

Section 6- Schedule of supply

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1. List of Goods and Related Services

Package Name: Supply of Electrical and Electronics related equipment's for Industrial Training Institutes to enhance technical and vocational skills among the youth of Himachal Pradesh (Package -03)

The Goods and Related Services are grouped in Lots. Bidders shall have the option of submitting Bids for one, any combination, or all of the lots. Lots shall not be further subdivided for the purpose of bidding. The bidder is required to supply the items as mentioned below for the respective Package and Lot(s) for which bidding.

Besides the supply of equipment, the bidder shall also carry-out required related services including unloading, installation & commissioning, after sales warranty & maintenance as well as the relevant handholding to the trainers of the ITI for proper usage and operations. The bidder shall do the necessary site preparation including electrical work, earthing, minor civil work, etc. as required for installation & commissioning of the equipment's/goods. While doing the site preparation the bidder shall ensure that aesthetics of the labs/workshops, IT Lab and the Library shall maintain /restored.

Lot No : 1							
Lot Name: Electronics appliances							
Item No	Name of Goods or Related Services	Description	Unit of Measure -ment	Quantity	Specification by the supplier (To be filled by the supplier)	Detailed information brochure attached at Page No.	Pass/Fail (By Purchaser)
1.	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 • Color -White • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Technology Used- Hybrid jet • Condenser Coil -Copper 	No.	56			
2.	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 	No.	10			

		<ul style="list-style-type: none"> • BEE Rating Year- 2019 • Power Requirement AC 230 V, 50 Hz • Color -White • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Technology Used- Hybrid jet • Condenser Coil -Copper 					
3.	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.	11			
4.	Calculator Scientific (Non-programmable)	Display <ul style="list-style-type: none"> • Display type: 31 * 96 FULL DOT, Natural display • Algebraic input logic: Natural V.P.A.M. with Number of characters/lines: 15/1+10/1 and Significant function: 10+2 Memory <ul style="list-style-type: none"> • Repeat function with Variable memory of 9 and Number of storable programs as Calc / Solv button Energy supply: Solar+Battery Statistics Functions: <ul style="list-style-type: none"> • Summations, Standard deviations for grouped and ungrouped values, Distribution functions (normal distribution and inverse normal distribution, binominal distribution, Poisson distribution), Regression analysis, Permutations (nPr) and combinations (nCr), Matrix calculation/vector calculation, REF/RREF function, Equation calculation, Inequality calculation Differential and integral calculus: <ul style="list-style-type: none"> • Numerical integral calculus, Numerical differential calculus 	No.	12			
5.	Car stereo	Car Stereo with following specifications: <ul style="list-style-type: none"> • Min. 15 cm Wide Screen • Audio Format: WMA/MP3/AAC/WAV • Video/Image Format: MPEG/JPEG / BMP • Operation: Touch Panel • Band: FM/AM • Disc Media: DVD-R/RW, CD-R/RW 	No.	1			

		<ul style="list-style-type: none"> AUX: 1 (Rear) POWER: MOSFET 50W Equalizer: G.EQ (5BAND) RCA Pre-outs: 2 (Front, Rear or Subwoofer) Audio IN RCA: 1 IN Video IN RCA: 1 IN Video OUT RCA for Rear Screen: 1 OUT 					
6.	Cell phone power source with charger chords for different cell phones	Cell phone power source with charger chords for different cell phones *Min. capacity:20000 -mAh Li-Ion *Micro USB connectors *Min. 2 Outputs of 1 Amps and 2 Amps for phone charging *LED Charging indicator and torch	No.	2			
7.	Credit card detection machine	Portable Credit card detection machine with printing features. With Wifi and GPRS facility along with Chip sensing feature	No.	1			
8.	Deep freezer	Deep freeze with following Specifications: <ul style="list-style-type: none"> Capacity: 200 L Refrigerant: 134a Power Supply: 230V Phase: Single Phase Frequency: 50 Hz Inner Cabinet: Anodised Stucco Aluminium PUF Thickness: 65mm(min) Compressor Type: Reciprocating Wheels/Legs: Heavy Duty Castors 	No.	1			
9.	Digital Theodolite	Digital Theodolite Specifications: Angle Measuring System <ul style="list-style-type: none"> Mode of Angle Measurement: Photoelectric Incremental Reading Min. Detection Method: H: Both Sides Detection Method: V: Single Side Precision of Angle Measurement: 2" Unit of Angle: DEG MIL GON Display: LCD Double Side, 7 digits x 2 lines, backlight Tilt Sensor: Automatic vertical compensation Compensator of Tilt Sensor type with ±3' as Range of Compensation Laser Optical plummet <ul style="list-style-type: none"> Magnification Ratio : 3x 	No.	5			

		<ul style="list-style-type: none"> • Angle of View: 3° • Min. Focus: 0.5m Telescope: <ul style="list-style-type: none"> • Magnification: 30 x • Min. focus: 1 Meter • Objective aperture: 45 mm 					
10.	Digital weighing machine	Digital Weighing Machine Specifications: <ul style="list-style-type: none"> • Type: Bench Type • Weighing Capacity: 100Kg or more • Preset keys/Hot keys: 20 • Power Supply: 230V AC, 50 Hz • Operating Temperature: 0C to 45C • Display Type: 7 Segment LED • Display Digit and Size: Min. 19 digits, 10 mm height • Battery: 6V/4 AH Rechargeable • Platter MOC: SS • Interface: Inbuilt RS232 	No.	1			
11.	Document Camera / Visualiser	Document Camera / Visualiser with Min. Specifications as: <ul style="list-style-type: none"> • Image pick-up device: 1/ 2.7 " or 1/ 3 "CMOS sensor • Effective Pixels: Min 1920 Horizontal x 1080 Vertical • Frame Rate: max. 30 fps OPTICAL <ul style="list-style-type: none"> • Zoom Optical 12, Digital 10 • Focus Auto • Shooting Area: A3 sized: 297 x 420 mm IMAGE <ul style="list-style-type: none"> • High Resolution Output : up-to 1080p • Image Adjustments: Auto Exposure, Black and White, Brightness Adjustment, Contrast Adjustment, Image • Rotation, Microscope mode CONNECTIVITY <ul style="list-style-type: none"> • Interfaces USB 1.1 Type B, VGA in, VGA out, HDMI out, built-in microphone, SD memory card 	No.	7			
12.	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.	18			

13.	EMS machine	EMS (Electronic Muscle Stimulator) Machine with Min Specifications as: <ul style="list-style-type: none"> • Min Channel 12 with pads 24 output • Body: Heavy Plastic Body • Technology: Micro-computer controlled/ Processor Control /PCB Based • Operation: Manual Mode/Timer Based/Auto Mode • Power Supply: 220-240 V AC with 50 Hz 	No.	1			
14.	Geyser (Storage type)	Capacity 10 Litres 3 KW Heating Element Min. Min. 4 Star rated from BEE ISI Mark Product	No.	8			
15.	FAX Machines with answering facility	<ul style="list-style-type: none"> • Printing method: Laser printing on plain paper • Effective scanning width : Min. 208 mm • Effective printing width: 202 mm (A4), 208 mm (Letter / Legal) • Resolution: Standard / Fine / Photo / Super Fine / Mixed • Paper size : A4 / Letter / Legal • Modem Speed: Min. 33.6 kbps • Document Memory 2.5 MB (Reception: 100 pages / Transmission: 150 pages)*2 • LCD readout 16 digits / 2 lines • Power Supply: AC 220 - 240 V, 50/60 Hz 	No.	1			
16.	Frost free refrigerator	Frost Free refrigerator specifications: <ul style="list-style-type: none"> •Capacity: Min. 200 litre •Input Power: 220-240 V AC 50 Hz • Type -Double Door Refrigerator with • Star Rating- Min. 3 Star BEE Rating • Color -White • Compressor- Reciprocatory type • Refrigerant -R600a 	No.	2			
17.	Mixture & Grinder	<ul style="list-style-type: none"> •Input Voltage: 230 V, 50Hz •Power: 750 W or above •Motor rating: 30 minute(s) •Capacity chutney jar: 0.5 L or above •Capacity wet grinding jar: 1.5 L or above •Capacity multi-purpose jar: 1.25 L or above •Blender volume capacity liquid: 1.5 L or above •Motor rating: 30 minute(s) or above •Capacity chutney jar: 0.5 L or above •Capacity wet grinding jar: 1.5 L or above 	No.	9			

		<ul style="list-style-type: none"> •Capacity multi-purpose jar: 1.25 L or above •Blender volume capacity liquid: 1.5 L or above 					
18.	Washing Machine Semi-Automatic	<ul style="list-style-type: none"> •Washing Machine Semi-Automatic 5 Kg & above •Input voltage 100V- 240V, 50Hz •Power in 1200W / Output power 100–400W •Top loading / Front loading type •Capacity: 5 Kg or above •Induction motor •Water proof •Body type: Plastic 	No.	12			
19.	Hand Held GPS	<p>Hand Held GPS complete in all aspect with key specifications as:</p> <ul style="list-style-type: none"> • Display: Min. of 2.2" transfective, 65K color TFT • Water rating: IPX7 • USB interface with High-sensitivity receiver • Base map with ability to add maps • Built-in memory: Min 3.7 GB and shall also Accepts data cards such as microSD™ card • Shall have Custom POIs (ability to add additional points of interest) • Routes: Min. 200 • Track log: Min. 10,000 points, 200 saved tracks 	No.	6			
20.	Home theatre system	<p>Home theatre system</p> <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.	6			
21.	Infra red lamp	<ul style="list-style-type: none"> •Voltage: 220/230 or 240/250V •Frequency: 50 Hz •Power: 150W •Cord length: 180 cm •Cord storage: Yes) •Insulation: Class II (double isolation) •Type of lamps: PAR 38E, 150 W + prismatic rings for more focus •Lifetime of lamp: 750 sessions of 10 minutes •Adjustability: 0-40 degrees (backwards) •On/off switch: Yes 	No.	1			

22.	Total Station	Total Station complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Laser pointer: Coaxial red laser using EDM beam • Levels Graphic: 6' (Inner Circle) • Circular Level: 10'/2mm • Optical: Magnification: 3x with Minimum focus: 0.5m from tribrach bottom 	No.	7			
23.	Inverter with Battery	Inverter with Battery 12 V Heavy Duty , Battery Input- 12 volt DC, Output- 220 volt AC Inverters 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.	11			
24.	LCD PROJECTOR	LCD PROJECTOR with following specifications: <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			
25.	LCD SCREEN	40-inch LCD panel with full HD 1080p resolution (1920 x 1080 pixels) Five separate HD inputs (two HDMI, two HD components, one PC) Light Sensor adjusts picture brightness based on ambient light Dynamic contrast ratio: 1000:1	No.	1			
26.	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- 	No.	11			

		CEC, RF Capable and USB.					
27.	LED 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.	7			
28.	Mobile (GMS/CDMA).	RAM 4GB Min, Internal Storage - 64GB, Processor - Octa Core 2GHz, Latest Operating Version of Android (4G & 5G Support), IS 13252 (Part 1) / IEC 609500-1	No.	4			
29.	Photocopy machine	<p>Multifunctional Photocopy machine with following Specifications:</p> <ul style="list-style-type: none"> • Paper Input Capacity: Standard: 2 x 250-sheet paper trays, 100-sheet multi-bypass tray Maximum: 1600 Sheets • Recommended paper size: Paper tray(s): A5 - A3, Bypass tray: A6 - A3 • Paper Output Capacity: Maximum: 350 sheets <p>Copier</p> <ul style="list-style-type: none"> • Copying Process: Laser beam scanning and electro photographic printing • Multiple Copies: Up to 99 copies • Resolutions: 600 dpi • Zoom: From 50 to 200% <p>Power Input: 1 Phase 220-240 V AC 50 Hz CE Mark Product</p>	No.	1			
30.	Refrigerator	<ul style="list-style-type: none"> • Type -Double Door Refrigerator with Top Freezer Refrigerator • Capacity : Min. 165 litres • BEE Rating Year- 2019 • Power Requirement AC 230 V, 50 Hz • Color -White • Compressor- Reciprocatory type 	No.	2			
31.	Scientific Calculator	<p>Display</p> <ul style="list-style-type: none"> • Display type: 31 * 96 FULL DOT, Natural display • Algebraic input logic: Natural V.P.A.M. with Number of characters/lines: 15/1+10/1 and Significand function: 10+2 <p>Memory</p> <ul style="list-style-type: none"> • Repeat function with Variable memory of 9 and Number of storable programs as Calc / Solv button <p>Statistics Functions:</p> <ul style="list-style-type: none"> • Summations, Standard deviations for grouped and 	No.	4			

		ungrouped values, Distribution functions (normal distribution and inverse normal distribution, binominal distribution, Poisson distribution), Regression analysis, Permutations (nPr) and combinations (nCr), Matrix calculation/vector calculation, REF/RREF function, Equation calculation, Inequality calculation Energy supply: Solar+Battery					
32.	Sensor thermometer (digital)	Sensor thermometer (digital) with following specifications: <ul style="list-style-type: none"> • Range: -50 °C to 150 °C • Temperature Resolution: 0.1 °C • Display Min. 36 x 17mm • Accuracy: ±0.1%+0.4°C • Survey Cycle: 10 Sec • Sensor: PT 100 • Battery: 1.5V (LR44) 	No.	4			
33.	Smart Board / Inter Active Board	Smart Board / Inter Active Board with Min. Specifications as: <ul style="list-style-type: none"> • Min. Size 78" diagonal LxH -(6x4 feet) • Whiteboard Surface: Non-Ceramic/ Ceramic High luminance nanotechnology, anti-scratch, anti glare surface • Aspect Ratio: 4:3 • Touch accuracy: 0.1 mm • Touch response time: < 8ms • Resolution: Min. 9600 x 9600 • DPI: Min. 600 • Power supply: USB (<5V/500mA) • Operations: Temperature: 0 to 60 degree Celsius; Humidity: 0% to 95% 	No.	7			
34.	Smart phones of different make (android/Windows)	Android Smartphone: OS: Android Nougat 7.1.2 • 2G/3G/4G GSM Mobile Specifications:- <ul style="list-style-type: none"> • 2 GB RAM 16 GB ROM Expandable Upto 32 GB • Min. 4.5 inch Full HD+ Display • Min. 12MP + 2MP Dual Rear Camera 13MP Front Camera • 4000 mAh Li Polymer Battery • Qualcomm Snapdragon 636 Processor Windows Smartphone: OS : Windows 10 <ul style="list-style-type: none"> • 2 GB RAM 16 GB ROM Expandable Upto 128 GB • 4.7 inch HD Display • 5MP Rear Camera 5MP Front Camera • 2220 mAh Battery 	No.	15			

		<ul style="list-style-type: none"> Qualcomm Snapdragon 400 Processor 					
35.	Air Conditioner unit split 1.5 Ton Inverter Technology	<ul style="list-style-type: none"> Type - Split 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 Refrigerant -R-134a or R-22 Technology Used- Hybrid jet Condenser Coil -Copper 	No.	4			
36.	Split A/C(Inverter technology)	<ul style="list-style-type: none"> Type - Inverter Split 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 Technology Used- Hybrid jet Condenser Coil -Copper 	No.	4			
37.	Telephone (STD & ISD facility).	Capacity: 4 Main Lines (Trunk Line/ P& T) and 32 Extensions, Internal/External Music on Holding, Operator/Auto-attendant Mode, Remote Programming, Day/Night Mode(Manual), Music & Ringing Recordable OGM(outgoing message), Music Duration 20 Seconds, Caller ID, Call Transfer, Call Forwarding Manually, Outgoing Call Transfer, Power Failure Transfer, Specific Main Line , (C.O./Trunk Line) Dialling, Three Way Conference, Do Not Disturb, Auto/Manual Dial-Out Mode, Brand: S-Tech (Manufactured By Swift Technologies) Model: STECH-CS416	No.	1			
38.	Telephone with intercom facilities	6 lines 6 SIP accounts, Up to 6-way voice conferencing, 3-way video conferencing, Dual-switched Gigabit ports and integrated WiFi (802.11b/g/n), FREE IP Video Talk account for video calling, 1 megapixel CMOS camera, 4.3 inch (480×272) capacitive touch screen	No.	1			

39.	Three/four door refrigerator	Three / four door refrigerator •Capacity: Min. 300 Litre •Input Power: 220-240 V AC 50 Hz • Type -Double Door Refrigerator with • Star Rating- Min. 3 Star BEE Rating • BEE Rating Year- 2019 • Color -White • Compressor- Reciprocator type • Refrigerant -R600a	No.	3			
40.	Vacuum Cleaner	Portable Vacuum Cleaner with Min. Desired specifications as : • Power Supply: Single Phase 220 V, AC 50 Hz • 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.)	No.	7			
41.	Vacuum cleaner -Hand Held	Hand Held Vacuum Cleaner with Min. Desired specifications as : • 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.	4			
42.	Wax heater	Wax heater with Min. Specifications as: • Power Supply: 220-240 V AC with 50 Hz •Capacity: Mi. 2 Kg •Type: Single Jar	No.	1			
43.	Location and navigational equipment set consisting of : • Hand held GPS units • Compass clinometers • Prismatic compass	Hand Held GPS complete in all aspect with key specifications as: • Display: Min. of 2.2" transfective, 65K color TFT • Water rating: IPX7 • USB interface with High-sensitivity receiver • Basemap with ability to add maps • Built-in memory: Min 3.7 GB and shall also Accepts data cards such as micro SD™ card • Shall have Custom POIs (ability to add additional points of interest) • Routes: Min. 200 • Track log: Min. 10,000 points, 200 saved tracks Compass clinometers complete in all aspect with key specifications as: • +/- 0.5° Azimuth/Bearing Accuracy • +/- 90° Inclinator • 0-45° Sine and Tangent Scales •	No.	1			

		Sapphire Jewel Bearing • Inch and Millimetre Scales • Aluminium Housing • Integrated Carrying Lanyard • Azimuth and Inclination Tripod Mounts Prismatic compass complete in all aspect with key specifications as: Prismatic Compass is made of Brass / Aluminium / Gun Metal with min. size of 125mm dia					
44.	Anemometers	Anemometers complete in all aspect with key specifications as: • LCD Display • Measurement Units: Velocity: m/s, km/h, ft/min, knots, mile/hr • Temperature: °C or °F • Sampling Time: o Auto: 1 to 3600 seconds o Manual: Push the data logger button once, will save data one time • Operating Humidity: Less than 85% RH • Power: 6 "AAA" alkaline or heavy-duty batteries (included), or 9V power adaptor (optional)	No.	1			
45.	Windwatch- which incorporates a barometer, altimeter, temperature probe and anemometer in a single hand held device. It can also measure wind-chill	Windwatch complete in all aspect with key specifications as: Windwatch- which incorporates a barometer, altimeter, temperature probe and anemometer in a single hand held device. It can also measure wind-chill	No.	1			
46.	Digital cameras	Digital cameras complete in all aspect with key specifications as: Digital camera with Min. 20 MP, Sensor type: CMOS, Data Storage as Micro SD Card with Min. 16 GB Micro SD Card. Chargeable Battery with Adapter	No.	1			
47.	Spring scales	• Spring scales complete in all aspect with key specifications as: Spring scales Handy 100 KG Weighing scale machine	No.	1			
48.	Calipers	Digital Calipers complete in all aspect with key specifications as: • Resolution: 0.01mm or .0005"/0.01mm • Repeatability: 0.01mm / .0005"	No.	1			
49.	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	No.	16			

		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					
50.	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.	12			
51.	UPS 2 KVA	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 24 V . Battery Backup: 01 Hr (Minimum) for 10 Computers Recharge time: approximately 08 Hr's	No.	6			
52.	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.	189			
53.	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.	11			
54.	UPS Trainer kit	AC Input : 190 to 260 V 10%, 50 Hz Load Output : 230 V / 2.5A Transformer Used 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	No.	6			

		All ICS are mounted on IC Sockets. Bare board Tested Glass Epoxy SMOBC PCB with Block Diagram.					
55.	LED Projector	<ul style="list-style-type: none"> o Display Type: LCD/LED/DLP 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.	54			
56.	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 Facbric Wall Mountable / Stand mountable Mounting stand Autolock (motorized)	No.	20			
57.	Profile Projector	Screen Diameter: Fine grain ground glass screen with cross lines, Axis colon: vertical lens axis; Electronic Protractor: Switchable degree/decimal, 1 minute / 0. Measuring Range X/Y Axis: 201 x 150 mm Max or equivalent Range: +/- 370 degree Workpiece Height: 110 mm Resolution: 0. 001 mm	No.	2			
58.	Laptop Spares: Cabinet with Display, memory Hard disk, battery pack, Key board membrane, Chargers, Suitable for Disassembling and Assembling practice of Trainees	Laptop Cabinet with 14" display, 4GB DDR-4 memory, 1TB hard disk, battery pack, keyboard membrane, DVD Writer Chargers	No.	17			
59.	Smart LED TV 42"	<ul style="list-style-type: none"> • Screen Size (Measured Diagonally): approx 42 inch • Display Type: LCD • DISPLAY RESOLUTION: 4K/(3840x2160) 	No.	5			

		<ul style="list-style-type: none"> • Backlit Type: Edge LED • Backlit Dimming Type: Frame Dimming • HDR Compatibility: Yes • Audio Power Output: 10W + 10W • Operating System: Android • Storage: 16 GB • CONNECTIVITY: • Wi-Fi, • Ethernet Inputs: 01 • Built-in Chromecast or equivalent • HDMI Inputs: 4, • USB Ports: 03 • USB Drive Format Support: FAT16/FAT32/exFAT/NTFS 					
60.	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	No.	9			
61.	Sound system	Form Factor: 5.1 Power Output: 1,200W Connectivity: BLUETOOTH, NFC, Wi-Fi, HDMI in/out, Ethernet, USB Keyboard Digital Amplifier: 24bit Speakers: Wireless Mica Reinforced Cellular woofer cone Speaker System: 3-way Radio: FM Playback: BLU-RAY 3D, BLU-RAY DISC, DVD Compatible: USB FILE SYSTEM (FAT32, NTFS), EXTERNAL HDD	No.	12			
62.	Interactive Board	USB Powered. 2397 sq. in. panel - 82" (2082) diagonal 1 panel. Operates as an Interactive Electronic Board with Projector & White Board modes. This unit is powered by the USB interface. Includes: Multi-touch Operation Built-in Stereo Speakers 02 USB Hub Ports Simultaneous Operation Up To 10 Points	No.	2			

63.	SMPS	Power Supply 24 Pin 450w Atx 12v SMPS PC Supply 100% Compatible With latest motherboards, 20+4 Pins Compliant with ATX 12V. 20/24 pin Main Power Connector 20/24 pin SATA Connectors-3 Pcs. Molex Connectors-2 Pcs 4 Pin ATX Connectors.-1Pc 120mm Smart Cooling Fan /230VAC 50/60Hz input, +3.3V/25A, +5V/0.3A, +12V/17A, -12V/0.8A, +5V/2A DC output	No.	35			
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Note: For detailed specifications please refer table 3: Technical Specifications

Lot No : 2							
Lot Name: Electronics lab equipments							
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.	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 • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220V ± 10%, 50Hz	No.	12			

