Pipe or better type.
- Frame/stand shall be rust free power coated.
- The floor height of the Frame/Stand's Top shall be Min. 900 mm so that the control panel mounted on it shall be 900 mm from floor. The MS Stand/frame shall have suitable foundation arrangement.
- The working area arrangement shall be fitted on front top side of the Stand/frame. The Working area shall be of Minimum dimensions as Length = 900 mm and Width = 300 mm and shall be made of Minimum of 12 mm plywood fitted with Minimum 3 mm hylam sheet on top. The three sides of the working top should be lipped using suitable teakwood lipping patti.
- Frame/stand shall have rack shelf with door having locking system just below the working area. Height of the rack shelf shall be min. 150 mm. Depth and length of shelf shall be as per stand/frame.
- Suitable safety terminals shall be provided and specially designed patch cords to protect from danger.
- 4mm or suitable sturdy shrouded banana patch cords and shrouded socket arrangement for high voltage circuits

Motor/Generator/Machine Foundation Bed:

Machine shall be fitted on M.S. channel of size min. 75 x 40 mm. Min. 6 mm thick on fabricated frame with coated & painted. Foundation bed shall have Suitable Anti-vibration Pads to avoid any vibrations during machine operation.

Where ever there are mechanically coupled machines, Bidder shall provide such an arrangement that the machines can be re-aligned as per operator requirement.

Mechanical/Electrical Loading Arrangement:

All the Motors which are not coupled with generators shall be provided with aluminum casted Brake-Drum/Pulley with heat suppression facility. Suitable friction brake dynamometer set having two nos. six inches dial type spring balances should be provided with fixed on motor base plate.

Further, Suitable Electrical loading arrangement shall be provided for DC/AC generators for performing experiments.

Bidder shall provide Backup protection at Panel.

Appendix O				
Electric Panel Board for AC Motor drive With Siemens Micro Master 420				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeter with selector switch Off/R/Y/YB/BR (main supply)	Suitable rating	1	IEC 61010
2	Ammeter with selector switch for three Phase(main supply)	Suitable rating	1	IEC 61010
3	TPN MCB	Suitable Rating	1	IS/IEC 60898-1
4	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	1 Each	ISI Product
5	HRC fuses Bakelite type base	Suitable Rating	1	IS 13703 / IEC 60269
6	RPM Meter	Suitable Rating	1	An ISO 9001 Certified factory product
7	Siemens Micro Master 420 controller	Suitable Rating	1 set	
8	Digital Voltmeter for motor input	Suitable Rating	1 for each phase	Safety standard IEC61010
9	Digital Frequency meters for Motor input	Suitable Rating	1	Safety standard IEC61010
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix P				
Electric Panel Board for DC drive trainer with SCR chopper circuit				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeters	Suitable rating	As required	IEC 61010
2	Ammeters	Suitable rating	As required	IEC 61010
3	Starter Switch	Suitable rating	As required	An ISO 9001 Certified factory product
4	DP MCB	Suitable Rating	As required	IS/IEC 60898-1
5	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	As required	ISI product
6	HRC fuses Bakelite type base	Suitable Rating	As required	IS 13703 / IEC 60269
7	RPM Meter	Suitable Rating	As required	An ISO 9001 Certified factory product
8	SCR chopper circuit controller drive	Suitable Rating	As required	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

Appendix Q				
Electric Panel Board for DC drives trainer with phase control method				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
1	Voltmeters	Suitable rating	As required	IEC 61010
2	Ammeters	Suitable rating	As required	IEC 61010
3	Starter Switch	Suitable rating	As required	An ISO 9001 Certified factory product
4	DP MCB	Suitable Rating	As required	IS/IEC 60898-1
5	Indicating lamp LED for incoming & outgoing in colour code	Suitable Rating	As required	ISI product
6	HRC fuses Bakelite type base	Suitable Rating	As required	IS 13703 / IEC 60269
7	RPM Meter	Suitable Rating	As required	An ISO 9001 Certified factory product
8	Phase controlled based controller complete in all aspects	Suitable Rating	As required	An ISO 9001 Certified factory product
NOTE: The Above equipment details shall be read with along the specifications as mentioned in tender. Anything which is required in addition to above shall be provided on the control panel in order to achieve the desired arrangement as mentioned in specifications.				

4. Drawings

Not Applicable