2.	A.F.O Oscillators	A.F.O Oscillators specifications: <ul style="list-style-type: none"> • Frequency Range : 10 Hz to 100 kHz • Frequency Stability : 0.1% / hr • Operating Modes : Sine and square wave • Very Low Sine Distortion • Digital Frequency Display • Trigger Output 	No.	2			
3.	Application kits for Microcontrollers 6 different applications	Application kits for Microcontrollers 6 different applications: <ol style="list-style-type: none"> 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.	5			
4.	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.	10			
5.	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 • 1mV/div Sensitivity on Both Channels • X-Y Operation 	No.	2			

		<ul style="list-style-type: none"> • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220V \pm 10%, 50Hz					
6.	C.R.O Single beam	C.R.O Single beam with following specifications: <ul style="list-style-type: none"> • Power Supply: 220 volts 50 Hz. • Single beam with a band width DC to 5 MHz. 	No.	2			
7.	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 	No.	12			
8.	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 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 • Latest ISO 9001 Certified factory product 	No.	10			
9.	Digital IC tester	<ul style="list-style-type: none"> • Digital IC Tester (Portable) with following Specifications: 	No.	8			

		<ul style="list-style-type: none"> • 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. 					
10.	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. • 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 	No.	6			
11.	Digital trainer kit	<p>Digital trainer kit to study different types of logic gates and digital circuits using breadboard with min. Specifications as:</p> <ul style="list-style-type: none"> • 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 1 Hz, 10 Hz, 100 Hz and 1 MHz clock • 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 	No.	20			

		PCB <ul style="list-style-type: none"> • 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 					
12.	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 • 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. 	No.	42			
13.	DSO (Colour)	50MHz 4 Channel Digital Storage Oscilloscope DC - 50MHz Bandwidth <ul style="list-style-type: none"> • 1mV/div to 10V/div Sensitivity on Both Channels • X-Y Operation • Time Base 5ns/div to 50s/div • Real Time Sampling 1GSa/sec • Min.7" TFT Display • Memory Depth min 12Mpt or above • Power Supply : AC 220V ± 10%, 50Hz 	No.	2			
14.	Electronic circuit simulation software with 6 user licenses	Circuit Design, Simulation, Analysis and PCB Design Software 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	No.	6			

		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.					
15.	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 • Latest ISO 9001 Certified factory product 	No.	6			
16.	Frequency modulator and Demodulator trainer kit	<p>Frequency modulator and Demodulator trainer kit with following specifications:</p> <p>FM Modulator Type : Reactance Modulator, Varactor Modulator, VCO Based Modulator</p> <p>FM Demodulator type, All 5 demodulation techniques</p> <p>Detailed teaching and learning contents through software.</p> <ul style="list-style-type: none"> •Frequency modulation should be using Voltage Controlled Oscillator • Demodulation should be through Phase locked Loop circuit. 	No.	3			

17.	Function Generator	<ul style="list-style-type: none"> •Input:- 220Volt, 50Hz •Single Phase Pulse / Function Generator with DDS Technology •Frequency:- 2 -20 MHz , Sine, Square, Triangular • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified factory product 	No.	9			
18.	Function Generator	<ul style="list-style-type: none"> •Input: 220 Volt, 50Hz •Frequency: 1 MHz- 10 MHz , Sine, Square, Triangular •Single Phase Pulse / Function Generator with DDS Technology 	No.	20			
19.	LCD based DPM	<p>LCD based DPM</p> <ul style="list-style-type: none"> •Maximum Input: 199.9mV DC. Maximum Display: 1999 counts (3½ Digit) with automatic polarity indication. Indication Method: LCD Display. •Measuring Method: Dual-Slope Integration A-D converter system Input Impedance: > 100M Ohms, Reading rate time: 2-3 reading per second. •Accuracy: ± 0.5% of full scale. •Decimal Points: Selectable with wire jumper or switches. • Supply Voltage: 7-11V DC 	No.	20			
20.	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.	3			

21.	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 • Fault Switches: 5 No. • Test Point: 10 No. • Operating Power supply: 230V + 15% AC, 50 Hz. 	No.	2			
22.	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. • Latest ISO 9001 Certified factory product	No.	10			
23.	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.	20			

24.	Microcontroller kits (8051) along with programming software (Assembly level Programming)	<p>Microcontroller kits (8051) along with programming software (Assembly level Programming)</p> <ul style="list-style-type: none"> • 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 	No.	16			
25.	Mobile phone Trainer	<p>Mobile phone Trainer with following specifications:</p> <p>Self contained, easy to operate, training and development platform that demonstrates the complete study and working of a 2G/3G/ 4G Dual SIM VoLTE handset to understand the fundamentals of Smart phone.</p> <p>Cellular system : 2G /3G/4G Dual SIM GSM Handset.</p> <p>Output power : +5... +33dBm/3.2mW... 2 W</p> <p>OS & Processor Features</p> <ul style="list-style-type: none"> • Operating system : Android Nougat 7.0 • System Architecture : Qualcomm Snapdragon 430 • Processor core : Octa Core • Processor clock speed : 1.4 GHz • GPU : Adreno 505 at 450 MHz <p>Display Features</p> <ul style="list-style-type: none"> • Display size : 5 inch with Full HD Resolution : 1920 x 1080 • Other display features : IPS display, 5 point multi-touch <p>Memory & Storage Features</p> <ul style="list-style-type: none"> • Internal storage : 16 GB with RAM : 3 GB and Expandable storage : 128 GB as Memory card type : Micro SD • Battery type : Li-Polymer 2800mAh 	No.	8			

		<ul style="list-style-type: none"> • Latest ISO 9001 certified factory product. 					
26.	Multi Scan Tool with oscilloscope	<p>Multi Scan Tool with Oscilloscope Specification:- Multi Scan Tool with Android based operating system should have android 5.0 having display of minimum size 10" IPS capacitive touch screen with CPU of 1.3 GHZ quad core and 1GB Ram. Memory capacity should be of 16 GB (Internal/SD Card). At least 6800 mAH lithium polymer Battery</p> <p>Tablet with high configuration.</p> <ul style="list-style-type: none"> • Built in social network service allow access to diagnostic community. • Customer management for the workshop. • Special functions: matching, coding, programming, battery reset, break reset etc. • Remote diagnosis & maintenance. • Built in 4 channel oscilloscope • One click update online via Wi-Fi • Built in car repair Data base and car repair tips application at least for Indian cars like Maruti, Mahindra, TATA and Hyundai. • Function of automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults quickly and conveniently, including "DC voltage simulation", "Fixed frequency simulation", "Predefined waveform simulation" and "Hand-painted waveform simulation." • Functional of android based automobile multi meter, which enables users to perform voltage test, resistance test and frequency test. 	No.	15			
27.	Multi Scan Tool with oscilloscope	<p>Multi Scan Tool with Oscilloscope Specification:- Multi Scan Tool with Android based operating system should have android 5.0 having display of minimum size 10" IPS capacitive touch screen with CPU of 1.3 GHZ quad core and 1GB Ram. Memory capacity should be of 16 GB (Internal/SD Card). At least 6800 mAH lithium polymer Battery</p> <p>Tablet with high configuration.</p> <ul style="list-style-type: none"> • Built in social network service allow access to diagnostic community. • Customer management for the workshop. 	No.	1			

		<ul style="list-style-type: none"> • Special functions: matching, coding, programming, battery reset, break reset etc. • Remote diagnosis & maintenance. • Built in 4 channel oscilloscope • One click update online via Wi-Fi • Built in car repair Data base and car repair tips application at least for Indian cars like Maruti, Mahindra, TATA and Hyundai. • Function of automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults quickly and conveniently, including "DC voltage simulation", "Fixed frequency simulation", "Predefined waveform simulation" and "Hand-painted waveform simulation." • Functional of android based automobile multi meter, which enables users to perform voltage test, resistance test and frequency test. 					
28.	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>	No.	4			
29.	20 MHz Dual Trace Oscilloscope	<p>Oscilloscope Dual Trace 20 MHz</p> <ul style="list-style-type: none"> • DC - 20MHz Bandwidth • 1mV/div Sensitivity on Both Channels • X-Y Operation • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester <p>Power Supply : AC 220V \pm 10%, 50Hz</p>	No.	29			
30.	PAM, PPM,PWM trainer kit	<p>PAM, PPM,PWM trainer kit with following specifications:</p> <p>Modulation & Demodulation Techniques : PAM,PWM, PPM , Line Coding</p>	No.	2			

		<p>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 • 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</p>					
31.	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.	8			
32.	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 	No.	4			
33.	Post error debugging card	Post error debugging card	No.	16			
34.	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 	No.	8			

		<ul style="list-style-type: none"> ° 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 					
35.	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.	7			
36.	Pulse Generator	<p>20 Hz - 20MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator</p> <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.	8			
37.	Pulse Generator	<p>20 Hz - 20MHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator</p> <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.	8			

38.	Sensor Kit	Sensor Kit with Min. following components: • Mounting Plate • Power Distribution Box • Counter Box • Indication Box • Material Box • Inductive Sensor • Capacitive Sensor • Magnetic Sensor • Ultrasonic Sensor • Connecting Wires • Motor with Control Unit	No.	2			
39.	Sensor Trainer Kit	Sensor Trainer Kit Containing following Sensors:- 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.	11			
40.	Service Oscillator	• Waveform Amplitude Sine, Square and Triangle • Output Signal Impedance 100mV - 5V peak to peak variable • Power Supply 220V/ 50Hz, +-10% • Frequency Range (Hz) 2Hz to 200KHz in four decade ranges	No.	1			
41.	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. • Size – 1" LED seven segment digits, Digits: 4 ½ .	No.	22			
42.	Signal Generator with Digital Display for Frequency Amplitude	10Hz - 100kHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator • Wide Frequency Range: 20 MHz - 20MHz • Pulse duration 20 ns to 20 s • Fast rise/fall time of 3ns • LCD Readout for frequency & mode • Output Impedance: 50 Ohms	No.	2			
43.	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	No.	8			

		<ul style="list-style-type: none"> • 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.					
44.	Solar Training Kit/ Simulator	MPPT Charge Controller PV Module Input Voltage : 24–50V Max Current : 25A Battery voltage : 24V Technology : MPPT Display type : LCD Charging Stage : Bulk, Absorptions and Float Battery: Solar Tubular, Capacity : 100Ah, Type : C10, Quantity : 2 Nos. Meters: DC Voltmeter : 0-300V, 2 Nos. DC Ammeter : 0-20A, 3 Nos. AC Multi Function Meter : Voltage-10-230V : Current-100mA-5A : Watt-10-1200W : Frequency-50Hz Structure for Solar Panel Material : MS Tracking Type : Manual, Dual Axis Seasonal and day wise Assembly : Detachable and easy to install Quantity : 2 sets. Safety and Protection MCB (DC) : 16Amp. for solar panels and 25 Amp. for battery , 2 Nos. MCB (AC) : 6 Amp. AC output load protection & Grid Charging , 2Nos. Fuse : 10 Amp. for Individual protection of solar panel and battery ,4Nos Banana Terminals : 10 Amp. & 20 Amp. (shock proof connections)	No.	5			
45.	UPS trainer	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 <ul style="list-style-type: none"> •The trainer kit should be a versatile training system 	No.	1			

		<p>to explain frequently used switching based power supply in UPS.</p> <ul style="list-style-type: none"> •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 					
46.	Wheat Stone Bridge	<p>Wheat Stone Bridge with galvanometer and battery</p> <ul style="list-style-type: none"> • 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 <p>ISO 9001 of latest version certified Factory product</p>	No.	21			
47.	Analog Component Trainer	<p>Analog Component Trainer with following specifications:</p> <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 	No.	4			

		<ul style="list-style-type: none"> • 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 					
48.	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.	6			
49.	Hardware and Network Trainer Kit	Interconnection : RJ45 connection cable to connect hardware to computer LAN card Software Topology selection: i) Star ii) Bus iii) Ring Protocol selection i) Stop andWait ii) Go back to n iii) Selective repeat iv) Sliding window v) Token Ring vi) Token Bus vii) CSMA / CD viii) CSMA / CA Packet Size 128 , 256, 512, 1024, 2048, 4096, 8192, 16384 Inter packet delay 1000,2000,3000, 4000,5000ms Error generation Bad packet, acknowledgment lost and auto error generation	No.	25			
50.	Network Training System	Router Based Training system or equivalent • Functions and Characteristics of Network System (LAN Card, Router, L2 Switching Hub, L3 Switching Hub) • 19" Rack Type Structure For Effective Network Configuration • Optimized Learning System	No.	8			

Note: For detailed specifications please refer table 3: Technical Specifications

Lot No : 3							
Lot Name: Electrical lab equipment							
Item No	Name of Goods or Related Services	Description	Unit of Measure -ment	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 • Ripple: Less than 3mv RMS • Protections: Fuse protection to be provided Outputs are protected against over loads & short circuits 	No.	42			
2.	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.	10			
3.	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.	11			
4.	4 Point relays	Pin Number: 4 Pin; Current: 40A Coil Voltage: DC 12V	No.	32			
5.	5 Point relays	Pin Number: 5 Pin; Current: 40A Coil Voltage: DC 12V	No.	34			
6.	Electric Induction plate	Electric Induction plate with min 1500 Watt, 240V having Ceramic cook top. <ul style="list-style-type: none"> • ISI mark product 	No.	10			

7.	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.	29			
8.	A.C. Energy Meter	AC energy meter Three Phase, 15 A , 440 V induction portable type AC Energy Meter Housed in Bakelite case	No.	32			
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	No.	67			
10.	Ac Ammeter Mi, Analog	• AC Ammeter MI • Analog • 0-1 A range with Moving iron spring-mounted jewel bearing suspension	No.	40			
11.	Ac Ammeter Mi, Analog	• AC Ammeter MI • Analog • (0-5 A MI) with Moving iron spring-mounted jewel bearing suspension	No.	38			
12.	Ac Ammeter Mi, Analog	• AC Ammeter MI •Analog •(0-25A MI) with Moving iron spring-mounted jewel bearing suspension	No.	38			
13.	Resistance type AC starter	• AC Starters: - •Resistance type starter For A.C Motors of 2 to 5 H.P.	No.	14			
14.	DOL AC Starters	•Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 2 to 5 HP motor • 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.	13			
15.	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.	No.	13			
16.	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.	No.	14			

17.	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.	14			
18.	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.	16			
19.	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.	13			
20.	Air blow gun with standard accessories	Air blow gun Copper body with jet operating lever and suitable hose/connector	No.	10			
21.	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.	4			
22.	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.	32			
23.	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			
24.	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			
25.	Ammeter 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			
26.	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	No.	40			

		mirror • it should be moving coil type					
27.	Ammeter Mc Analog	<ul style="list-style-type: none"> •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 	No.	40			
28.	Ammeter Mc Analog	<ul style="list-style-type: none"> •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 	No.	39			
29.	Ammeter, AC/DC portable precision grade Digital Panel board type	AC/DC Digital ammeter 0-30 Amps <ul style="list-style-type: none"> • 3 Digit, 7 Segment LED Display • True RMS Measurement for AC measurement • For 1Ø-2 Wire Electrical Network • IP Protection (Front): IP65 	No.	5			
30.	Analog multimeter	Analog Multimeter <ul style="list-style-type: none"> •AC Voltage (Volts) 10-1000 V •AC Voltage Accuracy $\pm 4\%$ •DC Voltage Accuracy $\pm 3\%$ •DC Current (Amp) 50μA-10 A •DC Voltage 0.1mV-1000 V •DC Current Accuracy $\pm 3\%$ •Resistance (ohm) 0.2 Ω-20 MΩ •Resistance Accuracy $\pm 3\%$ 	No.	4			
31.	Analog Multimeter	Analog Multimeter as per IS 1248 with following range: <ul style="list-style-type: none"> •AC Voltage (Volts) 10-1000 V •AC Voltage Accuracy $\pm 4\%$ •DC Voltage Accuracy $\pm 3\%$ •DC Current (Amp) 50μA-10 A •DC Voltage 0.1mV-1000 V •DC Current Accuracy $\pm 3\%$ •Resistance (ohm) 0.2 Ω-20 MΩ •Resistance Accuracy $\pm 3\%$ 	No.	26			

32.	Auto Transformer starter	<ul style="list-style-type: none"> •Auto Transformer starter suitable for Motor starting upto 3 HP Motors. •Shall conform to IEC 60947-4-1 •Starter enclosure to conform IP 53 	No.	2			
33.	Automatic Electric 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.	2			
34.	Autotransformer	<ul style="list-style-type: none"> •Single Phase Variable Auto Transformer •0 - 270 V, 15 Amp (Air cooled) Specification:- <ul style="list-style-type: none"> •Type :Single Phase Auto Transformer Amperage 15 Amp input voltage 0-270 V with safety fuses and line indicators 	No.	7			
35.	Electric Kettle	<ul style="list-style-type: none"> •Electric Kettle Min. 1500 Watts, 240V with 1.7 Litre capacity. 	No.	8			
36.	Battery Charger	<ul style="list-style-type: none"> •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.	45			
37.	Battery charger	<ul style="list-style-type: none"> •Automotive Battery Charger of Capacity-10amps(High) •The charger is for automotive, SMF, VRLA, Tubular and stationary batteries. •It shall be possible to recharge 20Ah to 100Ah batteries. •These charger should be able to select 12V/24V/36V 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.	1			
38.	Battery storage lead acid 6V & 12 V	<ul style="list-style-type: none"> •Voltage :12 V •Capacity (Ah): 50 AH 	No.	10			

		<ul style="list-style-type: none"> •Battery Type: Sealed Acid Lead Battery •*Voltage :6 V •Capacity (Ah):4.5 AH •Battery Type: Sealed Acid Lead Battery 					
39.	Battery terminal cleaner tool	<ul style="list-style-type: none"> •Battery Terminal Cleaner tool 	No.	2			
40.	Battery tester	Auto Battery tester specifications: <ul style="list-style-type: none"> •Type: Portable type with case •Test Method: Conductance, Non-loading •Battery Test: 12V starter batteries (standard, maintenance-free, and AGM) •Power Supply: From test battery with voltages from 5.5V •Voltmeter: 5.5 – 19.99V DC •Operating Range, Amps: 200 to 850 CCA, 200 to 900 SAE/EN, 120 to 550 DIN/IEC Test State/Diagnostic Capability: Battery life, voltmeter, starter system, charging system •Display: 4-digit LED numeric display, 3 LED indicators •User Interface: Push-button operation •Cable: Min. 1.3 ft •CE Mark/ ISO 9001 certified factory product 	No.	1			
41.	BLDC motor with controller	<ul style="list-style-type: none"> •15-30 Watts,315 Volt DC BLDC Motor with controller on panel mounted •Mains Supply : Single Phase, 230V AC $\pm 10\%$, 50Hz •Machine Type : BLDC, Rating : 15-30 W • Voltage Rating : 24V DC •Loading arrangement : Mechanical • Brake Drum/Pulley : Aluminium casted •Instrumentation Power Supply : 24V DC , 10A DC • Digital Meters used to display DC Voltage and Current with Digital Tachometer 	No.	4			
42.	Electric Iron	Electric Iron Automatic - 750 W, 240 V.	No.	7			
43.	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 	No.	24			

		<ul style="list-style-type: none"> • Fill counter:4-Digit, Preset, LED Display through controller • Winding Speed: Continuously variable Max. 1000 R.P.M to 1350 R.P.M 					
44.	Clamp meter	Tong Tester / Clamp Meter <ul style="list-style-type: none"> • 0 – 10 amp.(Min) • 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.	12			
45.	Compound gauge, Digital type	<ul style="list-style-type: none"> • Digital type Compound gauge diameter 63mm with recalibration set screw • scale vacuum 76mm. • Pressure 15 Kg/sq.cm 	No.	5			
46.	Contactor & auxiliary contacts-25Amps	Contactor & Auxiliary contacts 3 phase, 415 Volt, 25 Amp with 2 NO and 2 NC	No.	36			
47.	Contactor & auxiliary contacts- 32 Amps	Contactor & Auxiliary contacts 3 phase, 415 Volt, 32 Amp with 2 NO and 2 NC	No.	24			
48.	Copper bit soldering iron 0.25Kg	Copper Bit Soldering iron 0.25 KG:	No.	8			
49.	Core drill Machine	Core drill Machine : <ul style="list-style-type: none"> • Input Supply Voltage : single phase 220-240 V • Core Cutting Capacity: 12 - 38 mm • Core Cutting Depth: 50 mm 	No.	2			
50.	Immersion Heater	Immersion Heater 1500 Watt, 240V.	No.	10			
51.	D.O.L Starter	Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 2 HP 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.	2			

52.	DC Ohmmeter	Ohm Meter Specification :- •Measuring min. 0-300 Ohm with mid scales at 20 Ohms Capacity with Probe Black & red Ohm meter. •Range : min. 0-300 ohm . •Accuracy : +/- 5 % of the indicating value at center zero - Set of 2 pcs . •Shall comply to IS 1248	No.	35			
53.	Dc Power Supply	DC Power supply- 0 to 30V •Table Top and Portable type Outputs: •0 to 30V DC continuously Variable •+ 15 V and -15 V Volts DC constant output •+ 5 V DC Constant output •Current capacity : 5 Amps	No.	21			
54.	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.	20			
55.	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.	9			
56.	DC & AC ammeter 0-1 A(table model for lab experiments)	• 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.	10			

57.	DC & AC ammeter 0-1mA(table model for lab experiments)	<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 	No.	10			
58.	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.	10			
59.	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.	10			
60.	Desoldering pump	<ul style="list-style-type: none"> • 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.	82			
61.	De-soldering pump electrical heated	<ul style="list-style-type: none"> • Electric Vacuum Desoldering Pump • Wattage: 40 Watt • Power Supply: 220-240 Volts AC 50 Hz 	No.	20			
62.	De-soldering pump/gun	<ul style="list-style-type: none"> • 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.	42			

63.	Dial thermometer remote control, armored capillary dial	Dial thermometer Specifications: <ul style="list-style-type: none"> • Range:-50 ... 50 °C • Dial size in mm: 75 mm (Min.) • Capillary length: Min. 20 m • Material • Connection: Stainless steel 316 • Stem: Stainless steel 316L • Case/ring: Stainless steel 304 or 316L • Capillary: Stainless steel 316 • Armor: Flexible, SS 304 • Window: Instrument glass, optional laminated safety glass 	No.	3			
64.	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.	6			
65.	Digital Multimeter	Multimeter Digital Specifications :- <ul style="list-style-type: none"> • Voltage between any Terminal and Earth Ground: 1000V Min • Display: Digital: 4000 count updates 3/sec • Operating Altitude: 0 to 2000 meters Specification: <ul style="list-style-type: none"> • 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 μF/20 μF/200 μF $\pm 4.0\%$ • 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, 	No.	275			

		CAT II 600 V, and CAT III 300 V overvoltage standards					
66.	Digital thermometer	Digital thermometer •Type: Graduated disc analogy •Range: -50...50 °C	No.	1			
67.	Digital Tong Tester	Tong Tester / Clamp Meter •0 – 20 amp.(min) •Shall comply to Safety standard IEC 1010 or IEC 61010 • 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.	No.	2			
68.	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.	46			
69.	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	No.	4			
70.	DOL starter	Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 1/4 HP AC motor • 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			
71.	Dual DC regulated power supply	Regulated DC Power Supply with following specifications: • 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	No.	11			

		<ul style="list-style-type: none"> • Protections: Fuse protection will be provided Outputs are protected against over loads & short circuits 					
72.	Dual Power Supply	<p>Dual Power Supply complete in all aspect with key specifications as:</p> <ul style="list-style-type: none"> • DC Output : 2 outputs of 0 - 30 V, 2 A continuously variable by means of coarse and fine controls • Resolution : Voltage : 100 mV and Current : 10 mA • Recovery Time : $\leq 50 \mu s$ • Load Regulation : $\pm (0.05 \% + 10 \text{ mV})$ • Line Regulation : $\pm (0.05\% + 10 \text{ mV})$ • Display : 3 digit for voltage & 3 digit for current LED indication for Voltage & Current • Accuracy : $\pm (1 \% + 1 \text{ digit})$ • Over Range Indication : Glowing 'ORA' and 'ORB' LEDs indicate Overload • Both outputs are floating. • Built-in Overheat, Over Voltage and Short Circuit protection. • Power Supply : 230 V, $\pm 10\%$, 50 Hz • Operating Temperature : 0 - 40°C, 80% RH 	No.	2			
73.	ELCB and RCCB	<p>Earth Leakage Circuit Breaker- (ELCB)</p> <ul style="list-style-type: none"> • 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 <p>Residual Current Circuit Breaker (RCCB)</p> <ul style="list-style-type: none"> • 25 Amps, Double pole , IΔn 30 mA (Rated Short circuit capacity) • Specification: IEC 61008-1/IS 12640-1:2008/EN 61008-1 	No.	38			
74.	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.	9			
75.	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 	No.	4			

		<ul style="list-style-type: none"> Power supply: 220 V AC Single phase 50 Hz 					
76.	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			
77.	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 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. 	No.	29			
78.	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.	9			
79.	A.C. Energy Meter	<ul style="list-style-type: none"> A.C. Energy Meter- induction type Single Phase,5 A, 230-240 V 	No.	2			
80.	Clamp Meter	<ul style="list-style-type: none"> Fluke Meter Tong Tester / Clamp Meter 0 – 100 amp.(Min) Shall comply to Safety standard IEC 1010 or IEC 61010 	No.	2			
81.	Clamp Meter	Fluke Meter Tong Tester / Clamp Meter 0 – 100 amp.(Min) <ul style="list-style-type: none"> Hold button: Freezes the display reading. Reading is released when button is pushed a second time. 	No.	6			

		<ul style="list-style-type: none"> • 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 					
82.	Frequency Meter	Frequency Meter <ul style="list-style-type: none"> • AC frequency meter analog with range 45 to 55hz • Installation category 300 V CAT III • IS : 1248 / IEC 51 	No.	20			
83.	Glow plug tester	Glow Plug tester/analyser suitable for voltages upto 48 Volts.	No.	6			
84.	Growler	Growler • 230 V, 50 Hz, Single Phase, • ISO 9001 of latest version certified Factory product	No.	40			
85.	Hand blower	Hand blower with following Min. Specifications: <ul style="list-style-type: none"> • Supply voltage: 230 V AC • Motor Power: 500watts • RPM: Min. 14000 r/min • Air Flow: Min. 3.5l/min 	No.	2			
86.	Heat convector	Heat convector with min. following specifications: <ul style="list-style-type: none"> • Operating voltage of 220 -240 volts AC 50 Hz. • Power Wattage: 2000 W 	No.	4			
87.	Heating kit with infrared bulb	Heating kit with infrared bulb of 200 Watt Capacity	No.	2			
88.	Hydrometer	Hydrometer <ul style="list-style-type: none"> • Range: 1.100 - 1.300 Specific Gravity at 27°C • Complete with Glass Barrel 	No.	16			
89.	Motor Pump set	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 • Mechanical Steel : Carbon Ceramic 	No.	13			

90.	IDU Plus Generation type motor	<ul style="list-style-type: none"> •IDU Plus Generation type motor of 15 Watts,230 Volt AC complete with all accessories •Power supply: 230 V AC 50 Hz. 	No.	4			
91.	Digital Wattmeter	<ul style="list-style-type: none"> •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			
92.	Kilo Wattmeter	<ul style="list-style-type: none"> •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.	27			
93.	Knife Switch DPDT fitted with fuse terminals	<ul style="list-style-type: none"> •Knife Switch DPDT fitted with fuse of Min. 16 Amps. •The arrangement shall be enclosed in the MS box 	No.	58			
94.	Laboratory Type Induction Coil	<ul style="list-style-type: none"> •Laboratory Type Induction Coil 1000 Watt •Laboratory type induction coil 6 volt to 800-1000 volt 	No.	30			
95.	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.	10			
96.	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			
97.	LED lighting system	<ul style="list-style-type: none"> •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.	12			

98.	Limit Switch	Limit Switch • Liver operated 2A 500v, •2-contacts	No.	28			
99.	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) ,	No.	37			
100.	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.	28			
101.	Maintenance Free Battery	•VRLA Maintenance Free Battery with following Specifications: •Voltage: 12 Volt •Capacity: 9 AH	No.	8			
102.	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.	23			
103.	MCCB	MCCB of Min. 100 Amps Triple pole 440 V with enclosure.	No.	23			
104.	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 Confirm to IS 10656-1983	No.	4			
105.	Megger	Megger - (500 Volt) insulation Tester •Nominal test voltages •Dust & Water protection: IP54 Protected against dust and splashing water	No.	25			

		<ul style="list-style-type: none"> •Safety Protection Meets EN 61010-1 (1995) to 600 V phase to earth, Category IV •Designed to Generally Conform to IS 10656-1983 					
106.	Megger	Megger - (1000 Volt) insulation Tester <ul style="list-style-type: none"> •Nominal test voltages:50 V, 100 V, 250 V, 500 V, 1000 V •Insulation resistance range: 2 GΩ •Dust & Water protection: IP54 Protected against dust and splashing water •Safety Comply to EN 61326-1:2005, CAT IV 600V, IP54 protection 	No.	5			
107.	Milli Ammeter (AC)	AC Ammeter MI, analog, 0-200mA range with Moving iron spring-mounted jewel bearing suspension	No.	6			
108.	Milli Ammeter (DC)	Ammeter MC analog- (0 - 500 mA MC) with Moving Coil with Central Magnetic Core, 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 knife edged pointer and anti parallax mirror •It should be moving coil type 	No.	4			
109.	Milli Voltmeter	Milli Voltmeter <ul style="list-style-type: none"> •Centre - zero analog, •Milli Voltmeter centre zero 100 – 0 – 100 m volt •Confirming to BS 89, IEC 51 & IS 1248 	No.	33			
110.	Miniature Breaker	MCB 16 Amps.	No.	24			
111.	Analogue type Multimeter	Analog Multimeter <ul style="list-style-type: none"> •AC Voltage (Volts) 10-1000 V •AC Voltage Accuracy ±4% •DC Voltage Accuracy ±3% •DC Current (Amp) 50μA-10 A •DC Voltage 0.1mV-1000 V •DC Current Accuracy ±3% •Resistance (ohm) 0.2 Ω-20 MΩ •Resistance Accuracy ±3% 	No.	5			
112.	Digital Multimeter	Multimeter Digital Specifications :- <ul style="list-style-type: none"> •Voltage between any Terminal and Earth Ground:1000V Min •Display: Digital: 4000 count updates 3/sec •Operating Altitude: 0 to 2000 meters Specification:	No.	59			

		<ul style="list-style-type: none"> •DC voltage: 200mV/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/2MΩ \pm 0.8%, 20MΩ \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 μF/20 μF/200 μF \pm 4.0% •Temperature: -20 $^{\circ}$ C ~ 1000 $^{\circ}$ 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 					
113.	Ohm Meter; Portable box type	Ohm Meter- Shunt Type - Specification :- <ul style="list-style-type: none"> •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.	30			
114.	Ohm Meter; Series Type	Ohm Meter- Series Type - Specification :- <ul style="list-style-type: none"> •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.	30			
115.	Ohm Meter; Shunt Type	Ohm Meter- Shunt Type - Specification :- <ul style="list-style-type: none"> •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.	30			
116.	Electrode drying Oven	Electrode drying Oven <ul style="list-style-type: none"> •capacity: 10 kg •Voltage : 230 volt ac •Temperature : Max:350 Deg.cel •Wattage : 1000 Watt Min 	No.	2			
117.	Phase Sequence Indicator	Phase Sequence Indicator <ul style="list-style-type: none"> •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.	45			

118.	Insulators	PIN INSULATORS:- <ul style="list-style-type: none"> •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 <ul style="list-style-type: none"> •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 <ul style="list-style-type: none"> •11 KV Egg Type Insulator conforming to relevant IS standard. Suspension type insulators <ul style="list-style-type: none"> •11KV Brown Glazed 'Disc' insulators conforming to IS-731/71 for suspension or tension strings, ball and socket type having ball shank dia.16mm •Minimum failing load of 70 KN along with phospher bronze 'W' clips. 	No.	39			
119.	Portable electric drill Machine	<ul style="list-style-type: none"> •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.	9			
120.	Potential Transformer	<ul style="list-style-type: none"> •Potential Transformer Test Set with 415 V, 50Hz, PT Ratio, 440V/110V, •Burden: 10VA •Complete with control panel 	No.	23			
121.	Power Factor	415 V, 20 A, Three Phase portable type Power Factor Meter <ul style="list-style-type: none"> • Accuracy Class Class1.0 • Frequency 50Hz \pm 5 % • System Voltage 415V AC • Mounting flush 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	No.	41			

122.	Power Meter	<ul style="list-style-type: none"> • 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.	6			
123.	Power Meter	<ul style="list-style-type: none"> • 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.	9			
124.	Power Supply	<ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-12volts • 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.	3			
125.	Pressure gauge Digital type	<ul style="list-style-type: none"> • Digital type Pressure gauge with diameter 63mm with recalibration set • Min Pressure (PSI) 0 and Max Pressure (PSI) 30 • Min Temperature ($^{\circ}$ C) -20 and Max Temperature ($^{\circ}$ C) 60 • Display 5-digit LCD, 0.5" H • Battery Type : Two AA (included) • Battery Life 2000 hours minimum 	No.	6			
126.	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.	27			
127.	Reverse current Relay	<ul style="list-style-type: none"> • Reverse current relay of 16A, 440V • The Experimental Setup consists of the following parts: <ul style="list-style-type: none"> • 2 nos. 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 . 	No.	29			

128.	Rheostat (Sliding type)	•Rheostat (Sliding type) 0 - 25 Ohm, 2 Amp •Standatd ISI Product	No.	15			
129.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 - 300 Ohm, 2 Amp	No.	14			
130.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -1 Ohm, 10Amp	No.	14			
131.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -10 Ohm, 5 Amp	No.	15			
132.	Rheostat variable values	•0-1 ohm, 5 A •0-10 ohm, 5 A •0-25 ohm, 1 A •0-300 ohm, 1 A	No.	16			
133.	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			
134.	Rotary Switch	Rotary Switch of 16 A/440v	No.	32			
135.	Rubber mat	Rubber Mat of Min 2' x 4' x 1" dimension conforming to IS 15652	No.	6			
136.	SC Couplers	Fiber optic cable adaptor coupler SC-SC Duplex single mode.	No.	48			
137.	Shaded Pole Motor	Fractional HP, with Min. 25 Watt Shaded pole motor 240 V, 50 Hz	No.	15			
138.	SMD Soldering & De soldering Station with necessary accessories	SMD soldering/desoldering station with Fume Extractor with following specifications: Input Power: 220-240 V AC 50 Hz Soldering: Wattage: 100 W or above Temp. range: 150-450 deg C Tip code: 44-710652 or better SMD Rework: Wattage: 100 W or above Temp. range: 150-450 deg C or above Air Flow Capacity range: 2 L/min to 38 L/min (or above) De-Soldering: Wattage: 100 W or above Temp. range: 300-400 deg C or above	No.	7			

		Tip code: 44-915412 or better					
139.	SMD soldering/desoldering station	SMD soldering/desoldering station with Fume Extractor with following specifications: Input Power: 220-240 V AC 50 Hz Soldering: Wattage: 100 W or above Temp. range: 150-450 deg C Tip code: 44-710652 or better SMD Rework: Wattage: 100 W or above Temp. range: 150-450 deg C or above Air Flow Capacity range: 2 L/min to 38 L/min (or above) De-Soldering: Wattage: 100 W or above Temp. range: 300-400 deg C or above Tip code: 44-915412 or better	No.	8			
140.	SMPS of different make	SMPS •Input power: 200-300V AC. •Output Voltage: 12V. •Power Rating: 450 Watt.	No.	6			
141.	SMPS of PC	•Input power: 200-300V AC. •Output power: 12V. • Power Rating: 450 Watt.	No.	20			
142.	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,12volt rechargeable 8 Amp •Nos. of cells - 36 •Open circuit Voltage - 22 volt •Maximum Power Volt - 18 Volt	No.	24			
143.	Soldering & De soldering Station	Temperature controlled soldering/ desoldering station with min. specifications as: • Input Voltage : 180-240VAC,50Hz Fuse : Suitable rating • DEsold pump :Suitable rating • Vacuum Pressure :Suitable rating • Min. Temp Range : 180 to 480°C • Temperature control accuracy +/- 1°C	No.	1			

		<ul style="list-style-type: none"> • Tip Leakage Current : < 2 mA • Temperature control Stability +/- 1°C • Tip to Ground Resistance : < 2 Ohms • Tip to Ground Leakage Voltage : < 2 mV 					
144.	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. 	No.	42			
145.	Soldering Iron 10 w	Soldering iron 10 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 10W • 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.	12			
146.	Soldering Iron 240 W	Soldering iron of Min. 240 Watt Rating, with soldering working stand complete in all aspects	No.	1			
147.	Soldering Iron 25 W	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.	6			
148.	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. 	No.	21			
149.	Soldering Iron Changeable bits 15 W	Soldering iron with changable bits 15 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 15W • Cord length: 5 feet 	No.	21			

		<ul style="list-style-type: none"> • 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. 					
150.	Soldering Iron	Soldering Iron 65 Watts: <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. 	No.	10			
151.	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.	42			
152.	Soldering iron 25W 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. 	No.	38			
153.	Solenoid with core	Educational Solenoid and Electromagnet with Iron Core	No.	20			
154.	Star delta starter	Fully Automatic Star-Delta Starters <ul style="list-style-type: none"> • Suitable for motor starting upto 2 HP or higher, AC-3 Duty, 415V, 50Hz, 3-Ph • Sheet steel enclosures with IP 54 protection. 	No.	2			
155.	Synchronous Motor Capacitor For Synchronous Motor	Synchronous Motor and capacitor for Synchronous Motor 240V, 60rpm 0.8mf ± 5% 450 VAC	No.	2			
156.	Analog Tachometer	Tachometer - Analog type Analog Type - 10000 RPM	No.	22			

157.	Digital Tachometer	Tachometer Digital <ul style="list-style-type: none"> • 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.	13			
158.	Tachometer digital, multi range	Tachometer Digital <ul style="list-style-type: none"> • Digital Photo Sensor Type - 3000 RPM (Tachometer - 5 Digit bright LED display of 10 mm height with memories of last ,highest and lowest readings , 	No.	2			
159.	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.	46			
160.	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 : 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 	No.	18			
161.	Thermometer Digital	<ul style="list-style-type: none"> • 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 	No.	25			

		resolution • 2-1/2" stainless steel probe with 20" cable • Includes wallet-style case					
162.	Tong tester (clamp on multi meter)	Tong Tester / Clamp Meter • 0 – 10-30 amp.(min) with 0-500 V • 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.	5			
163.	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.	23			
164.	Transformer 0-12 V, 6-0-6 V, 1 Amp	Transformer 0-12 V, 6-0-6 V, 1 Amp	No.	8			
165.	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.	29			
166.	Variable resistance /potentiometer	Variable resistance boxes/variatic of Following Ohm Values each: 220Ω, 150Ω, 1kΩ, 33Ω, 100Ω, 1.2Ω	No.	12			
167.	Various Lamps	• Halogen Incandescent Lamp: 100 Watts with fixture and all accessories. The applicable standard for lamp shall be as IEC 432	No.	1			

		<ul style="list-style-type: none"> • Fluorescent tube: Min 40 Watt with fixture fitted with choke(copper), starter and holder. • HP mercury vapor Lamp : Min. 150 Watt with fixture and all accessories • High-pressure sodium Lamp : Min. 150 Watt with fixture and all accessories • Low-pressure sodium Lamp LED: Min. 150 Watt with fixture and all accessories 					
168.	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.	10			
169.	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 Table model Analog Voltmeter with range 0-10V : <ul style="list-style-type: none"> • Range: Voltage (V): 0 – 10 V Table model Analog Voltmeter with range 0-30V : <ul style="list-style-type: none"> • Range: Voltage (V): 0 – 30V 	No.	4			
170.	Voltmeter 50V/DC	<ul style="list-style-type: none"> • Voltmeter MC analog - (0 - 50V) 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			
171.	Voltmeter AC to 500 V	<ul style="list-style-type: none"> • A.C. Voltmeter • M.I. analog, • A.C. Voltmeter M.I. 75V - 150 V - 300 V – 500V A.C • Confirming to BS 89, IEC 51 & IS 1248 	No.	2			
172.	Voltmeter, AC/DC portable precision grade Digital Panel board type	AC/DC Digital Voltmeter 0-500 Volts <ul style="list-style-type: none"> • 3 Digit, 7 Segment LED Display • True RMS Measurement for AC measurement • For 1Ø-2 Wire Electrical Network • IP Protection (Front): IP65 	No.	5			
173.	Wattmeter AC/DC, 0 to 10 Kw	<ul style="list-style-type: none"> • Kilo Wattmeter Analog 0-10 KW, • pressure coil rating- 240v/440v, • Current rating-5A/10A(min) Analog, 	No.	2			

		<ul style="list-style-type: none"> • Portable type Housed in Bakelite case Conforming to IS 1248 					
174.	Digital Wattmeter	<ul style="list-style-type: none"> • Multi range Digital Wattmeter which calculate and displays power of single phase 230 V, 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.	1			
175.	Conductivity meters- both low range and high range.	Digital Conductivity meters with both low range and high range. complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Display : 3.5 Digital LED • Ranges 0 to 200 uS/cm, 0 to 2 mS/cm, 0 to 20 mS/cm, 0 to 200 mS/cm & 0 to 1000 mS/cm 	No.	1			
176.	pH meters	Digital pH meters complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Display: 3 1/2 Digit LED • Accuracy: + 0.01 pH • Power Requirement 220 VAC +10% 50 Hz 	No.	1			
177.	Temperature probes	Temperature probes complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Measuring Range : -50 to +250 Deg.C; • Accuracy : Class A Accuracy of ± 0.2 Deg.C +/- 1 count • Output : Pt-100 3 Wire Type standard • Type : Simplex type with transition teflon/teflon cable of length 3 meters. • Sensor Length : Standard 6 inch(150mm) • MOC : Stainless Steel 304 pipe of 150mm length of Outer Diameter : Standard 6 mm. 	No.	1			
178.	Thermo-hygrometers	Thermo-hygrometers complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Measuring rate 18 s • Storage temp. -40 to +70 °C • Battery type 9V block battery • Battery life approx. 1 year • Material/Housing ABS • Display LCD, 2 lines 	No.	1			
179.	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. 	No.	1			

		<ul style="list-style-type: none"> • Auxiliary handle with adjustable depth stop can be rotated 360° • CE Mark product 					
180.	SMPS Tester	<ul style="list-style-type: none"> • PC Power Supply Tester • 20/24 Pin PSU ATX SATA HDD • SMPS LED Display 	No.	12			

Lot No : 4							
Lot Name: Electrical lab equipments							
Item No	Name of Goods or Related Services	Description	Unit of Measure -ment	Quantity	Specification by the supplier (To be filled by the supplier)	Detailed information brochure attached at Page No.	Pass/Fail (By Purchaser)
1.	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', Speed : 1500 RPM \pm 10% at full load 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.	13			
2.	AC 3 Phase motor with control panel	A.C. SQUIRREL CAGE INDUCTION MOTOR 2 HP WITH Automatic STAR DELTA STARTER with Mechanical Load - A.C. SQUIRREL CAGE INDUCTION MOTOR :- Rating: 2 HP 415 volts, 50 Hz, Squirrel cage Induction Motor 1440 RPM, TEFC, Insulation: class 'F' , frame 100, horizontal foot mounted with Six terminals are brought out on terminal box. Machine Control Panel & Operating Table:	No.	2			

		<p>- 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 Appendix-F</p>					
3.	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, Insulation: class 'B' , horizontal foot mounted.</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-J</p>	No.	3			
4.	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, class 'F' insulation, 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>	No.	7			

		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-G					
5.	AC Squirrel Cage Motor with Mechanical Load along with control panel.	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 1440 RPM, TEFC, class 'F' insulation, frame 100, 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 items/component as given ELECTRICAL PANEL BOARD given in Appendix-F	No.	12			
6.	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 of Vehicles with following specifications: Power Requirements <ul style="list-style-type: none"> • 220V single phase, 15 Amperes 	No.	12			

		Drive Specifications: <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers Output Supply <ul style="list-style-type: none"> • 12V/24V fixed Vice <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters Instrumentation/meters Installed on panel: <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes in case of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 					
7.	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 of Vehicles with following specifications: Power Requirements <ul style="list-style-type: none"> • 220V single phase, 15 Amperes Drive Specifications: <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers Output Supply <ul style="list-style-type: none"> • 12V/24V fixed Vice <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters Instrumentation/meters Installed on panel: <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes in case of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 	No.	1			
8.	Auto Electrical test bench	Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo,	No.	1			

		alternator, regulators and starter motors of Vehicles with following specifications: Power Requirements <ul style="list-style-type: none"> • 220V single phase, 15 Amperes Drive Specifications: <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers Output Supply <ul style="list-style-type: none"> • 12V/24V fixed Vice <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters Instrumentation/meters Installed on panel: <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes in case of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 					
9.	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.	9			
10.	Bus bar with brackets	200 Amps, 1 Meter each, four buses of RYBN of Copper material with extension assembly. Bus bars with connectors and hardware shall be of copper material. Housed in enclosure with locking arrangement.	No.	82			
11.	Capacitor start 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, 1440 RPM, TEFC, class 'B' insulation, frame 90, horizontal foot mounted. Terminals provided on terminal box. Starting winding, running winding with capacitor terminals brought out on terminal box Control Panel	No.	2			

		<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>					
12.	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</p> <p>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 panelB) 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</p>	No.	20			

		: e) Over Current : f) Ratio Error Polarity : g) Phase lag-lead : h) Phase Error Over Range					
13.	Cut out Relays	16A, 440V Cut out Relays with following specifications: ·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	No.	29			
14.	D.C. Compound Generator with AC Motor along with control panel	Specifications for above shall as follows: DC Compound Generator: 2.5 KW, 220V,. Self-Excited with variac, 4 Pole. Standard ISI Product. Insulation Class "B", Horizontal foot mounted 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. 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	No.	9			

		given ELECTRICAL PANEL BOARD given in Appendix-A					
15.	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. Insulation Class "B", 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 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 BOARD given in Appendix-A</p>	No.	8			
16.	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>	No.	8			

		<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>					
17.	DC Series Motor coupled with spring balance load fitted with control panel	<p>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</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>	No.	10			
18.	DC Shunt Motor	<p>DC Shunt 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 4 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</p>	No.	9			

		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					
19.	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: 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>	No.	14			
20.	Dual Magnetization Yoke	Dual Magnetization Yoke : AC / HWDC, 230 VAC, 50Hz	No.	1			

21.	Dual Magnetization Yoke	Dual Magnetization Yoke : AC / HWDC, 230 VAC, 50Hz	No.	17			
22.	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.	6			
23.	Electrical test bench	<p>Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo, alternator, regulators and starter motors of Vehicles with following specifications:</p> <p>Power Requirements</p> <ul style="list-style-type: none"> • 220V single phase, 15 Amperes <p>Drive Specifications:</p> <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers <p>Output Supply</p>	No.	1			

		<ul style="list-style-type: none"> • 12V/24V fixed Vice <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters Instrumentation/meters Installed on panel: <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes in case of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 					
24.	Load Bank (Lamp / heater Type)	Load Bank - (heater Type) 6 KW,3Phase,440 volt, Current: 5A to 50A, Frequency: 50Hz	No.	16			
25.	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.</p> <p>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> <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</p>	No.	11			

		given ELECTRICAL PANEL BOARD given in Appendix-E					
26.	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. Insulation Class "B", 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, 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 BOARD given in Appendix-B</p>	No.	8			
27.	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 50 Kv or 0 to 60 Kv, or 0 to 100 Kv, • Capacity: Min. 60 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 	No.	7			

		<p>withstand test set.</p> <ul style="list-style-type: none"> • The instrument should have a 50-0-50 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 					
28.	Over Current Relay	<p>Over current relay of 16A, 440V</p> <p>Technical Specifications:</p> <ul style="list-style-type: none"> ·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.	29			
29.	Single Phase 220 V Capacitor type AC Meter squirrel cage Induction motor	<p>Single Phase Capacitor Motor of 1 HP 240 VOLT WITH STARTER/SWITCH</p> <p>1. MOTOR :</p> <p>A.C. Single Phase Capacitor Start Induction Motor 1 HP 230volts AC, 50 Hz, 1440 RPM, TEFC, class 'B' insulation, frame 90, 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:</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. 	No.	9			

		- 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					
30.	Single phase Transformer, core type, air cooled	SINGLE PHASE TRANSFORMER, CORE TYPE, AIR COOLED TRANSFORMER SINGLE PHASE 1 KVA A Laboratory Type Model For Conducting Various Experiments. TECHNICAL SPECIFICATION : -Transformer Single Phase air cooled capacity 1 KVA, Copper wound Primary 230 Volts, Secondary 0-110-115-120 Volts. -The unit must be fitted in MS Box 20 SWG with side ventilation. Top of the box will be of 6mm. Bakelite sheet and the terminals of primary & secondary will be brought out with Educational type Bakelite banana type terminals 30 Amps and proper marking.	No.	41			
31.	Single Phase Variable Auto Transfer	Single Phase(Air cooled) Auto Transformer Amperage 10 Amp input voltage0-270 V with safety fuses and line indicators.	No.	24			
32.	Split phase induction motor with Control panel	Phase Split Motor of 1 HP 240 VOLT WITH STARTER/SWITCH 1. MOTOR : A.C. Split phase Induction Motor 1 HP 230volts AC, 50 Hz, 1440 RPM, TEFC, class 'B' insulation, frame 90, 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.	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-J					
33.	Starter motor axial type, pre-engagement type & Co-axial type	Pre-engagement type Starter Motor with solenoid switch with following Specifications: <ul style="list-style-type: none"> • System Voltage : 12 Volts • Polarity: Negatively earth • Operating Temperature range : -5 OC to +93OC • Power Output : Min. 2 Kw • Lock Torque : 3.0 kg.m (min.) at 5.6 V and 850 Amps (Max.) Current • Run Torque : 0.6 kg.m. (min.) at 9.8 V and 300 Amps (Max.) Current with 2300 RPM • Earth, Main and Solenoid terminals of Steel Axial type Starter motor with solenoid switch with following Specifications: <ul style="list-style-type: none"> • System Voltage : 12 Volts • Operating Temperature range : -5 OC to +93OC • Power Output : Min. 4.5 Kw • Lock Torque : 6.2 kg.m (min.) at 11 V and 1200 Amps (Max.) Current • Run Torque : 3.5 kg.m. (min.) at 16 V and 700 Amps (Max.) Current • Main and Solenoid terminals • Pre-engagement type Starter Motor Co-Axial type Starter motor with solenoid switch with following Specifications: <ul style="list-style-type: none"> • System Voltage : 12 Volts • Operating Temperature range : -5 OC to +93OC • Power Output : Min. 2 Kw 	No.	1			
34.	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	No.	9			

		<p>stepper drive and motor that allows to control the speed and direction of the motor along with display system.</p> <p>Front Panel programmable SET values, which generates necessary control output through Relays for any Process Application</p>					
35.	Synchronous motor along with control panel.	<p>SYNCHRONOUS MOTOR 3 PHASE, 3 HP, 440V, 50HZ, 4 POLE, WITH ACCESSORIES and starting/ prime mover arrangement , excitation arrangements.</p> <p>1. MOTOR :</p> <p>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:</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-I</p>	No.	12			
36.	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 1440 RPM, TEFC, class 'F' insulation, frame 100, 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 	No.	1			

		<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-F 					
37.	Three phase transformer, shell type oil cooled with Delta/Star	<p>THREE PHASE TRANSFORMER, SHELL TYPE OIL COOLED</p> <p>Working Model For Conducting Various Experiments.</p> <p>TECHNICAL SPECIFICATIONS:-</p> <ol style="list-style-type: none"> 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.	23			

38.	Thyristor /IGBT controlled D.C. motor drive with tacho-generator 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 as given ELECTRICAL PANEL BOARD given in Appendix-L</p>	No.	11			
39.	Thyristor/IGBT Controlled AC Motor With VVVF Control	<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</p> <p>Cage :Steel Body ,Class : E Class ,RPM : 1500 approx. Windings :Stator winding Input Terminal :6</p> <p>IGBT : Suitable Thyristor/IGBT AC Drive, Mounted on Control panel</p> <p>Machine Control Panel & Operating Table:</p> <p>- Refer Appendix "N" for General requirements.</p> <p>Machine Mounting arrangement:</p>	No.	12			

		<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-M</p>					
40.	Universal Motor along with control panel.	<p>MOTOR UNIVERSAL 230 VOLT, 50CYCLES 1 HP WITH STARTER/SWITCH</p> <p>UNIVERSAL MOTOR :</p> <p>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:</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-H</p>	No.	13			

2. Delivery and Completion Schedule

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

Lot No.	Description of Goods or Related Services	Delivery Schedule (Duration)	Location	Required Arrival Date of Goods or Completion Date for Related Services
Lot-1	Lot-1 Electronics Appliances	Within 365 Days from the Signing of the contract.	The location of Delivery of various items of Lot-1 attached separately	Within 365 Days from the Signing of the contract.
Lot-2	Lot-2 Electronics Lab equipment	Within 365 Days from the Signing of the contract.	The location of Delivery of various items of Lot-2 attached separately	Within 365 Days from the Signing of the contract.
Lot-3	Lot-3 Electrical Lab equipment	Within 365 Days from the Signing of the contract.	The location of Delivery of various items of Lot-3 attached separately	Within 365 Days from the Signing of the contract.
Lot-4	Lot-4 Electrical machinery	Within 365 Days from the Signing of the contract.	The location of Delivery of various items of Lot-4 attached separately	Within 365 Days from the Signing of the contract.

3. Technical Specifications

- Special Note: 1** As a part of Documentation even if not mentioned all items supplied shall have minimum of 1. User/Operation Manual and 2. Warranty Certificate. Additional requirements for specific items will be explicitly mentioned.
- Special Note: 2** The installation has to be carried out as per the guidelines given by the OEM with necessary ground work and fixtures wherever necessary.
- Special Note: 3** All Light, Medium and Heavy machineries and item needing installation either on Ground or on Wall is the sole responsibility of the supplier.
- Special Note: 4** All costs involved in installation such as materials and Labour is to be borne by the Supplier.
- Special Note: 5** Machines and items shall be installed at the identified position in the designated ITI workshop /Laboratory.
- Special Note: 6** Warranty of One/Two/.. / means that the Supplier of the item takes full responsibility in ensuring the best working condition of the item during the warranty period.
- Special Note: 7** In the event the item is not working the OEM ensure that the item is brought back to best working condition with-in a reasonable period of time not more than 5 days in the worst case.
- Special Note: 8** All parts of the machine not intentionally damaged by the user should be replaced free of cost by the supplier.
- Special Note: 9** All consumable items if any needing replacement will be supplied by the ITI.
- Special Note: 10** All Items of delicate nature shall be supplied in a suitable Cloth/Wooden/ Other suitable storage case/cover for protection of the item from dust and moisture.
- Special Note: 11** Detailed information brochures having specifications, make and model number of individual item to be attached.

Lot-1: Electronics Appliances

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.	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 	<ul style="list-style-type: none"> • Auto Air Swing, • Dust Filter, • Auto Restart, • Timer, • Sleep Mode, 	Voltage stabilizer with other standard Accessories as		Product Catalogue	Installation shall be in scope of supplier without any	2 Years

		<ul style="list-style-type: none"> • Color -White • Compressor- Rotary • Dehumidification- Yes • Remote Control -Yes • Technology Used- Hybrid jet • Condenser Coil -Copper 	<ul style="list-style-type: none"> • Refrigerant Leakage Detector • LED Display • Turbo Mode 	required			cost. Further, instllation also includes the material required for installation .	
2.	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 • Technology Used- Hybrid jet • 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(if required) with other standard Accessories as required		Product Catalogue	Installation shall be in scope of supplier without any cost. Further, installation also includes the material required for installation .	2 Years

3.	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		2 Years
4.	Calculator Scientific (Non-programmable)	Display <ul style="list-style-type: none"> • Display type: 31 * 96 FULL DOT, Natural display • Algebraic input logic: Natural V.P.A.M. with Number of characters/lines: 15/1+10/1 and Significand function: 10+2 Memory <ul style="list-style-type: none"> • Repeat function with Variable memory of 9 and Number of storable programs as Calc / Solv button Energy supply: Solar+Battery Statistics Functions: <ul style="list-style-type: none"> • Summations, Standard deviations for grouped and ungrouped values, Distribution functions (normal distribution and inverse normal distribution, binominal distribution, Poisson distribution), Regression analysis, Permutations (nPr) and combinations (nCr), Matrix calculation/vector calculation, REF/RREF function, Equation calculation, 	Basic mathematics <ul style="list-style-type: none"> • Angle dimensions DEG/RAD/GRAD, Conversions between >DEG/>RAD/>GRAD' Coordinate conversion Pol, Trigonometric functions, Hyperbolic functions, Exponent, log, In, 10x, ex ,Mathematical functions, Calculations based on n , 	Batteries and Case		Manual		2 Years

		Inequality calculation Differential and integral calculus: • Numerical integral calculus, Numerical differential calculus	hexadecimal/decimal/binary/octal), Logical operators , Percentage calculations, Remainder function, , Calculation of complex numbers, Random number generator, Random integers, Calculation of the minimum or maximum of a quadratic function, Base-N calculations, "Verify" test function, Value table, Recurring decimal fractions					
5.	Car stereo	Car Stereo with following specifications: • Min. 15 cm Wide Screen • Audio Format: WMA/MP3/AAC/WAV • Video/Image Format: MPEG/JPEG / BMP • Operation: Touch Panel • Band: FM/AM • Disc Media: DVD-R/RW, CD-R/RW • AUX: 1 (Rear) • POWER: MOSFET 50W • Equalizer: G.EQ (5BAND) • RCA Pre-outs: 2 (Front, Rear or Subwoofer) • Audio IN RCA: 1 IN • Video IN RCA: 1 IN • Video OUT RCA for Rear Screen: 1 OUT	• Stations Memory • DVD Videos with DVD Menu direct touch control • Rear USB Interface • Rear View Camera IN • Picture Adjustment • LED Backlight • Clear Type Resistive Touch Panel with Anti Glare / Reflection	• Power Connector • Truss Screws • 1.5 m USB Cable		Catalogue		2 years

			<ul style="list-style-type: none"> • Clock, Calendar • Dimmer with Dimmer Trigger (Auto/Manual/Clock) • Display Off Option • Wired Remote Input • Remote Control Included • CE Mark Product 					
6.	Cell phone power source with charger chords for different cell phones	Cell phone power source with charger chords for different cell phones *Min. capacity:20000 -mAh Li-Ion *Micro USB connectors *Min. 2 Outputs of 1 Amps and 2 Amps for phone charging *LED Charging indicator and torch	<ul style="list-style-type: none"> • CE Mark product/Latest ISO 9001 Certified factory product 	USB Cables		Catalogue		2 Years

7.	Credit card detection machine	Portable Credit card detection machine with printing features. With Wifi and GPRS facility along with Chip sensing feature	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	Standard Accessories		Operating Manual	Installation & training	2 Years
8.	Deep freezer	Deep freeze with following Specifications: <ul style="list-style-type: none"> • Capacity: 200 L • Refrigerant: 134a • Power Supply: 230V • Phase: Single Phase • Frequency: 50 Hz • Inner Cabinet: Anodised Stucco Aluminium • PUF Thickness: 65mm(min) • Compressor Type: Reciprocating • Wheels/Legs: Heavy Duty Castors 	<ul style="list-style-type: none"> • Robust construction for heavy duty use • Corrosion resistant body • Suited for high ambient temperatures in tropical countries • Twin door larger capacity models to avoid cooling loss • Locks • High density PUF insulation for better holding time • Highly energy-efficient compressor • Color: White • ISI/CE Mark 	Standard Accessories as required		Product Catalogue		1 Year on product and 5 years on Compress or

			Product					
9.	Digital Theodolite	Digital Theodolite Specifications: Angle Measuring System <ul style="list-style-type: none"> • Mode of Angle Measurement: Photoelectric Incremental Reading Min. • Detection Method: H: Both Sides • Detection Method: V: Single Side • Precision of Angle Measurement: 2" • Unit of Angle: DEG MIL GON • Display: LCD Double Side, 7 digits x 2 lines, backlight • Tilt Sensor: Automatic vertical compensation Compensator of Tilt Sensor type with $\pm 3'$ as Range of Compensation Laser Optical plummet <ul style="list-style-type: none"> • Magnification Ratio : 3x • Angle of View: 3° • Min. Focus: 0.5m Telescope: <ul style="list-style-type: none"> • Magnification: 30 x • Min. focus: 1 Meter • Objective aperture: 45 mm 	<ul style="list-style-type: none"> • 2.5" – unsurpassed telescope resolving power • 5" Accuracy, Fast distance measurement of 0.9s.. • Reflector less operation from 30cm to 500m. • 50,000-point internal memory • Upto 32GB USB Pen Drive Support • Coaxial laser-pointer for fast and accurate aiming. • Ensures accuracy even with reflective sheets. 	<ul style="list-style-type: none"> • LR6/AA batteries (x4) • Lens cap • Plumb bob • Tool kit • Operator's manual • Carrying case and shoulder strap 		Operation Manual (CD-R)		2 Years

			<ul style="list-style-type: none"> • IP66 dust-proof waterproof rating. • Rugged metal chassis and heavy duty handle. • Standard usage temperature range -20° to 60°C. • Long-Range Laser with Ultra-Small Beam Spot • Detachable Tribrach 					
10.	Digital weighing machine	<p>Digital Weighing Machine Specifications:</p> <ul style="list-style-type: none"> • Type: Bench Type • Weighing Capacity: 100Kg or more • Preset keys/Hot keys: 20 • Power Supply: 230V AC, 50 Hz • Operating Temperature: 0C to 45C • Display Type: 7 Segment LED • Display Digit and Size: Min. 19 digits, 10 mm height • Battery: 6V/4 AH Rechargeable • Platter MOC: SS • Interface: Inbuilt RS232 	<ul style="list-style-type: none"> • Count accumulation and subtraction function • Automatic re-computing function to enhance sampling accuracy • Net weight/gross weight display • Easy to use full function numeric keypad • In-built rechargeable battery • Date and Time • Weight can be viewed on PC or serial printer • Unit weight 	standard Accessories as required		Product Catalogue		2 Years

			recall facility through preset keys					
11.	Document Camera / Visualiser	<p>Document Camera / Visualiser with Min. Specifications as:</p> <ul style="list-style-type: none"> • Image pick-up device: 1/ 2.7 " or 1/ 3 "CMOS sensor • Effective Pixels: Min 1920 Horizontal x 1080 Vertical • Frame Rate: max. 30 fps <p>OPTICAL</p> <ul style="list-style-type: none"> • Zoom Optical 12, Digital 10 • Focus Auto • Shooting Area: A3 sized: 297 x 420 mm <p>IMAGE</p> <ul style="list-style-type: none"> • High Resolution Output : up-to 1080p • Image Adjustments: Auto Exposure, Black and White, Brightness Adjustment, Contrast Adjustment, Image • Rotation, Microscope mode <p>CONNECTIVITY</p> <ul style="list-style-type: none"> • Interfaces USB 1.1 Type B, VGA in, VGA out, HDMI out, built-in microphone, SD memory card 	<p>Min. Desired Features:</p> <ul style="list-style-type: none"> • PC-Free Image Viewer View images from internal or supported external memory • Image Storage SD/SDHC compatibility (128MB-32GB) • Features Auto focus, Freeze, Parallel video output, SD card viewer, Split screen, Zoom • Security Kensington lock, Security bar, Security cable hole 	<ul style="list-style-type: none"> • AC Adaptor • Carrying Case • VGA cable • Microscope Adapter • Power cable • Remote control incl. batteries • USB cable 		<ul style="list-style-type: none"> • CD Manual • Quick Setup Guide • Software and drivers (CD) 		2 Years

			<ul style="list-style-type: none"> • Illumination LED lights • Included Software Easy Interactive Tools and driver for Document Camera (for Windows) • Portable and light weight 					
12.	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	•ISI Mark product			Manual		

13.	EMS machine	<p>EMS (Electronic Muscle Stimulator) Machine with Min Specifications as:</p> <ul style="list-style-type: none"> • Min Channel 12 with pads 24 output • Body: Heavy Plastic Body • Technology: Micro-computer controlled/ Processor Control /PCB Based • Operation: Manual Mode/Timer Based/Auto Mode • Power Supply: 220-240 V AC with 50 Hz 	<ul style="list-style-type: none"> • Digital Display • Wire Check Facility • Each channel with independent intensity controls • Programs to include lifting, inch loss , fat loss , figure correction, toning firming all in one etc. • Auto-cut-off with buzzer. • Latest ISO 9001 certified factory product/ CE Mark product 	standard Accessories as required		Catalogue		2 Years
14.	Geyser (Storage type)	<p>Capacity 10 Litres 3 KW Heating Element Min. Min. 4 Star rated from BEE ISI Mark Product</p>	<p>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</p> <p>a) Thermostat, b) Thermal cut off, c) Pressure release valve (PRV), d) Non returning valve (NRV), e) Fusible plug</p>	Flexible corrugated Stainless steel connectors for hot water heaters. Of Min. of 18" size(st of 2 -for Both Hot and cold)		Catalogue		5 Years inner tank warranty and 2 year product warranty

15.	FAX Machines with answering facility	<ul style="list-style-type: none"> • Printing method: Laser printing on plain paper • Effective scanning width : Min. 208 mm • Effective printing width: 202 mm (A4), 208 mm (Letter / Legal) • Resolution: Standard / Fine / Photo / Super Fine / Mixed • Paper size : A4 / Letter / Legal • Modem Speed: Min. 33.6 kbps • Document Memory 2.5 MB (Reception: 100 pages / Transmission: 150 pages)*2 • LCD readout 16 digits / 2 lines • Power Supply: AC 220 - 240 V, 50/60 Hz 	<ul style="list-style-type: none"> • Dial Mode: Tone (DTMF) / Pulse • Manual answer: TEL, TEL / FAX • Call back feature: Available*1 • Incoming call ringer: Ring tone 1, 2, 3 • Monitor volume: 8 levels • Handset volume: 3 levels • Flash: Available • Caller ID: FSK / DTMF compatible*1 CE Mark Product	Standard Accessories		Operating Manual	Installation & training	2 Years
16.	Frost free refrigerator	Frost Free refrigerator specifications: <ul style="list-style-type: none"> •Capacity: Min. 200 litre •Input Power: 220-240 V AC 50 Hz • Type -Double Door Refrigerator with • Star Rating- Min. 3 Star BEE Rating • Color -White • Compressor- Reciprocatory type • Refrigerant -R600a 	<ul style="list-style-type: none"> •Auto Fridge defrost to stop ice build up •LED Interior Light • Manual Defrost • Stabilizer Free Operation • Mechanical Temperature Cooling System • Lock and Key • BEE Rating Year- 2019 • CE/ISI mark product 	standard Accessories as required		Product Catalogue		1 Year on product and 5 years on Compressor

17.	Mixture & Grinder	<ul style="list-style-type: none"> •Input Voltage: 230 V, 50Hz •Power: 750 W or above •Motor rating: 30 minute(s) •Capacity chutney jar: 0.5 L or above •Capacity wet grinding jar: 1.5 L or above •Capacity multi-purpose jar: 1.25 L or above •Blender volume capacity liquid: 1.5 L or above •Motor rating: 30 minute(s) or above •Capacity chutney jar: 0.5 L or above •Capacity wet grinding jar: 1.5 L or above •Capacity multi-purpose jar: 1.25 L or above •Blender volume capacity liquid: 1.5 L or above 	•ISI Mark product			Catalogue		
18.	Washing Machine Semi-Automatic	<ul style="list-style-type: none"> •Washing Machine Semi-Automatic 5 Kg & above •Input voltage 100V- 240V, 50Hz •Power in 1200W / Output power 100–400W •Top loading / Front loading type •Capacity: 5 Kg or above •Induction motor •Water proof •Body type: Plastic 	•CE/ISI Mark product			Catalogue		2 years

19.	Hand Held GPS	<p>Hand Held GPS complete in all aspect with key specifications as:</p> <ul style="list-style-type: none"> • Display: Min. of 2.2" transfective, 65K color TFT • Water rating: IPX7 • USB interface with High-sensitivity receiver • Base map with ability to add maps • Built-in memory: Min 3.7 GB and shall also Accepts data cards such as microSD™ card • Shall have Custom POIs (ability to add additional points of interest) • Routes: Min. 200 • Track log: Min. 10,000 points, 200 saved tracks 	<ul style="list-style-type: none"> • Automatic routing (turn by turn routing on roads) • Paperless Geocaching-friendly • Custom maps compatible • Sun and moon information • Tide tables • Area calculation • Picture viewer 	USB Cable Batteries Case etc		Operation Manual		2 Years
20.	Home theatre system	<p>Home theatre system</p> <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 	Stereophonic audio system. CE Mark product	Accessories: Cables, connectors, etc., as required.		English language user manual with Operation and Maintenance instructions to be provided		2 Years

21.	Infra red lamp	<ul style="list-style-type: none"> •Voltage: 220/230 or 240/250V •Frequency: 50 Hz •Power: 150W •Cord length: 180 cm •Cord storage: Yes) •Insulation: Class II (double isolation) •Type of lamps: PAR 38E, 150 W + prismatic rings for more focus •Lifetime of lamp: 750 sessions of 10 minutes •Adjustability: 0-40 degrees (backwards) •On/off switch: Yes 	<ul style="list-style-type: none"> • Therapeutic Features : to accelerate the absorption of nourishment to the facial mask, the skin and various type of scalp and hair treatments • To stimulate blood circulation, accelerate metabolism, relief pains, reduce fat weight, perspire, removing the toxic, re-supply skin moisture, loose physique etc. • Latest ISO 9001 certified factory product 	standard Accessories as required		Catalogue		2 Years
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22.	Total Station	<p>Total Station complete in all aspect with key specifications as:</p> <ul style="list-style-type: none"> • Laser pointer: Coaxial red laser using EDM beam • Levels Graphic: 6' (Inner Circle) • Circular Level: 10'/2mm • Optical: Magnification: 3x with Minimum focus: 0.5m from tribrach bottom 	<ul style="list-style-type: none"> • 5" Accuracy, Fast distance measurement of 0.9s.. • Reflector less operation from 30cm to 500m. • 50,000-point internal memory • Upto 32GB USB Pen Drive Support • Coaxial EDM beam and laser-pointer for fast and accurate aiming. • Ensures accuracy even with reflective sheets. • IP66 dust-proof waterproof rating. • Rugged metal chassis and heavy duty handle. • Standard usage temperature range -20° to 60°C. • Able to interchange data between GPS and Total station without any data conversion. 	<p>1 No. Battery (BDC46C) 1 No. Battery Charger (CDC68A) Battery Adapter, Power Cable, Lens Cap, Lens Hood, Tool Pouch, Screwdriver, Lens Brush, Adjusting Pin 2x, Cleaning Cloth Carrying case, Carrying Strap, Heavy Duty Wooden Tripod, Prism with Holder & Target Plate, Telescopic Prism Pole etc.</p>		Operation Manual (CD-R)		2 Years
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23.	Inverter with Battery	<p>Inverter with Battery 12 V Heavy Duty , Battery Input- 12 volt DC, Output- 220 volt AC Inverters 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</p>	<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 			Product Catalogue		
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			zero level offers more amount of power to 50 Hz frequency of AC.					
24.	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 	<ul style="list-style-type: none"> • 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 • Display Modes: Presentation, Standard, sRGB, 	Standard Accessories		Operating Manual	Installation & training	2 Years

			Movie, User 1 & 2 • Built-in Speaker: 10W RMS, Monaural • HDMI™ port and 2 x VGA portsRJ-45 network port for remote control and monitoring • CE mark Product					
25.	LCD SCREEN	40-inch LCD panel with full HD 1080p resolution (1920 x 1080 pixels) Five separate HD inputs (two HDMI, two HD components, one PC) Light Sensor adjusts picture brightness based on ambient light Dynamic contrast ratio: 1000:1	Comm Port Compatible, USB 2.0 • CE mark Product	Standard Accessories		Operating Manual	Installation & training	2 Years

26.	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
27.	LED 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

28.	Mobile (GMS/CDMA).	RAM 4GB Min, Internal Storage - 64GB, Processor - Octa Core 2GHz, Latest Operating Version of Android (4G & 5G Support), IS 13252 (Part 1) / IEC 609500-1	Screen Size 6" Touch Screen Colour LED Display, Bluetooth, Wi-Fi, Dual Rear Camera with Flash Min. 16MP.	Mobile Charger, Bluetooth earphone, Mobile Cover Temper Glass.		Operating Manual		2 Years
29.	Photocopy machine	<p>Multifunctional Photocopy machine with following Specifications:</p> <ul style="list-style-type: none"> • Paper Input Capacity: Standard: 2 x 250-sheet paper trays, 100-sheet multi-bypass tray Maximum: 1600 Sheets • Recommended paper size: Paper tray(s): A5 - A3, Bypass tray: A6 - A3 • Paper Output Capacity: Maximum: 350 sheets <p>Copier</p> <ul style="list-style-type: none"> • Copying Process: Laser beam scanning and electro photographic printing • Multiple Copies: Up to 99 copies • Resolutions: 600 dpi • Zoom: From 50 to 200% <p>Power Input: 1 Phase 220-240 V AC 50 Hz CE Mark Product</p>	<p>Scanner Features</p> <ul style="list-style-type: none"> • Type Colour & BW • Scan Modes Binary/ Halftone/ Grayscale/ 8Colors/ Full Colors • Resolutions Maximum: 600 dpi • Original Size A3, A4, A5 • Bundled Drivers TWAIN, Network (Option) <p>Printer</p> <ul style="list-style-type: none"> • Resolutions 600 x 600 dpi • Interface Standard: USB 2.0 Option: 	Standard Accessories		Operating Manual	Installation & training	2 Years

			Ethernet 10 base-T / 100 base-TX • Supported Environments Windows® XP/Vista/7/Server 2003/Server 2008/					
30.	Refrigerator	<ul style="list-style-type: none"> • Type -Double Door Refrigerator with Top Freezer Refrigerator • Capacity : Min. 165 litres • BEE Rating Year- 2019 • Power Requirement AC 230 V, 50 Hz • Color -White • Compressor- Reciprocatory type 	<ul style="list-style-type: none"> • LED Interior Light • Manual Defrost • Stabilizer Free Operation • Mechanical Temperature Cooling System • Lock and Key • Star Rating- 3 Star BEE Rating • CE Mark product 	standard Accessories as required		Product Catalogue		2 Years

31.	Scientific Calculator	<p>Display</p> <ul style="list-style-type: none"> • Display type: 31 * 96 FULL DOT, Natural display • Algebraic input logic: Natural V.P.A.M. with Number of characters/lines: 15/1+10/1 and Significand function: 10+2 <p>Memory</p> <ul style="list-style-type: none"> • Repeat function with Variable memory of 9 and Number of storable programs as Calc / Solv button <p>Statistics Functions:</p> <ul style="list-style-type: none"> • Summations, Standard deviations for grouped and ungrouped values, Distribution functions (normal distribution and inverse normal distribution, binominal distribution, Poisson distribution), Regression analysis, Permutations (nPr) and combinations (nCr), Matrix calculation/vector calculation, REF/RREF function, Equation calculation, Inequality calculation <p>Energy supply: Solar+Battery</p>	<p>Basic mathematics</p> <ul style="list-style-type: none"> • Angle dimensions DEG/RAD/GRAD, Conversions between >DEG/>RAD/>GRAD' Coordinate conversion Pol, Trigonometric functions, Hyperbolic functions, Exponent, log, In, 10x, ex ,Mathematical functions, Calculations based on n , hexadecimal/decimal/binary/octal), Logical operators , Percentage calculations, Remainder function, , Calculation of complex numbers, Random number generator, Random integers, Calculation of the minimum or maximum of a quadratic function, Base-N calculations, "Verify" test 	Batteries and Case		Manual		2 Years
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			function, Value table, Recurring decimal fractions Differential and integral calculus <ul style="list-style-type: none"> Numerical integral calculus, Numerical differential calculus 					
32.	Sensor thermometer (digital)	Sensor thermometer (digital) with following specifications: <ul style="list-style-type: none"> Range: -50°C to 150°C Temperature Resolution: 0.1°C Display Min. 36 x 17mm Accuracy: ±0.1%+0.4°C Survey Cycle: 10 Sec Sensor: PT 100 Battery: 1.5V (LR44) 	<ul style="list-style-type: none"> IP67 waterproof Max/Min/Avg function Backlit LCD Resolution 0.1°C; 0.1°F Battery life indicator ISO 9001 Certified Factory Product/ CE mark Product 	Batteries and case		Manual		2 Years

33.	Smart Board / Inter Active Board	Smart Board / Inter Active Board with Min. Specifications as: <ul style="list-style-type: none"> • Min. Size 78" diagonal LxH -(6x4 feet) • Whiteboard Surface: Non-Ceramic/ Ceramic High luminance nanotechnology, anti-scratch, anti glare surface • Aspect Ratio: 4:3 • Touch accuracy: 0.1 mm • Touch response time: < 8ms • Resolution: Min. 9600 x 9600 • DPI: Min. 600 • Power supply: USB (<5V/500mA) • Operations: Temperature: 0 to 60 degree Celsius; Humidity: 0% to 95% 	<ul style="list-style-type: none"> • Operating system: Windows XP/2003/Vista/7/10, Linux, Android, MAC 10.6/10.7 • Multi-touch capability • Touch Technology: DViT (Digital Touch Vision) Optical Sensors • Touch type: Finger touch & touch with any opaque object 	<ul style="list-style-type: none"> • Smart Whiteboard Software, • USB Cable, • Smart Pens, • Wall mount bracket 		<ul style="list-style-type: none"> • CD Manual • Quick Setup Guide • Software and drivers (CD) 		2 years
34.	Smart phones of different make (android/Windows)	Android Smartphone: OS: Android Nougat 7.1.2 <ul style="list-style-type: none"> • 2G/3G/4G GSM Mobile Specifications:- <ul style="list-style-type: none"> • 2 GB RAM 16 GB ROM Expandable Upto 32 GB • Min. 4.5 inch Full HD+ Display • Min. 12MP + 2MP Dual Rear Camera 13MP Front Camera • 4000 mAh Li Polymer Battery • Qualcomm Snapdragon 636 Processor Windows Smartphone: OS : Windows 10 <ul style="list-style-type: none"> • 2 GB RAM 16 GB ROM Expandable Upto 128 GB • 4.7 inch HD Display • 5MP Rear Camera 5MP Front Camera • 2220 mAh Battery • Qualcomm Snapdragon 400 Processor 	<ul style="list-style-type: none"> • Front & Back camera. • Easy to hold • handy • Gorilla glass • safety cover. 	<ul style="list-style-type: none"> • Ear phone • Charger • Blue tooth Ear phone 		English language user manual with Operation and Maintenance instructions to be provided		2 Years

35.	Air Conditioner unit split 1.5 Ton Invertor Technology	<ul style="list-style-type: none"> • Type - Split 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 • Refrigerant -R-134a or R-22 • Technology Used- Hybrid jet • 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	Installation shall be in scope of supplier without any cost. Further, Installation also includes the material required for installation.	1 Year on product and 5 years on Compress or
36.	Split A/C(Inverter technology)	<ul style="list-style-type: none"> • Type - Inverter Split 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 • Technology Used- Hybrid jet • 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 	Standard Accessories as required		Product Catalogue	Installation shall be in scope of supplier without any cost. Further, Installation also includes the material required for installation .	1 Year on product and 5 years on Compress or

37.	Telephone (STD & ISD facility).	Capacity: 4 Main Lines (Trunk Line/ P& T) and 32 Extensions, Internal/External Music on Holding, Operator/Auto-attendant Mode, Remote Programming, Day/Night Mode(Manual), Music & Ringing Recordable OGM(outgoing message), Music Duration 20 Seconds, Caller ID, Call Transfer, Call Forwarding Manually, Outgoing Call Transfer, Power Failure Transfer, Specific Main Line , (C.O./Trunk Line) Dialling, Three Way Conference, Do Not Disturb, Auto/Manual Dial-Out Mode, Brand: S-Tech (Manufactured By Swift Technologies) Model: STECH-CS416	Call Forwarding, Call Accounting, Selective Outgoing Calling Feature, Conference calling, Voicemail	Standard Accessories		Operating Manual	Installation & training	2 Years
38.	Telephone with intercom facilities	6 lines 6 SIP accounts, Up to 6-way voice conferencing, 3-way video conferencing, Dual-switched Gigabit ports and integrated WiFi (802.11b/g/n), FREE IP Video Talk account for video calling, 1 megapixel CMOS camera, 4.3 inch (480×272) capacitive touch screen	Indicates pressing the Feature key, Briefly display the approximate length of your current or most recent call., Send your calls to another telephone in your system	Standard Accessories		Operating Manual	Installation & training	2 Years

39.	Three/four door refrigerator	Three / four door refrigerator •Capacity: Min. 300 Litre •Input Power: 220-240 V AC 50 Hz • Type -Double Door Refrigerator with • Star Rating- Min. 3 Star BEE Rating • BEE Rating Year- 2019 • Color -White • Compressor- Reciprocator type • Refrigerant -R600a	• LED Interior Light • Manual Defrost • Stabilizer Free Operation • Mechanical Temperature Cooling System • Lock and Key	standard Accessories as required		Product Catalogue		1 Year on product and 5 years on Compressor
40.	Vacuum Cleaner	Portable Vacuum Cleaner with Min. Desired specifications as : • Power Supply: Single Phase 220 V, AC 50 Hz • Vacuum Pressure: 22kpa -34 kpa • Noise (dB): <= 82dB (A) • Power Cord Length: 5m (min) • Airflow: > 1.8m ³ /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.)	Min. Desired Features: • Flexible Hose • One-step click-off nozzle for easy emptying • Cyclonic airflow with filtration system • Soft touch handle • Adjustable suction • Rubber type wheel • CE/ISI Mark Product	• Crevice tool • Integrated brush • Turbo brush • Multi Clean nozzle		Manual	Demonstration / training to be provided at the time of supply.	2 Years

41.	Vacuum cleaner - Hand Held	Hand Held Vacuum Cleaner with Min. Desired specifications as : • 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	Min. Desired Features: • Flexible Hose • One-step click-off nozzle for easy emptying • Cyclonic airflow with filtration system • Soft touch handle • Adjustable suction	• Cord clip • Flexible hose • Shoulder strap • Brush tool and flexible hose		Manual		2 Years
42.	Wax heater	Wax heater with Min. Specifications as: • Power Supply: 220-240 V AC with 50 Hz • Capacity: Mi. 2 Kg • Type: Single Jar	• With Thermostat • Auto Cut off • Shock Proof • CE Mark Product	Wax Heater Cleaning kit along with standard accessories		Catalogue		2 Years

43.	<p>Location and navigational equipment set consisting of :</p> <ul style="list-style-type: none"> • Hand held GPS units • Compass clinometers • Prismatic compass 	<p>Hand Held GPS complete in all aspect with key specifications as:</p> <ul style="list-style-type: none"> • Display: Min. of 2.2" transfective, 65K color TFT • Water rating: IPX7 • USB interface with High-sensitivity receiver • Basemap with ability to add maps • Built-in memory: Min 3.7 GB and shall also Accepts data cards such as micro SD™ card • Shall have Custom POIs (ability to add additional points of interest) • Routes: Min. 200 • Track log: Min. 10,000 points, 200 saved tracks <p>Compass clinometers complete in all aspect with key specifications as:</p> <ul style="list-style-type: none"> • +/- 0.5° Azimuth/Bearing Accuracy • +/- 90° Inclinator • 0-45° Sine and Tangent Scales • Sapphire Jewel Bearing • Inch and Millimetre Scales • Aluminium Housing • Integrated Carrying Lanyard • Azimuth and Inclination Tripod Mounts <p>Prismatic compass complete in all aspect with key specifications as:</p> <p>Prismatic Compass is made of Brass / Aluminium / Gun Metal with min. size of 125mm dia</p>	<p>Hand Held GPS with min. features as:</p> <ul style="list-style-type: none"> • Automatic routing (turn by turn routing on roads) • Paperless Geocaching-friendly • Custom maps compatible • Sun and moon information • Tide tables • Area calculation • Picture viewer • CE Mark Product <p>Compass clinometers with min. features as:</p> <ul style="list-style-type: none"> • In-built spirit level • Durable aluminium housing – protects against impact, corrosion and water • Edges at 90 degrees angles for contact measuring • In-built spirit level • Individually calibrated • Optical adjustment for reading • Nylon pouch with belt-loop • CE Mark 	Standard Accessories		Product Catalogue		2 Years
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			Product Prismatic compass with min. features as: <ul style="list-style-type: none"> • Quality metal Prismatic Compass • Military Model , Coated metal case and foldable metal lid fitted a glass window with the sighting line etched into it • Floating luminous arrow dial with sapphire bearing • scale adjustable • Sighting slot and sighting hair-line • Adjustable lens prism • cm and inch scales on both side of body as a map measuring ruler • Reference table at bottom of base for estimating distance and angle of slope • Screw hole at base for fitting with a tripod • Thumb ring for firm holding and neck strap • CE 					
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			Mark Product					
44.	Anemometers	Anemometers complete in all aspect with key specifications as: <ul style="list-style-type: none"> • LCD Display • Measurement Units: Velocity: m/s, km/h, ft/min, knots, mile/hr • Temperature: °C or °F • Sampling Time: <ul style="list-style-type: none"> o Auto: 1 to 3600 seconds o Manual: Push the data logger button once, will save data one time • Operating Humidity: Less than 85% RH • Power: 6 “AAA” alkaline or heavy-duty batteries (included), or 9V power adaptor (optional) 	Anemometers with min. features as: <ul style="list-style-type: none"> • CE Mark Product • Data Output: <ul style="list-style-type: none"> o RS232: With optional cable/software o USB: With optional cable/software • Operating Temperature: 0 to 50°C (32 to 122°F) • Real Time SD Memory Card Data Logger 	Standard Accessories		Product Catalogue		2 Years

45.	Windwatch- which incorporates a barometer, altimeter, temperature probe and anemometer in a single hand held device. It can also measure wind-chill	Windwatch complete in all aspect with key specifications as: Windwatch- which incorporates a barometer, altimeter, temperature probe and anemometer in a single hand held device. It can also measure wind-chill	Windwatch with min. features as: • CE Mark Product Waterproof (IP-67)	Standard Accessories		Product Catalogue		2 Years
46.	Digital cameras	Digital cameras complete in all aspect with key specifications as: Digital camera with Min. 20 MP, Sensor type: CMOS, Data Storage as Micro SD Card with Min. 16 GB Micro SD Card. Chargeable Battery with Adapter	Digital cameras with min. features as: • CE Mark Product	Standard Accessories		Product Catalogue		2 Years

47.	Spring scales	<ul style="list-style-type: none"> Spring scales complete in all aspect with key specifications as: Spring scales Handy 100 KG Weighing scale machine 	Spring scales with min. features as: Latest ISO 9001 certified Factory Product	Standard Accessories		Product Catalogue		2 Years
48.	Calipers	Digital Calipers complete in all aspect with key specifications as: <ul style="list-style-type: none"> Resolution: 0.01mm or .0005"/0.01mm Repeatability: 0.01mm / .0005" 	Calipers with min. features as: <ul style="list-style-type: none"> Display: LCD Battery: Solar battery Dust/Water protection level: IP67 CE/ Latest ISO 9001 certified factory product 	Standard Accessories		Product Catalogue		2 Years

49.	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	Automatic change over from mains to UPS and vice versa.	Standard Accessories	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum
50.	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.	Standard Accessories	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

51.	UPS 2 KVA	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 24 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.	Standard Accessories	Standar d Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum
52.	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.	Standard Accessories	Standar d Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

53.	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.	Standard Accessories	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	
54.	UPS Trainer kit	AC Input : 190 to 260 V 10%, 50 Hz Load Output : 230 V / 2.5A Transformer Used 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.	Standard Features /Latest ISO 9001 Certified factory product	Standard Accessories	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

55.	LED Projector	<ul style="list-style-type: none"> o Display Type: LCD/LED/DLP 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 /Latest ISO 9001 Certified factory product	<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	<ul style="list-style-type: none"> - To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises 	2 Years Minimum
56.	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 Autolock (motorized)	Relay: Power synchronised relay to create a synchronised control with projector i.e. when the projector is turned on the screen will automatically lower and the Projector is off the screen will automatically retract	Standard Accessories	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	<ul style="list-style-type: none"> - To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises 	2 Years Minimum

57.	Profile Projector	Screen Diameter: Fine grain ground glass screen with cross lines, Axis colon: vertical lens axis; Electronic Protractor: Switchable degree/decimal, 1 minute / 0. Measuring Range X/Y Axis: 201 x 150 mm Max or equivalent Range: +/- 370 degree Workpiece Height: 110 mm Resolution: 0. 001 mm	High versatility and easy operation Easy to read digital X-Y counter Digital read out protector screen Zero setting +/- direction switching and RS 232 C output	Standard Accessories	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum
58.	Laptop Spares: Cabinet with Display, memory Hard disk, battery pack, Key board membrane, Chargers, Suitable for Disassembling and Assembling practice of Trainees	Laptop Cabinet with 14" display, 4GB DDR-4 memory, 1TB hard disk, battery pack, keyboard membrane, DVD Writer Chargers	Each laptop spare compatible with operating system i.e. Windows 8 & above, latest Mac OS & latest Linux OS	Standard Connecting connector/Leads or each spares parts , 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 at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

59.	Smart LED TV 42"	<ul style="list-style-type: none"> • Screen Size (Measured Diagonally): approx 42 inch • Display Type: LCD • DISPLAY RESOLUTION: 4K/(3840x2160) • Backlit Type: Edge LED • Backlit Dimming Type: Frame Dimming • HDR Compatibility: Yes • Audio Power Output: 10W + 10W • Operating System: Android • Storage: 16 GB • CONNECTIVITY: • Wi-Fi, • Ethernet Inputs: 01 • Built-in Chromecast or equivalent • HDMI Inputs: 4, • USB Ports: 03 • USB Drive Format Support: FAT16/FAT32/exFAT/NTFS 	IR Blaster Voice Search	AC Power Cord Batteries IR Blaster Operating Instructions Quick Setup Guide Table Top Stand Voice Remote Control	Standard Spares	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum
60.	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, f/3.5-5.6G VR Prime 50mm, f/1.4G Wireless Remote Camera Pouch, Lens holder pouch Battery: Lithium ion battery with charger	Standard spares, as suggested by the manufacturer	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

61.	Sound system	Form Factor: 5.1 Power Output: 1,200W Connectivity: BLUETOOTH, NFC, Wi-Fi, HDMI in/out, Ethernet, USB Keyboard Digital Amplifier: 24bit Speakers: Wireless Mica Reinforced Cellular woofer cone Speaker System: 3-way Radio: FM Playback: BLU-RAY 3D, BLU-RAY DISC, DVD Compatible: USB FILE SYSTEM (FAT32, NTFS), EXTERNAL HDD	Play Mode: Normal, Repeat, Shuffle and Resume HDMI Inputs / Outputs Number of Channels 5 or more Remote Control Dolby Atmos, 4K upscaling	Wireless amplifier FM Antenna (Pig tail/T type) Batteries Auto Calibration Mic	Standar d spares, as suggested by the manufa cturer	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum
62.	Interactive Board	USB Powered. 2397 sq. in. panel - 82" (2082) diagonal 1 panel. Operates as an Interactive Electronic Board with Projector & White Board modes. This unit is powered by the USB interface. Includes: Multi-touch Operation Built-in Stereo Speakers 02 USB Hub Ports Simultaneous Operation Up To 10 Points	Drawing tools(e.g. pens and erasers), Lessons & Audio Recorder, Slide Show, On-Screen Keyboard, Magnifier, Shape Recognition, Print, Text Recognition Highly integrated with central control with PC, document camera high-power speakers 4k HD video & IP radio One-button to power on/off, easier & faster	Stand, Electronic Pens, Wireless Kit	Standar d spares, as suggested by the manufa cturer	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

			operation to improve efficiency of class 10 touch points Plug-and-play Modular structure design, easy to assemble and maintain Wireless module optional 10 Points Multi-touch true multi-point writing					
63.	SMPS	Power Supply 24 Pin 450w Atx 12v SMPS PC Supply 100% Compatible With latest motherboards, 20+4 Pins Compliant with ATX 12V. 20/24 pin Main Power Connector 20/24 pin SATA Connectors-3 Pcs. Molex Connectors-2 Pcs 4 Pin ATX Connectors.-1Pc 120mm Smart Cooling Fan /230VAC 50/60Hz input, +3.3V/25A, +5V/0.3A, +12V/17A, -12V/0.8A, +5V/2A DC output	Lightening Proof Fan for temperature control Low noise and ripple Universal motherboard plug 20+4 pin supporting the latest motherboards. Output over voltage. Over current protection Short circuit protection on all output	Standard accessories	Standard spares, as suggested by the manufacturer	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

Lot-2 Electronics lab equipments

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.	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 • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220V \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		2 Years
2.	A.F.O Oscillators	A.F.O Oscillators specifications: <ul style="list-style-type: none"> • Frequency Range : 10 Hz to 100 kHz 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified 	Main Power cord		Instructional manual		2 Years

		<ul style="list-style-type: none"> • Frequency Stability : 0.1% / hr • Operating Modes : Sine and square wave • Very Low Sine Distortion • Digital Frequency Display • Trigger Output 	factory product					
3.	Application kits for Microcontrollers 6 different applications	<p>Application kits for Microcontrollers 6 different applications:</p> <ol style="list-style-type: none"> 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.) <p>Application Kits:-</p> <ul style="list-style-type: none"> • 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		2 Years
4.	Basic Analogue Electronics Trainer	<p>Basic Analogue Electronics Trainer with following specifications:</p> <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 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product • Completely self - contained Multi Experiment Unit covering various 	<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 & 		<ul style="list-style-type: none"> • Operating and Experimental manual, 		2 Years

		<ul style="list-style-type: none"> • 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 	<p>Characteristics & Applications</p> <ul style="list-style-type: none"> • 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 	Component Set					
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			multivibrator using transistor, Bistable 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					
5.	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 • 1mV/div Sensitivity on Both Channels • X-Y Operation • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220V \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 	Main Power cord		Instructional manual		2 Years

			oscilloscope tube <ul style="list-style-type: none"> • 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 					
6.	C.R.O Single beam	C.R.O Single beam with following specifications: <ul style="list-style-type: none"> • Power Supply: 220 volts 50 Hz. • Single beam with a band width DC to 5 MHz. 	<ul style="list-style-type: none"> • The accurate triggering of time base enable clear and stable display on screen min. 8x8 cm. • shall have option to select Vertical deflection for either A.C. or D.C. provision or attenuation in the input circuit, calibrated from 5 mV to 50V/cm. 	Standard Accessories		Manual		2 years
7.	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 	<ul style="list-style-type: none"> • DC / AC Power Supply • Sine/ square/ TTL Generator Data Switches • LED indication • LED Display: 8 in Nos Simulation/ 	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

		segment display), Potentiometers 6Nos, Bread Board 172.5 mm x 128.5mm with 1685 points , Simulation/ Teaching Content through software	Teaching Content through software. • Latest ISO 9001 Certified factory product					
8.	Digital I.C. 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. • Independent buffered logic level indicators for High / Low status indication of digital outputs. • Potentiometer (IOOK) 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>The Digital IC Trainer should be able to facilitate conduct of both basic and advance experiments as below:</p> <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, 	Cords : Set of 20 assorted coloured multi-stand 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 		

			<p>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 					
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			combination of two or more above using the onboard components with use of external components without soldering.					
9.	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. 	<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. • Portable size • Mains operation • Self Diagnosis • Identifies Unknown model number of Devices <p>Note: The product shall strictly be Latest ISO 9001 certified factory product</p>	Standard Accessories		Product Catalogue		2 Years

10.	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. • Set of assorted coloured multi-strand wires with 2 mm termination at both ends • Working Voltage: 230V 10% single phase AC 	<p>The Digital IC Trainer should be able to facilitate conduct of both basic and advance experiments as below:</p> <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 	<p>Cords : Set of 20 assorted coloured multi-stand wires with 2 mm stackable (stackable) termination at both ends</p>		<ul style="list-style-type: none"> • List of Experiments with Procedures and Observation sheets • Detailed Operating Manual 		2 Years
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			<p>Half Adder, Full Adder, Half Subtractor, Full Subtractor, Even I Odd Parity Checker, Multiplexer, Demultiplexer, Binary to Gray & Gray to Binary Converters.</p> <ul style="list-style-type: none"> • 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 onboard components with use of external 					
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			components without soldering. • Latest ISO 9001 Certified factory product					
11.	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 1 Hz, 10 Hz, 100 Hz and 1 MHz clock • 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	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 standard accessories		Manual and experiment lists to be performed		2 Years
12.	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	Required Minimum Features: • Bread Board: Unique solder-less large size, spring loaded breadboard	• Standard Accessories		• Detailed Operating Manual • List of Experiments with Procedures and		2 Years

		<p>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>consisting of two Terminal Strips</p> <ul style="list-style-type: none"> • Continuity Tester: For testing the continuity • Inbuilt Resistors, Capacitors, Diodes, Zeners, Transistors, Diac, Triac, FETs, UJT, LEDs, Potentiometers, Audio transformers, OEN relays, Speaker, DIP switches and others used in construction of electronic circuits for carrying out experiments. • 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 			Observation sheets		
13.	DSO (Colour)	50MHz 4 Channel Digital Storage Oscilloscope DC - 50MHz Bandwidth	<ul style="list-style-type: none"> • Trigger types: Edge, Pulse width, Video, 	standard accessories		English language user manual with	In house training to be provided to	2 Years

		<ul style="list-style-type: none"> • 1mV/div to 10V/div Sensitivity on Both Channels • X-Y Operation • Time Base 5ns/div to 50s/div • Real Time Sampling 1GSa/sec • Min.7" TFT Display • Memory Depth min 12Mpt or above • Power Supply : AC 220V \pm 10%, 50Hz 	<p>Slope.</p> <ul style="list-style-type: none"> • 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 Pict Bridge compatible printer and support PC remote control, RS232 Pass/Fail Output. • CE Mark/ Latest ISO 9001 Certified factory product 			Operation and Maintenance instructions to be provided	the Instructors of the Institute.	
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14.	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 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.</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</p>	standard accessories		manual/catalogue		2 Years
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			and change on a component spreadsheet. IT should also have unique 3D capability to view the physical parts already on the schematic diagram.					
15.	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 	<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. <p><u>Exercises that should be possible using the Trainer:</u></p> <ul style="list-style-type: none"> • Setting up Fiber Optic Analog & Digital Link • AM system using Analog & Digital Input Signals • Frequency Modulation System and Pulse Width 	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"> • Latest ISO 9001 Certified factory product 	Modulation System <ul style="list-style-type: none"> • Study of Propagation Loss, Bending Loss & Measurement of Numerical Aperture • Characteristics of Fiber Optic Communication Link • 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 					
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16.	Frequency modulator and Demodulator trainer kit	<p>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.</p> <ul style="list-style-type: none"> • 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
17.	Function Generator	<ul style="list-style-type: none"> • Input:- 220Volt, 50Hz • Single Phase Pulse / Function Generator with DDS Technology • Frequency:- 2 -20 MHz , Sine, Square, Triangular • 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 Control • Double-pulse Mode • Simultaneous Fixed Level TTL, TTL, ECL and ECL outputs • 20 Volts Peak 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Operating Manual 		2 Years

			to Peak Output • SYNC Out Facility					
18.	Function Generator	<ul style="list-style-type: none"> • Input: 220 Volt, 50Hz • Frequency: 1 MHz- 10 MHz , Sine, Square, Triangular • 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 		2 Years

19.	LCD based DPM	<p>LCD based DPM</p> <ul style="list-style-type: none"> •Maximum Input: 199.9mV DC. Maximum Display: 1999 counts (3½ Digit) with automatic polarity indication. Indication Method: LCD Display. •Measuring Method: Dual-Slope Integration A-D converter system Input Impedance: > 100M Ohms, Reading rate time: 2-3 reading per second. •Accuracy: ± 0.5% of full scale. •Decimal Points: Selectable with wire jumper or switches. • Supply Voltage: 7-11V DC 	<ul style="list-style-type: none"> • Over range indication. • Latest ISO 9001 Certified factory product 			English language user manual with Operation and Maintenance instructions to be provided		2 Years
20.	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. 	<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 	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

			box of commercial 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 					
21.	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 Fault Switches: 5 No. Test Point: 10 No. Operating Power supply: 230V + 15% AC, 50 Hz. 	<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 	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

			commercial 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 					
22.	Linear I.C. Trainer	<p>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</p> <p>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.</p> <ul style="list-style-type: none"> Latest ISO 9001 Certified factory product 	<p>Should have required Power supply, Signal sources and components to be able to carry out the following experiments:</p> <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 resistance 	Cords : Set of 20 assorted coloured multi-stand 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 		

			etc. • 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					
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			operation and characteristics of a Timer IC and Applications of timers in systems and circuits <ul style="list-style-type: none"> • Study of Phase Lock Loop, Measurement of important PLL characteristics: lock range, capture range, VCO sensitivity, VCO linearity etc. 					
23.	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 	<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: <ul style="list-style-type: none"> Logic "1" (Hi LED) >3.0±0.25V Logic "0" (Lo LED) >0.75±0.25V • CMOS : <ul style="list-style-type: none"> Logic "1" (Hi LED) >60%Vcc±5% Logic "0" (Lo LED) ... 	Standard Accessories		Product Catalogue		2 Years

			>15%Vcc±5%					
24.	Microcontroller kits (8051) along with programming software (Assembly level Programming)	<p>Microcontroller kits (8051) along with programming software (Assembly level Programming)</p> <ul style="list-style-type: none"> •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 	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

			<p>Hex keypad.</p> <ul style="list-style-type: none"> •For large program user can use on board PC based USB Programmer. •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 					
25.	Mobile phone Trainer	<p>Mobile phone Trainer with following specifications:</p> <p>Self contained, easy to operate, training and development platform that demonstrates the complete study and working of a 2G/3G/ 4G Dual SIM VoLTE handset to understand the fundamentals of</p>	<ul style="list-style-type: none"> • Real time study and operation of Smart Phone • Easy measurement of voltages and 	<ul style="list-style-type: none"> •Ear phone •Charger. 		English language user manual with Operation and Maintenance instructions to be provided		1 Year

		<p>Smart phone.</p> <p>Cellular system : 2G /3G/4G Dual SIM GSM Handset.</p> <p>Output power : +5... +33dBm/3.2mW... 2 W</p> <p>OS & Processor Features</p> <ul style="list-style-type: none"> • Operating system : Android Nougat 7.0 • System Architecture : Qualcomm Snapdragon 430 • Processor core : Octa Core • Processor clock speed : 1.4 GHz • GPU : Adreno 505 at 450 MHz <p>Display Features</p> <ul style="list-style-type: none"> • Display size : 5 inch with Full HD Resolution : 1920 x 1080 • Other display features : IPS display, 5 point multi-touch <p>Memory & Storage Features</p> <ul style="list-style-type: none"> • Internal storage : 16 GB with RAM : 3 GB and Expandable storage : 128 GB as Memory card type : Micro SD • Battery type : Li-Polymer 2800mAH • Latest ISO 9001 certified factory product. 	<p>observation of waveforms on test points</p> <ul style="list-style-type: none"> • Soldering free fault creation and troubleshooting • Android based application development • IoT related application development <p>Connectivity Features</p> <ul style="list-style-type: none"> • Supported networks : 4G VoLTE (Cat 4),UMTS/HSPA+, GSM/EDGE • Internet connectivity : 4G, 3G, Wi-Fi, EDGE, GPRS • Pre-installed browser : Android • Micro USB port ,Bluetooth support with Bluetooth version : BR/EDR+BLE 4.2 • Wi-Fi hotspot with Wi-Fi version : 802.11 b/g/n • Dual band (2.4GHz & 5GHz) • Audio jack : 					
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			3.5 mm • OTG compatible • Location services : GPS, A-GPS & GLONASS • Map support : Google Maps • GPS support : Yes Camera Features • Primary camera : min. 13 Megapixel, LED Flash PDAF with FHD Video Recording, 1080p HD Video • Video resolution : 1920 x 1080 • Secondary camera : 5 Megapixel, Display Flash • Secondary camera : Fixed Focus					
26.	Multi Scan Tool with oscilloscope	Multi Scan Tool with Oscilloscope Specification:- Multi Scan Tool with Android based operating system should have android 5.0 having display of minimum size 10" IPS capacitive touch screen with CPU of 1.3 GHZ quad core and 1GB Ram. Memory capacity should be of 16 GB (Internal/SD Card). At least 6800 mAH lithium polymer	• Built-in social network service for auto diagnosis. • Car Remote Diagnosis extendable • Workshop Customer	Standard Accessories		Operational Manual		2 Years

		<p>Battery</p> <p>Tablet with high configuration.</p> <ul style="list-style-type: none"> • Built in social network service allow access to diagnostic community. • Customer management for the workshop. • Special functions: matching, coding, programming, battery reset, break reset etc. • Remote diagnosis & maintenance. • Built in 4 channel oscilloscope • One click update online via Wi-Fi • Built in car repair Data base and car repair tips application at least for Indian cars like Maruti, Mahindra, TATA and Hyundai. • Function of automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults quickly and conveniently, including "DC voltage simulation", "Fixed frequency simulation", "Predefined waveform simulation" and "Hand-painted waveform simulation." • Functional of android based automobile multi meter, which enables users to perform voltage test, resistance test and frequency test. 	<p>Management Platform</p> <ul style="list-style-type: none"> • Adhere to X431 vehicle diagnostic functions. • One-Click update of the diagnostic software online. • Auto technical data base and car repair tips. • Data stream storage and re-display in graphic. • Operating System Android 4.0 • Screen 10.1 inch capacitive touch. • Processor 1.2GHz. Memory 1 GB and storage 8GB with 6600mAh Battery. • Camera front 0.3 megapixel and rear 3.2 megapixel • Latest ISO 9001 Certified factory product 					
27.	Multi Scan Tool with oscilloscope	<p>Multi Scan Tool with Oscilloscope Specification:-</p> <p>Multi Scan Tool with Android based operating system should have android 5.0</p>	<ul style="list-style-type: none"> • Built-in social network service for auto diagnosis. 	Standard Accessories		Operational Manual		2 Years

		<p>having display of minimum size 10" IPS capacitive touch screen with CPU of 1.3 GHZ quad core and 1GB Ram. Memory capacity should be of 16 GB (Internal/SD Card). At least 6800 mAH lithium polymer Battery</p> <p>Tablet with high configuration.</p> <ul style="list-style-type: none"> • Built in social network service allow access to diagnostic community. • Customer management for the workshop. • Special functions: matching, coding, programming, battery reset, break reset etc. • Remote diagnosis & maintenance. • Built in 4 channel oscilloscope • One click update online via Wi-Fi • Built in car repair Data base and car repair tips application at least for Indian cars like Maruti, Mahindra, TATA and Hyundai. • Function of automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults quickly and conveniently, including "DC voltage simulation", "Fixed frequency simulation", "Predefined waveform simulation" and "Hand-painted waveform simulation." • Functional of android based automobile multi meter, which enables users to perform voltage test, resistance test and frequency test. 	<ul style="list-style-type: none"> • Car Remote Diagnosis extendable • Workshop Customer Management Platform • Adhere to X431 vehicle diagnostic functions. • One-Click update of the diagnostic software online. • Auto technical data base and car repair tips. • Data stream storage and re-display in graphic. • Operating System Android 4.0 • Screen 10.1 inch capacitive touch. • Processor 1.2GHz. Memory 1 GB and storage 8GB with 6600mAh Battery. • Camera front 0.3 megapixel and rear 3.2 megapixel 					
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28.	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 Half Wave Precision Rectifier, Op-Amp as active second order 	Patch Cords and Main power cords		List of experiments, that are possible in the Trainer must be specified, along with Observation sheets. English language user manual with Operation and Maintenance instructions to be provided.		2 Years
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			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.					
29.	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 • 40ns/div to 0.2s/div Time Base • Z Modulation (TTL Level) • Min. 8 x 10 cm LCD Display • TV Triggering Frame (V) & Line (H) • Line Trigger • Component Tester Power Supply : AC 220V \pm 10%, 50Hz	<ul style="list-style-type: none"> • 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 	Main Power cord		Instructional manual		2 Years

			Sync output					
30.	PAM, PPM,PWM trainer kit	PAM, PPM,PWM trainer kit with following specifications: Modulation & Demodulation 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 • 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	<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
31.	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 	<ul style="list-style-type: none"> • 4-Digit error code display • Support for 80H, 84H 300H 	Standard accessories should be provided.		Operational Manual		2 Years comprehensive on site

		resistance value. • Inbuilt Power Supply: 12V DC power supply • Standard PCI ISA interface	port and compatible with all mainstream motherboards • PCI bus compatible, • Power On Self Test (POST) status codes display,					warranty
32.	PCI slot Testing tool	• 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	• 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		2 Years
33.	Post error debugging card	Post error debugging card	Latest ISO 9001 Certified factory product			Product Catalogue		
34.	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	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	Standard Accessories Connecting Leads, Power Cord		Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details		2 Years comprehensive on site warranty

		<ul style="list-style-type: none"> Power Devices: IGBT-G4BC20S, MOSFET-IRF Z44N, SCR TYN 616, UJT-2N2646, DIAC-DB3, TRIAC-BT136, PUT- 2N6027 	Chopper Circuits. 5) Series resonant inverter. 6) Single phase bridge inverter. <ul style="list-style-type: none"> Latest ISO 9001 Certified Factory Product 					
35.	POWER ELECTRONICS TRAINER	The instrument comprises of the following:- <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 	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. <ul style="list-style-type: none"> Latest ISO 9001 Certified factory product 	All standard accessories for conducting experiments.		English language user manual with Operation and Maintenance instructions to be provided		2 Years
36.	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 	<ul style="list-style-type: none"> Versatile Waveform Generation for a Wide Range of Testing Application Wide Range 	<ul style="list-style-type: none"> Standard Accessories 		<ul style="list-style-type: none"> Operating Manual 		2 Years

		<ul style="list-style-type: none"> • Output Impedance: 50 Ohms • 3 Digit Digital Indication for Frequency • Latest ISO 9001 Certified Factory Product 	of Frequencies from 2Hz to 200kHz <ul style="list-style-type: none"> • 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 					
37.	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 	<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 	<ul style="list-style-type: none"> • Standard Accessories 		<ul style="list-style-type: none"> • Operating Manual 		2 Years

			<ul style="list-style-type: none"> • 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 					
38.	Sensor Kit	Sensor Kit with Min. following components: • Mounting Plate • Power Distribution Box • Counter Box • Indication Box • Material Box • Inductive Sensor • Capacitive Sensor • Magnetic Sensor • Ultrasonic Sensor • Connecting Wires • Motor with Control Unit	ISO 9001 Certified Factory Product/ CE mark Product	standard Accessories as required		Manual with experiment lists to be performed		2 Years
39.	Sensor Trainer Kit	Sensor Trainer Kit Containing following Sensors:- 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 	Standard accessories.		Product catalogue		2 Years

			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.					
40.	Service Oscillator	• Waveform Amplitude Sine, Square and Triangle • Output Signal Impedance 100mV - 5V peak to peak variable • Power Supply 220V/ 50Hz, +-10% • Frequency Range (Hz) 2Hz to 200KHz in four decade ranges	• Frequency control • Adjustable wave output • Latest ISO 9001 Certified factory product	Connecting Leads with banana Plug & crocodile		Product catalogue		2 years
41.	Seven segment DPM trainer	Seven segment DPM trainer •Input – AC or DC selectable. •Multiple Input ranges in single DPM	• Latest ISO 9001 certified factory product.			Product Catalogue		2 Years

		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 .						
42.	Signal Generator with Digital Display for Frequency Amplitude	10Hz - 100kHz , Sine, Square, Triangular 220 V, 50 Hz, Single Phase Pulse / Function Generator • Wide Frequency Range: 20 MHz - 20MHz • Pulse duration 20 ns to 20 s • Fast rise/fall time of 3ns • LCD Readout for frequency & mode • Output Impedance: 50 Ohms	• 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	• Standard Accessories		• Operating Manual		2 Years

			<ul style="list-style-type: none"> • Latest ISO 9001 certified factory product. 					
43.	SMPS Trainer	SMPS Trainer with following specifications: <ul style="list-style-type: none"> • 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		2 Years
44.	Solar Training Kit/ Simulator	MPPT Charge Controller PV Module Input Voltage : 24–50V Max Current : 25A Battery voltage : 24V Technology : MPPT Display type : LCD Charging Stage : Bulk, Absorptions and Float Battery: Solar Tubular, Capacity : 100Ah,	<ul style="list-style-type: none"> • Complete training system to study the fundamentals of photovoltaic system • The system has two modes for study: 	List of Accessories Patch Cards : 20Amp. & 10 Amp. Mains Card : 2 Nos. Wires : 2.5 Square mm		Manual		2 Years

		<p>Type : C10, Quantity : 2 Nos. Meters: DC Voltmeter : 0-300V, 2 Nos. DC Ammeter : 0-20A, 3 Nos. AC Multi Function Meter : Voltage-10-230V : Current-100mA-5A : Watt-10-1200W : Frequency-50Hz Structure for Solar Panel Material : MS Tracking Type : Manual, Dual Axis Seasonal and day wise Assembly : Detachable and easy to install Quantity : 2 sets. Safety and Protection MCB (DC) : 16Amp. for solar panels and 25 Amp. for battery , 2 Nos. MCB (AC) : 6 Amp. AC output load protection & Grid Charging , 2Nos. Fuse : 10 Amp. for Individual protection of solar panel and battery ,4Nos Banana Terminals : 10 Amp. & 20 Amp. (shock proof connections)</p>	<p>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</p>	<p>havells : Red – 30 meters : Black – 30 meters Gravity Hydrometer : 1 No. BNC to BNC cable : 1 No. Glass Fuse 10Amp. : 10 Nos. Optional Accessories Sun Path Finder : 1 No. Rheostat 100W/8Amp : 1 No</p>				
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			9001 certified factory product					
45.	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

46.	Wheat Stone Bridge	<p>Wheat Stone Bridge with galvanometer and battery</p> <ul style="list-style-type: none"> • 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 <p>ISO 9001 of latest version certified Factory product</p>	<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 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 	Standard Accessories		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 		
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47.	Analog Component Trainer	<p>Analog Component Trainer with following specifications:</p> <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 	<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 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 	<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, 		2 Years
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			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. Coupled Transistor, Inverting Amplifier, Non-inverting Amplifier, Integrating Amplifier for A.C input Signal, Differentiator Amplifier, Square Wave Generator					
48.	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)	Standard Features /Latest ISO 9001 Certified factory product	Connecting Leads, Power Cord	Standard spares, as suggested by the	Operating Manual/user Manual, General Maintenance manual System	Training to the staff should be provided as required at the institute premises	2 Years Minimum

		Fuse: 500 mA (Slow blow, spare fuse is given with mains socket)			manu facturer	Warranty Card Local Service Provider details		
49.	Hardware and Network Trainer Kit	Interconnection : RJ45 connection cable to connect hardware to computer LAN card Software Topology selection: i) Star ii) Bus iii) Ring Protocol selection i) Stop and Wait ii) Go back to n iii) Selective repeat iv) Sliding window v) Token Ring vi) Token Bus vii) CSMA / CD viii) CSMA / CA Packet Size 128 , 256, 512, 1024, 2048, 4096, 8192, 16384 Inter packet delay 1000,2000,3000, 4000,5000ms Error generation Bad packet, acknowledgment lost and auto error generation	Standard Features /Latest ISO 9001 Certified factory product	Standard accessories	Standard spares, as suggested by the manufacturer	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh.- Training to the staff should be provided as required at the institute premises	2 Years Minimum
50.	Network Training System	Router Based Training system or equivalent · Functions and Characteristics of Network System (LAN Card, Router, L2 Switching Hub, L3 Switching Hub) · 19" Rack Type Structure For Effective Network Configuration · Optimized Learning System	Standard Features /Latest ISO 9001 Certified factory product	Standard accessories	Standard spares, as suggested by the manufacturer	Operating Manual/user Manual, General Maintenance manual System Warranty Card Local Service Provider details	- To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises	2 Years Minimum

Lot-3: Electrical lab equipment

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 • Ripple: Less than 3mv RMS • 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 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		<ul style="list-style-type: none"> *Manual *Test Certificates 		2 Years
2.	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 		2 Years

3.	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 		2 Years
4.	4 Point relays	Pin Number: 4 Pin; Current: 40A Coil Voltage: DC 12V	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	*Connecting terminals *Leads *Connector		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 		2 Years
5.	5 Point relays	Pin Number:5 Pin; Current: 40A Coil Voltage: DC 12V	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 	*Connecting terminals *Leads *Connector		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 		2 Years
6.	Electric Induction plate	Electric Induction plate with min 1500 Watt, 240V having Ceramic cook top. •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		2 Years
7.	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		*Manual *Test Certificates		2 Years

8.	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		2 Years
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		
10.	Ac Ammeter Mi, Analog	•AC Ammeter MI <ul style="list-style-type: none"> • Analog • 0-1 A 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, 			Product Catalogue		

11.	Ac Ammeter Mi, Analog	●AC Ammeter MI <ul style="list-style-type: none"> • Analog • (0-5 A MI) 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 moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 			Product Catalogue		
12.	Ac Ammeter Mi, Analog	●AC Ammeter MI <ul style="list-style-type: none"> •Analog •(0-25A MI) 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 moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 			Product Catalogue		
13.	Resistance type AC starter	●AC Starters: - <ul style="list-style-type: none"> •Resistance type starter For A.C Motors of 2 to 5 H.P. 	<ul style="list-style-type: none"> •ISO 9001 of latest version certified Factory product 			Product Catalogue		
14.	DOL AC Starters	<ul style="list-style-type: none"> •Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 2 to 5 HP motor • 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		2 Years

15.	Manual Star-Delta type AC starter	Star Delta Starter- Manual <ul style="list-style-type: none"> • 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 			Product Catalogue		2 Years
16.	Semi-Automatic Star-Delta type AC starter	Star Delta Starter – <ul style="list-style-type: none"> • 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		2 Years
17.	Fully Automatic Star-Delta type AC starter	Fully Automatic Star-Delta Starters <ul style="list-style-type: none"> • 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		2 Years

18.	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		standard accessories		Operation Manual		2 Years
19.	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 •Ammeter selector switch	standard accessories		Operation Manual		2 Years
20.	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		2 years

21.	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	• Movement Type: Moving Iron type • Standards: IS-1248 • Accuracy: $\pm 1.5\%$ of Full Scale			catalogue		2 Years
22.	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.	Patch Cords		Catalogue		2 years
23.	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.	Patch Cords		Catalogue		2 years
24.	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.	Patch Cords		Catalogue		2 years

25.	Ammeter DC with external shunt	<ul style="list-style-type: none"> •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) 	<ul style="list-style-type: none"> •Linear Scale •Anti-glare Glass. 	Patch Cords		Catalogue		2 years
26.	Ammeter Mc Analog	<ul style="list-style-type: none"> •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 moulded case) • portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual		2 Years
27.	Ammeter Mc Analog	<ul style="list-style-type: none"> •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 moulded case) •portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual		2 Years

28.	Ammeter Mc Analog	<ul style="list-style-type: none"> •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 moulded case) •portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual		2 Years
29.	Ammeter, AC/DC portable precision grade Digital Panel board type	AC/DC Digital ammeter 0-30 Amps <ul style="list-style-type: none"> • 3 Digit, 7 Segment LED Display • True RMS Measurement for AC measurement • For 1Ø-2 Wire Electrical Network • IP Protection (Front): IP65 	<ul style="list-style-type: none"> •Panel Mounted •Accuracy: $\pm 0.5\%$ 	Standard Accessories		Manual		2 Years
30.	Analog multimeter	Analog Multimeter <ul style="list-style-type: none"> •AC Voltage (Volts) 10-1000 V •AC Voltage Accuracy $\pm 4\%$ •DC Voltage Accuracy $\pm 3\%$ •DC Current (Amp) 50μA-10 A •DC Voltage 0.1mV-1000 V •DC Current Accuracy $\pm 3\%$ •Resistance (ohm) 0.2 Ω-20 MΩ •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		2 Years

31.	Analog Multimeter	Analog Multimeter as per IS 1248 with following range: •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 	*Batteries *Case *Test Leads		*Manual *Test Certificates		2 Years
32.	Auto Transformer starter	<ul style="list-style-type: none"> Auto Transformer starter suitable for Motor starting upto 3 HP Motors. Shall conform to IEC 60947-4-1 Starter enclosure to conform IP 53 	<ul style="list-style-type: none"> Push button operation for ON-OFF Ammeters, ammeter selector switch 	standard accessories		Operation Manual		2 Years
33.	Automatic Electric 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 ISI Product 	standard accessories		Manual		2 Years
34.	Autotransformer	<ul style="list-style-type: none"> Single Phase Variable Auto Transformer 0 - 270 V, 15 Amp (Air cooled) Specification:- <ul style="list-style-type: none"> Type :Single Phase Auto Transformer Amperage 15 Amp input voltage 0-270 V with safety fuses and line indicators 	<ul style="list-style-type: none"> ISO 9001 of latest version certified Factory product 	Standard Accessories		<ul style="list-style-type: none"> Calibration certificate User's Manual 		2 Years

35.	Electric Kettle	<ul style="list-style-type: none"> •Electric Kettle Min. 1500 Watts, 240V with 1.7 Litre capacity. 	<ul style="list-style-type: none"> •ISI Mark product 	standard accessories		Manual		2 Years
36.	Battery Charger	<ul style="list-style-type: none"> •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. 	<ul style="list-style-type: none"> •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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel(5 Meter) • Any other special tool required for assembling/disssembling the Setup supplied. 		Instruction manual for complete panel along with test details to be performed.	NA	2 years
37.	Battery charger	<ul style="list-style-type: none"> •Automotive Battery Charger of Capacity-10amps(High) •The charger is for automotive, SMF, VRLA, Tubular and stationary batteries. •It shall be possible to recharge 20Ah to 100Ah batteries. •These charger should be able to select 12V/24V/36V 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. 	<ul style="list-style-type: none"> •Charger should have the facility to disconnect the charging when battery is fully charged, to prevent the over-charging or damage. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/disssembling the Setup supplied. 		Instruction manual for complete panel along with test details to be performed.	NA	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			Product Catalogue		2 Years
39.	Battery terminal cleaner tool	•Battery Terminal Cleaner tool	Standard Features	Standard Accessories		Product Catalogue		
40.	Battery tester	Auto Battery tester specifications: • Type: Portable type with case • Test Method: Conductance, Non-loading • Battery Test: 12V starter batteries (standard, maintenance-free, and AGM) • Power Supply: From test battery with voltages from 5.5V • Voltmeter: 5.5 – 19.99V DC • Operating Range, Amps: 200 to 850 CCA, 200 to 900 SAE/EN, 120 to 550 DIN/IEC Test State/Diagnostic Capability: Battery life, voltmeter, starter system, charging system • Display: 4-digit LED numeric display, 3 LED indicators • User Interface: Push-button operation •Cable: Min. 1.3 ft •CE Mark/ ISO 9001 certified factory product	Features: • 12V load-free battery tester • Suitable for testing lead-acid batteries: Standard, Maintenance free, plus AGM batteries • Capable of diagnosing 12V starter and charging systems • Lowest voltage storage function when testing starter systems • Highest and lowest voltage storage function when testing charging systems • Accurate test results under all temperature conditions • Indicator for defective battery • Solid and rugged housing stands up to daily shop use • The four digit LED voltage screen, three LED indicators and the arrow keys enable easy			Operational manual		1 years Warranty

			and intuitive handling of the device					
41.	BLDC motor with controller	<ul style="list-style-type: none"> •15-30 Watts,315 Volt DC BLDC Motor with controller on panel mounted •Mains Supply : Single Phase, 230V AC $\pm 10\%$, 50Hz •Machine Type : BLDC, Rating : 15-30 W • Voltage Rating : 24V DC •Loading arrangement : Mechanical • Brake Drum/Pulley : Aluminium casted •Instrumentation Power Supply : 24V DC , 10A DC • Digital Meters used to display DC Voltage and Current with Digital Tachometer 	Standard Features	Standard Accessories		Manuals/ catalogues		2 Years
42.	Electric Iron	Electric Iron Automatic - 750 W, 240 V.	•ISI Mark product			Manual		
43.	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 	<ul style="list-style-type: none"> *Running direction indicator; Type Led Indicator *Controller Micro Processor Logic Controller • 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		

44.	Clamp meter	<p>Tong Tester / Clamp Meter</p> <ul style="list-style-type: none"> • 0 – 10 amp.(Min) • 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 	<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 	<ul style="list-style-type: none"> • Test Leads • Batteries • Soft carrying case 		Catalogue		2 Years
45.	Compound gauge, Digital type	<ul style="list-style-type: none"> • Digital type Compound gauge diameter 63mm with recalibration set screw • scale vacuum 76mm. • Pressure 15 Kg/sq.cm 	<ul style="list-style-type: none"> • Case ABS plastic 	ABS Plastic Case with standard accessories		Product Catalogue		2 Years
46.	Contactor & auxiliary contacts-25Amps	Contactor & Auxiliary contacts 3 phase, 415 Volt, 25 Amp with 2 NO and 2 NC	Shall comply with IS/IEC 60947-2			Product catalogue		2 Years

47.	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			Product catalogue		2 Years
48.	Copper bit soldering iron 0.25Kg	Copper Bit Soldering iron 0.25 KG:				Product Catalogue		
49.	Core drill Machine	Core drill Machine : •Input Supply Voltage : single phase 220-240 V •Core Cutting Capacity: 12 - 38 mm •Core Cutting Depth: 50 mm	<ul style="list-style-type: none"> • Compact, Lightweight core drill with ease of use vertical and overhead use. • Safety fuse protection for overload. • CE Mark product or Latest ISO Certified factory product 	Power Cords and other standard accessories		Operation Manual		2 Years
50.	Immersion Heater	Immersion Heater 1500 Watt, 240V.	•ISI Mark product			Manual		

51.	D.O.L Starter	<p>Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 2 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. 	<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		2 Years
52.	DC Ohmmeter	<p>Ohm Meter Specification :-</p> <ul style="list-style-type: none"> • Measuring min. 0-300 Ohm with mid scales at 20 Ohms Capacity with Probe Black & red Ohm meter. • Range : min. 0-300 ohm . • Accuracy : +/- 5 % of the indicating value at center zero - Set of 2 pcs . • Shall comply to IS 1248 	<ul style="list-style-type: none"> • Portable Box type, • Self-contained • Battery operated, • Should be moving coil type and anti-parallax mirror scale and knife edge pointer provided accurate reading. <p>Should have facility of press to read switch avoids battery drain,</p> <ul style="list-style-type: none"> • An infinity adjustment potentiometer help to provide accurate reading without effect of variation of battery voltage. • Mechanical zero adjuster is provided adjust zero, 	Patch cords Standard Accessories Case		Manual		2 years

53.	Dc Power Supply	DC Power supply- 0 to 30V •Table Top and Portable type Outputs: •0 to 30V DC continuously Variable •+ 15 V and -15 V Volts DC constant output •+ 5 V DC Constant output •Current capacity : 5 Amps	•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		
54.	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		
55.	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	Standard Accessories		*Manual *Test Certificates		2 Years

			pane • Latest ISO 9001 Certified factory product					
56.	DC & AC ammeter 0-1 A(table model for lab experiments)	• 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	• 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 moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010	case and connection cords		User Manual		2 Years

57.	DC & AC ammeter 0-1mA(table model for lab experiments)	<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 moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010 	case and connection cords		User Manual		2 Years
58.	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 moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010 	case and connection cords		User Manual		2 Years

59.	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 	<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		2 Years
60.	Desoldering pump	<ul style="list-style-type: none"> • 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		2 Years
61.	De-soldering pump electrical heated	<ul style="list-style-type: none"> • 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		2 Years

62.	De-soldering pump/gun	<ul style="list-style-type: none"> • 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		2 Years
63.	Dial thermometer remote control, armored capillary dial	Dial thermometer Specifications: <ul style="list-style-type: none"> • Range:-50 ... 50 °C • Dial size in mm: 75 mm (Min.) • Capillary length: Min. 20 m • Material • Connection: Stainless steel 316 • Stem: Stainless steel 316L • Case/ring: Stainless steel 304 or 316L • Capillary: Stainless steel 316 • Armor: Flexible, SS 304 • Window: Instrument glass, optional laminated safety glass 	<ul style="list-style-type: none"> • Rugged stainless steel construction • Fast response • Protection IP65 • High repeatability and small hysteresis • Dry or liquid filled • Rigid stem or bulb with capillary • Dial: Aluminium, black markings on white background • Pointer: Aluminium, black • Movement: Stainless steel 304 • Accuracy: Class 1 	Standard Accessories		Product Catalogue		2 Years

64.	Digital LCR Meter	<p>Digital LCR meter with following specifications:</p> <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 	<ul style="list-style-type: none"> *Batteries *Case *Test Leads 		<ul style="list-style-type: none"> *Manual *Test Certificates 		2 Years
65.	Digital Multimeter	<p>Multimeter Digital Specifications :-</p> <ul style="list-style-type: none"> • Voltage between any Terminal and Earth Ground: 1000V Min • Display: Digital: 4000 count updates 3/sec • Operating Altitude: 0 to 2000 meters <p>Specification:</p> <ul style="list-style-type: none"> • 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 μF/20 μF/200 μF $\pm 4.0\%$ • 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 	<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 	<ul style="list-style-type: none"> • Universal hanger clip • Test Leads • Batteries 		User Manual		2 Years

		overvoltage standards	are protected up to 1000 V					
66.	Digital thermometer	Digital thermometer •Type: Graduated disc analogy •Range: -50...50 °C	• ISI/CE Mark Product	Standard Accessories		Product Catalogue		2 Years
67.	Digital Tong Tester	Tong Tester / Clamp Meter •0 – 20 amp.(min) •Shall comply to Safety standard IEC 1010 or IEC 61010 • 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. • 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		Product Catalogue		3 Years

68.	Digital Wattmeter	<ul style="list-style-type: none"> • 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 	*Batteries *Case		*Manual *Test Certificates		2 Years
69.	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	• ISO 9001 of latest version certified Factory product or Standard ISI product or CE Mark Product	Standard Accessories		• Calibration certificate • User's Manual		2 Years
70.	DOL starter	Direct-on-Line Starters in Sheet-Steel Enclosure suitable for 1/4 HP AC motor • 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.	• 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		2 Years
71.	Dual DC regulated power supply	Regulated DC Power Supply with following specifications: • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 30-0-30volts, 2 Amps	• Indications: LED indications for ac input CV,CC operations 4 ½ digit digital meters to read output voltage & load current. • Controls: On/Off	Standard Accessories		*Manual *Test Certificates		2 Years

		<ul style="list-style-type: none"> • 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 	switch at input side Coarse and fine voltage set potentiometer Coarse current set potentiometers <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 					
72.	Dual Power Supply	Dual Power Supply complete in all aspect with key specifications as: <ul style="list-style-type: none"> • DC Output : 2 outputs of 0 - 30 V, 2 A continuously variable by means of coarse and fine controls • Resolution : Voltage : 100 mV and Current : 10 mA • Recovery Time : $\leq 50 \mu s$ • Load Regulation : $\pm (0.05 \% + 10 \text{ mV})$ • Line Regulation : $\pm (0.05\% + 10 \text{ mV})$ • Display : 3 digit for voltage & 3 digit for current LED indication for Voltage & Current • Accuracy : $\pm (1 \% + 1 \text{ digit})$ • Over Range Indication : Glowing 'ORA' and 'ORB' LEDs indicate Overload • Both outputs are floating. • Built-in Overheat, Over Voltage and Short Circuit protection. • Power Supply : 230 V, $\pm 10\%$, 50 Hz • Operating Temperature : 0 - 40°C, 80% RH 	Dual Power Supply with min. features as: <ul style="list-style-type: none"> • Digital display for Voltage and Current • Adjustable Current limiter • Excellent Line & Load Regulation • Low Ripple Voltage • Automatic Overload (Current protection) • Constant Voltage & Constant Current operation • Latest ISO 9001 certified factory product 	Power Cords	,	Product Catalogue		2 Years

73.	ELCB and RCCB	Earth Leakage Circuit Breaker- (ELCB) <ul style="list-style-type: none"> •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) <ul style="list-style-type: none"> •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): <ul style="list-style-type: none"> •Features: Shock proof, Fine finish, Easy to use Residual Current Circuit Breaker (RCCB) <p>Features:</p> <ul style="list-style-type: none"> •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) 			Product Catalogue		
74.	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 			Manual		2 Years

75.	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 			Manual		2 Years
76.	Electric pump	<p>Electric Pump of 1 HP with min. desired specifications as Follows:</p> <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"> • Aluminium extruded motor body to prevent corrosion • 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 	Standard Accessories		Instruction manual		2 Years

77.	Electric Soldering Iron	<p>Soldering iron 25 Watts:• 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> <p>Soldering Iron 60 Watts:• 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>	<p>Features:• 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.</p>	<p>• One set of Soldering Iron tips of different shapes.• Screw driver or Allen key for replacing soldering Iron Tip• Tip Cleaning Knife</p> <p>Note: above accessories of suitable rating/size shall be provided with each Type of soldering iron.</p>	<p>• One set of Soldering Iron tips of different shapes.• One spare Tip cleaning sponge.</p>	Instruction manual for complete panel along with test details to be performed.		2 years
78.	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/ ISI Mark Product 			Manual		2 Years

79.	A.C. Energy Meter	<ul style="list-style-type: none"> •A.C. Energy Meter- induction type •Single Phase,5 A, 230-240 V 	<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		
80.	Clamp Meter	<ul style="list-style-type: none"> •Fluke Meter Tong Tester / Clamp Meter •0 – 100 amp.(Min) •Shall comply to Safety standard IEC 1010 or IEC 61010 	<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 	<ul style="list-style-type: none"> •Test Leads •Batteries •Soft carrying case 		Catalogue/Manual		2 Years

			<p>functions scattered around the dial.</p> <ul style="list-style-type: none"> • Jaw release lever. <p>Alignment marks: To meet accuracy specifications, a conductor must be aligned with these marks.</p> <ul style="list-style-type: none"> • Common input jack. • Volts/ohm input jack. • Input for flexible current probe 					
81.	Clamp Meter	<p>Fluke Meter Tong Tester / Clamp Meter 0 – 100 amp.(Min)</p> <ul style="list-style-type: none"> • 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. • Shall comply to Safety standard IEC 1010 or IEC 61010 	<ul style="list-style-type: none"> • Current-sensing jaw. • Tactile barrier (to protect fingers from shocks). • 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 accuracy specifications, a conductor must be aligned with these marks.</p> <ul style="list-style-type: none"> • Common input jack. • Volts/ohm input jack. • Input for flexible current probe 	<ul style="list-style-type: none"> • Test Leads • Batteries • Soft carrying case 		Catalogue/M anual		2 Years

82.	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 	<ul style="list-style-type: none"> •Test Leads •Batteries •Soft carrying case 		*Manual *Test Certificates		
83.	Glow plug tester	Glow Plug tester/analyser suitable for voltages upto 48 Volts.	<ul style="list-style-type: none"> • Test the Glow Plug / Heater Plug • Test the glow plug without removing from the Engine • Latest ISO 9001 Certified factory product 	Patch cords Case		Manual		
84.	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		Instruction manual		2 years

85.	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		2 Years
86.	Heat convector	Heat convector with min. following specifications: • Operating voltage of 220 -240 volts AC 50 Hz. • Power Wattage: 2000 W	<ul style="list-style-type: none"> • Thermostat control. • Handle on the top with firm grip • Twin-blade fan. • Min. Three heating positions and two fan speeds. • Twin Turbo Design for fast & efficient heating • Side Vents to draw in air easily • Inbuilt fan ensure instant heating • Shock Proof • Night light indicator • ISI mark Product 	Suitable Power socket along with standard Accessories as required		Catalogue		
87.	Heating kit with infrared bulb	Heating kit with infrared bulb of 200 Watt Capacity	<ul style="list-style-type: none"> • ISI/CE Mark Product 	standard accessories		Product Catalogue		
88.	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		2 Years

89.	Motor Pump set	<p>Electric Pump of 1 HP with min. desired specifications as Follows:</p> <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 •Mechanical Steel : Carbon Ceramic 	<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 • Fitted with Thermal Overload Protector(TOP) - protector motor from burning • capacitor inside terminal box • Motor with IP 44 protection and class B insulation 	Standard Accessories		Instruction manual		2 Years
90.	IDU Plus Generation type motor	<ul style="list-style-type: none"> •IDU Plus Generation type motor of 15 Watts,230 Volt AC complete with all accessories •Power supply: 230 V AC 50 Hz. 	<ul style="list-style-type: none"> •Duct Type Indoor Unit •Built-in drain pump, 	Standard Accessories		Manuals/catalogues		2 Years
91.	Digital Wattmeter	<ul style="list-style-type: none"> •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 *Test Leads 		<ul style="list-style-type: none"> *Manual *Test Certificates 		2 Years
92.	Kilo Wattmeter	<ul style="list-style-type: none"> •Kilo Wattmeter Analog 0-1.5-3KW, •Pressure coil rating- 240v/440v, •Current rating-5A/10A(min) Analog, •Portable type Housed in Bakelite case 	<ul style="list-style-type: none"> • Knife edge pointer and Anti-parallax mirror scale. • Accuracy class as per 	<ul style="list-style-type: none"> *Connecting Leads *Case 		<ul style="list-style-type: none"> *Manual *Test Certificates 		2 Years

		Conforming to IS 1248	IS:1248 <ul style="list-style-type: none"> • Wooden case with Bakelite Top. • Wide window for easy reading. • Quick response due to unique damping. 					
93.	Knife Switch DPDT fitted with fuse terminals	<ul style="list-style-type: none"> • Knife Switch DPDT fitted with fuse of Min. 16 Amps. • The arrangement shall be enclosed in the MS box 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 			Product Catalogue		2 Years
94.	Laboratory Type Induction Coil	<ul style="list-style-type: none"> • Laboratory Type Induction Coil 1000 Watt • Laboratory type induction coil 6 volt to 800-1000 volt 	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 			Product Catalogue		2 Years
95.	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		2 Years
96.	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 $\pm 1.5\%$ 	<ul style="list-style-type: none"> • Designed to international safety standard IEC1010-1 • A tilt stand provides position flexibility for viewing and operating 	*Batteries *Case *Test Leads		*Manual *Test Certificates		2 Years

		<ul style="list-style-type: none"> •INDUCTANCE: 600 Ω H\pm2.5%; 6m/60m/600mH\pm1.5%; 6H:<4H \pm2.8% >4H \pm5.0%; 60H:<40H\pm3.5% >40H Unspecified •POWER: 6 (1.5V) (AAA Type) 	the meter <ul style="list-style-type: none"> • SMT application • Auto range and manual range • Data hold • Max. /min. Value measurement Auto power off / disable auto power off					
97.	LED lighting system	<ul style="list-style-type: none"> •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		2 Years
98.	Limit Switch	Limit Switch <ul style="list-style-type: none"> • Liver operated 2A 500v, •2-contacts 	Shall comply to IS 13947			Product catalogue		2 Years
99.	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. • Power Supply - min 9V battery (6F 22) , 	*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		

100.	Magnetic Flux	<ul style="list-style-type: none"> •Magnetic Flux Meter portable type Housed in Bakelite case Technical Specifications : •Range : 0-500 tesla •Accuracy : $\pm 0.5\%$ •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		
101.	Maintenance Free Battery	<ul style="list-style-type: none"> •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 			Catalogue		2 Years
102.	Manual Motor coil Winding Machine	<ul style="list-style-type: none"> •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. 	<ul style="list-style-type: none"> •Digital Counter system with reset/hold. •Machine fitted on Movable stand with sitting arrangement 	relevant Fitting tools for Machines		Operational Manual		
103.	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. 			Product Catalogue		

104.	Megger	<p>Megger - (500 Volt) insulation Tester</p> <ul style="list-style-type: none"> •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 Confirm to IS 10656-1983 	<p>*ABS Resin Case with Acrylic Meter Cover</p> <p>*Measurement from 10% to 100% of the Insulation Resistance Range</p> <p>*Terminal Voltage :>85% of Rated Voltage for Insulation Resistance</p>	<ul style="list-style-type: none"> • Pair of Crocodile / Alligator Test Leads (Red & Black) • Carrying Case • AA Batteries (Fitted - In) or Battery adaptor if required [Input : 240V, 50] 		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 		2 Years
105.	Megger	<p>Megger - (500 Volt) insulation Tester</p> <ul style="list-style-type: none"> •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 Confirm to IS 10656-1983 	<p>*ABS Resin Case with Acrylic Meter Cover</p> <p>*Measurement from 10% to 100% of the Insulation Resistance Range</p> <p>*Terminal Voltage :>85% of Rated Voltage for Insulation Resistance</p>	<ul style="list-style-type: none"> • Pair of Crocodile / Alligator Test Leads (Red & Black) • Carrying Case • AA Batteries (Fitted - In) or Battery adaptor if required [Input : 240V, 50] 		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 		2 Years

106.	Megger	<p>Megger - (1000 Volt) insulation Tester</p> <ul style="list-style-type: none"> •Nominal test voltages:50 V, 100 V, 250 V, 500 V, 1000 V •Insulation resistance range: 2 GΩ •Dust & Water protection: IP54 Protected against dust and splashing water •Safety Comply to EN 61326-1:2005, CAT IV 600V, IP54 protection 	<ul style="list-style-type: none"> • CAT IV 600 V rating • Adjustable insulation test voltages • Dual digital display readout • Digital and analog arc display • Continuity auto-test capability • Automatically perform PI and DAR tests, Polarization Index (PI) and Dielectric Absorption Ratio (DAR) • True RMS voltage measurement • Auto fuse warning • Buzzer select button 	<ul style="list-style-type: none"> • Red/Black silicone test lead set with crocodile clips • Hard carry case • Instrument rubber boot with built-in stand 		<ul style="list-style-type: none"> • Calibration certificate • User's Manual 		2 Years
107.	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 moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	Standard Accessories		Catalogue/M anual		2 Years
108.	Milli Ammeter (DC)	<p>Ammeter MC analog- (0 - 500 mA MC) with Moving Coil with Central Magnetic Core, Spring Mounted Jewel Bearing Suspension</p> <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 	<ul style="list-style-type: none"> • This precision grade portable laboratory type direct indicating meter should be housed in electrical grade phenolic (plastic moulded case) , portable box type housed in Bakelite case • Meters Shall comply to IS-1248 or IEC-1010, 	case and connection cords		User Manual		

109.	Milli Voltmeter	Milli Voltmeter •Centre - zero analog, •Milli Voltmeter centre zero 100 – 0 – 100 m volt •Confirming to BS 89, IEC 51 & IS 1248	portable box type housed in Bakelite case	Batteries, Case		User Manual		
110.	Miniature Breaker	MCB 16 Amps.	Conforming to IS/IEC 60898-1			Product Catalogue		2 Years
111.	Analogue type 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 $\pm 3\%$	• 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	*Batteries *Case *Test Leads		*Manual *Test Certificates		2 Years
112.	Digital Multimeter	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 $\pm 1.2\%$	• 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	• Universal hanger clip • Test Leads • Batteries		User Manual	1 Year	2 Years

		<ul style="list-style-type: none"> •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 μF/20 μF/200 μF \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 	<ul style="list-style-type: none"> • 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 					
113.	Ohm Meter; Portable box type	<p>Ohm Meter- Shunt Type -</p> <p>Specification :-</p> <ul style="list-style-type: none"> •Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. •Range : 0-2000 ohm . •Accuracy : +/- 5 % of the indicating value at centre 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. <p>Should have facility of press to read switch avoids battery drain,</p> <ul style="list-style-type: none"> • 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		

114.	Ohm Meter; Series Type	<p>Ohm Meter- Series Type -</p> <p>Specification :-</p> <ul style="list-style-type: none"> •Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. •Range : 0-2000 ohm . •Accuracy : +/- 5 % of the indicating value at centre 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. <p>Should have facility of press to read switch avoids battery drain,</p> <ul style="list-style-type: none"> • 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		
115.	Ohm Meter; Shunt Type	<p>Ohm Meter- Shunt Type -</p> <p>Specification :-</p> <ul style="list-style-type: none"> •Measuring 0-2000 Ohm Capacity with Probe Black & red Ohm meter. •Range : 0-2000 ohm . •Accuracy : +/- 5 % of the indicating value at centre 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. <p>Should have facility of press to read switch avoids battery drain,</p> <ul style="list-style-type: none"> • An infinity adjustment potentiometer help to provide accurate reading without effect of variation of battery 	Batteries if applicable, Case		User Manual		

			voltage. • Mechanical zero adjuster is provided adjust zero,					
116.	Electrode drying Oven	Electrode drying Oven •capacity: 10 kg •Voltage : 230 volt ac •Temperature : Max:350 Deg.cel •Wattage : 1000 Watt Min	<ul style="list-style-type: none"> • Easy to carry • High density insulation for energy savings • Insulated chamber door along with gasket to avoid heat losses • Inner mild steel duly painted with heat resistant paint • Auto Cut with temperature control. • Digital display of Temp. at front 	Power Cord		Manual		2 years
117.	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		

118.	Insulators	<p>PIN INSULATORS:-</p> <ul style="list-style-type: none"> •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. <p>Shackle type Insulator</p> <ul style="list-style-type: none"> •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 <p>Egg type Insulator</p> <ul style="list-style-type: none"> •11 KV Egg Type Insulator conforming to relevant IS standard. <p>Suspension type insulators</p> <ul style="list-style-type: none"> •11KV Brown Glazed 'Disc' insulators conforming to IS-731/71 for suspension or tension strings, ball and socket type having ball shank dia.16mm •Minimum failing load of 70 KN along with phospher bronze 'W' clips. 		all the insulators shall include hardware fittings for conductor fixing.		Product Catalogue		2 Years
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119.	Portable electric drill Machine	<ul style="list-style-type: none"> • 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. 	<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 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 	<ul style="list-style-type: none"> * Set of drill bits of difference sizes (12 pieces) each for concrete, Steel, and wood. * Depth Gauge * Chuck Key * Carrying Case 		Catalogue		2 years
120.	Potential Transformer	<ul style="list-style-type: none"> • Potential Transformer Test Set with 415 V, 50Hz, PT Ratio, 440V/110V, • Burden: 10VA • Complete with control panel 	<p>Floor mounting Type PT Test Set provides the following:-</p> <ul style="list-style-type: none"> • Separate terminals to connect standard P.T. and P.T. under test • Ratio error and phase angle error calibrated dials • Range selecting Switch • Polarity check indicator • Voltmeter to indicate percentage voltage injected • Null detector with sensitivity control 	Standard accessories		Operational Manual		

			<ul style="list-style-type: none"> • Terminal to connect burden box • Power supply to energies electronic null detector • high permeability magnetic core • secondary voltage selector switch for 110 V and 63.5V 					
121.	Power Factor	415 V, 20 A, Three Phase portable portable type Power Factor Meter <ul style="list-style-type: none"> • Accuracy Class Class1.0 • Frequency 50Hz \pm 5 % • System Voltage 415V AC • Mounting flush 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	<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 			*Manual *Test Certificates		
122.	Power Meter	<ul style="list-style-type: none"> •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 	*Batteries *Case		*Manual *Test Certificates		2 Years

123.	Power Meter	<ul style="list-style-type: none"> • 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 	Standard accessories		Operating Manual/user Manual,		2 Years
124.	Power Supply	<ul style="list-style-type: none"> • Bench top model Type DC regulated Power supply • Input: 230v ac, +/-10%, 50hz, single phase • Output: 0-12volts • 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 • Latest ISO 9001 Certified factory product 	Standard Accessories		*Manual*Test Certificates		2 Years

125.	Pressure gauge Digital type	Digital type Pressure gauge with diameter 63mm with recalibration set <ul style="list-style-type: none"> • Min Pressure (PSI)0 and Max Pressure (PSI)30 • Min Temperature (° C)-20 and Max Temperature (° C)60 • Display5-digit LCD, 0.5" H • Battery Type : Two AA (included) • Battery Life2000 hours minimum 	<ul style="list-style-type: none"> • Case ABS plastic • Enclosure Rating: IP67 • Media Compatibility: Gases and liquids compatible with wetted materials • Resolution: 0.01 psi • Accuracy±0.5% full-scale • CE Mark product / Latest ISO 9001 Certified factory product 	ABS Plastic Case with standard accessories		Instructional manual with calibration certificate		2 Years
126.	Primary current injection set	<ul style="list-style-type: none"> • Output current: 0-200A • Accuracy: ±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 	<ul style="list-style-type: none"> •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		

127.	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		2 Years
128.	Rheostat (Sliding type)	•Rheostat (Sliding type) 0 - 25 Ohm, 2 Amp •Standatd ISI Product	• Latest ISO 9001 Certified factory product			Product Catalogue		
129.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 - 300 Ohm, 2 Amp	• Latest ISO 9001 Certified factory product			Product Catalogue		
130.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -1 Ohm, 10Amp	• Latest ISO 9001 Certified factory product			Product Catalogue		
131.	Rheostat (Sliding type)	Rheostat (Sliding type) 0 -10 Ohm, 5 Amp	• Latest ISO 9001 Certified factory product			Product Catalogue		

132.	Rheostat variable values	<ul style="list-style-type: none"> •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	Demonstration / training to be provided at the time of supply.	2 Years
133.	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		2 Years comprehensive onsite warranty
134.	Rotary Switch	Rotary Switch of 16 A/440v	Shall comply to IS 13947			Product catalogue		2 Years
135.	Rubber mat	Rubber Mat of Min 2' x 4' x 1" dimension conforming to IS 15652				Product Catalogue		
136.	SC Couplers	Fiber optic cable adaptor coupler SC-SC Duplex single mode.	SC to SC, Duplex Multimode Fiber Optic Cables,	Standard Accessories		Product catalogue		2 Years
137.	Shaded Pole Motor	Fractional HP, with Min. 25 Watt Shaded pole motor 240 V, 50 Hz				Product Catalogue		

138.	SMD Soldering & De soldering Station with necessary accessories	<p>SMD soldering/desoldering station with Fume Extractor with following specifications: Input Power: 220-240 V AC 50 Hz Soldering: Wattage: 100 W or above Temp. range: 150-450 deg C Tip code: 44-710652 or better SMD Rework: Wattage: 100 W or above Temp. range: 150-450 deg C or above Air Flow Capacity range: 2 L/min to 38 L/min (or above) De-Soldering: Wattage: 100 W or above Temp. range: 300-400 deg C or above Tip code: 44-915412 or better</p>	<ul style="list-style-type: none"> • Lead Free Operation • Double digital LED displays • ESD Safe and Spike Free Circuitry • Delayed Suction • Feature to eliminate the problem of solder clogging up the tip • Temperature and air flow adjustment to suit the task you are doing • CE Mark Product 	Fume extractor Extra heating element Min. 2 soldering iron stands Min. of 4 hood tips Min. 4 tweezers and other accessories as per product.		• Operating manual,		2 Years
139.	SMD soldering/desoldering station	<p>SMD soldering/desoldering station with Fume Extractor with following specifications: Input Power: 220-240 V AC 50 Hz Soldering: Wattage: 100 W or above Temp. range: 150-450 deg C Tip code: 44-710652 or better SMD Rework: Wattage: 100 W or above Temp. range: 150-450 deg C or above Air Flow Capacity range: 2 L/min to 38 L/min (or above) De-Soldering: Wattage: 100 W or above Temp. range: 300-400 deg C or above Tip code: 44-915412 or better</p>	<ul style="list-style-type: none"> • Lead Free Operation • Double digital LED displays • ESD Safe and Spike Free Circuitry • Delayed Suction • Feature to eliminate the problem of solder clogging up the tip • Temperature and air flow adjustment to suit the task you are doing • CE Mark Product 	Fume extractor Extra heating element Min. 2 soldering iron stands Min. of 4 hood tips Min. 4 tweezers and other accessories as per product.		• Operating manual,		2 Years

140.	SMPS of different make	SMPS •Input power: 200-300V AC. •Output Voltage: 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			Manual		2 Years
141.	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		2 Years
142.	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		

143.	Soldering & De soldering 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, 		2 Years
144.	Soldering iron	<p>Soldering iron 25 Watt 240 V</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>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 • 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.		

145.	Soldering Iron 10 w	Soldering iron 10 Watt 240 V <ul style="list-style-type: none"> • Type: Non-temperature controlled • Wattage: 10W • 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 shall be provided with each Type of 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.		2 Years
146.	Soldering Iron 240 W	Soldering iron of Min. 240 Watt Rating, with soldering working stand compete in all aspects	Shall comply with relevant safety standards	Standard Accessories		Manual		2 Years

147.	Soldering Iron 25 W	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 shall be provided with each Type of 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.		
148.	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 Tip • Tip Cleaning Knife Note: above accessories of suitable rating/size shall be provided	<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.		

				with each Type of soldering iron.				
149.	Soldering Iron Changeable bits 15 W	Soldering iron with changable bits 15 Watt 240 V <ul style="list-style-type: none"> • 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: <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 shall be provided with each Type of 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.		
150.	Soldering Iron	Soldering Iron 65 Watts: <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. 	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 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 Note: above	<ul style="list-style-type: none"> • One set of Soldering Iron tips of different shapes. • One spare Tip cleaning sponge. 	Catalogue		2 Years

				accessories of suitable rating/size shall be provided with each Type of soldering iron.				
151.	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 shall be provided with each Type of 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.		

152.	Soldering iron 25W 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 Tip • Tip Cleaning Knife Note: above accessories of suitable rating/size shall be provided with each Type of 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.		
153.	Solenoid with core	Educational Solenoid and Electromagnet with Iron Core	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product 			Instruction Sheet		2 Years

154.	Star delta starter	Fully Automatic Star-Delta Starters • Suitable for motor starting upto 2 HP or higher, 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		2 Years
155.	Synchronous Motor Capacitor For Synchronous Motor	Synchronous Motor and capacitor for Synchronous Motor 240V, 60rpm 0.8mf \pm 5% 450 VAC	<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 			Manual		2 Years
156.	Analog Tachometer	Tachometer - Analog type Analog Type - 10000 RPM	<ul style="list-style-type: none"> • Hand held type • Latest ISO 9001 Certified factory product 	Standard Accessories Case		*Manual *Test Certificates		2 Years

157.	Digital Tachometer	<p>Tachometer Digital</p> <ul style="list-style-type: none"> • 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		2 Years
158.	Tachometer digital, multi range	<p>Tachometer Digital</p> <ul style="list-style-type: none"> • Digital Photo Sensor Type - 3000 RPM (Tachometer - 5 Digit bright LED display of 10 mm height with memories of last ,highest and lowest readings , 	<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		2 Years

159.	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 750° 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 Cleaning Knife 	<ul style="list-style-type: none"> • One spare Tip cleaning sponge. 	Instructional Manual		<ul style="list-style-type: none"> • 2 years
160.	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 : 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 	<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, 		2 Years

161.	Thermometer Digital	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Includes wallet-style case • Latest ISO 9001 Certified factory product 	Probes		Instruction Manual		2 Years
162.	Tong tester (clamp on multi meter)	<p>Tong Tester / Clamp Meter</p> <ul style="list-style-type: none"> • 0 – 10-30 amp.(min) with 0-500 V • 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 	<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 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 	Test Leads Batteries Soft carrying case		Product Catalogue		3 Years

163.	Tong Tester	<p>Digital Type Tong Tester / Clamp Meter</p> <ul style="list-style-type: none"> • 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 	<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 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 	<ul style="list-style-type: none"> • Test Leads • Batteries • Soft carrying case 		Product Catalogue		3 Years
164.	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		2 Years

165.	Under Voltage Relay	<p>Under voltage Relay 360V-440V</p> <p>Technical Specifications:</p> <ul style="list-style-type: none"> • 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 	<p>Objective:</p> <ul style="list-style-type: none"> • 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 Reset, Test Switch (ON/OFF) • Relay Circuit Diagram : Screen Printed on front panel • Latest ISO 9001 Certified factory product 	<p>Standard Accessories:</p> <ul style="list-style-type: none"> • Power Cords • Patch Cords • Instruction Manual. 		Instruction Manual		2 Years
166.	Variable resistance /potentiometer	<p>Variable resistance boxes/varioc of Following Ohm Values each: 220Ω, 150Ω, 1kΩ, 33Ω, 100Ω, 1.2Ω</p>	<ul style="list-style-type: none"> • Latest ISO 9001 Certified Factory Product 					2 Years
167.	Various Lamps	<ul 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 vapor Lamp : Min. 150 Watt with fixture and all accessories • High-pressure sodium Lamp : Min. 150 Watt with fixture and all accessories • Low-pressure sodium Lamp LED: Min. 150 Watt with fixture and all accessories 				Product Catalogue		

168.	Voltage Stabilizer	<p>Voltage Stabilizer with following specifications:</p> <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 	<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		2 Years
169.	Voltmeter (0-1V), (0-10V), (0-30V) (table model)	<p>Table model Analog Voltmeter with range 0-1V :</p> <ul style="list-style-type: none"> • Range: Voltage (V): 0 – 1 V <p>Table model Analog Voltmeter with range 0-10V :</p> <ul style="list-style-type: none"> • Range: Voltage (V): 0 – 1 0V <p>Table model Analog Voltmeter with range 0-30V :</p> <ul style="list-style-type: none"> • 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		2 Years
170.	Voltmeter 50V/DC	<ul style="list-style-type: none"> • VoltmeterMC analog - (0 - 50V) 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		2 Years

171.	Voltmeter AC to 500 V	<ul style="list-style-type: none"> • A.C. Voltmeter • M.I. analog, • A.C. Voltmeter M.I. 75V - 150 V - 300 V - 500V A.C • Confirming to BS 89, IEC 51 & IS 1248 	portable box type housed in Bakelite case	Batteries, Case		User Manual		
172.	Voltmeter, AC/DC portable precision grade Digital Panel board type	Ac/DC Digital Voltmeter 0-500 Volts <ul style="list-style-type: none"> • 3 Digit, 7 Segment LED Display • True RMS Measurement for AC measurement • For 1Ø-2 Wire Electrical Network • IP Protection (Front): IP65 	<ul style="list-style-type: none"> • Panel Mounted • Accuracy: $\pm 0.5\%$ 	Standard Accessories		Manual		2 Years
173.	Wattmeter AC/DC, 0 to 10 Kw	<ul style="list-style-type: none"> • Kilo Wattmeter Analog 0-10 KW, • pressure coil rating- 240v/440v, • Current rating-5A/10A(min) Analog, • Portable type Housed in Bakelite case Conforming to IS 1248	<ul style="list-style-type: none"> • Knife edge pointer and Anti-parallax mirror scale. • Accuracy class as per IS:1248 • Wooden case with Bakelite Top. • Wide window for easy reading. • Quick response due to unique damping. 	*Connecting Leads *Case		*Manual *Test Certificates		2 Years

174.	Digital Wattmeter	<ul style="list-style-type: none"> • Multi range Digital Wattmeter which calculate and displays power of single phase 230 V, 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 	*Batteries *Case		*Manual *Test Certificates		2 Years
175.	Conductivity meters- both low range and high range.	Digital Conductivity meters with both low range and high range. complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Display : 3.5 Digital LED • Ranges 0 to 200 uS/cm, 0 to 2 mS/cm, 0 to 20 mS/cm, 0 to 200 mS/cm & 0 to 1000 mS/cm 	Digital Conductivity meters with min. features as: <ul style="list-style-type: none"> • CE/ Latest ISO 9001 certified factory product • Accuracy + 1%FS ± 1 digit • Adjustable Cell constant on Digital Display • Resolution 0.1uS/cm • Power 230V + 10%, 50Hz 	Standard Accessories		Product Catalogue		2 Years
176.	pH meters	Digital pH meters complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Display: 3 1/2 Digit LED • Accuracy: + 0.01 pH • Power Requirement 220 VAC +10% 50 Hz 	Digital pH meters with min. features as: <ul style="list-style-type: none"> • CE/ Latest ISO 9001 certified factory product 	Standard Accessories		Product Catalogue		2 Years

177.	Temperature probes	Temperature probes complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Measuring Range : -50 to +250 Deg.C; • Accuracy : Class A Accuracy of ± 0.2 Deg.C +/- 1 count • Output : Pt-100 3 Wire Type standard • Type : Simplex type with transition teflon/teflon cable of length 3 meters. • Sensor Length : Standard 6 inch(150mm) • MOC : Stainless Steel 304 pipe of 150mm length of Outer Diameter : Standard 6 mm. 	Temperature probes with min. features as: <ul style="list-style-type: none"> • CE/ Latest ISO 9001 certified factory product 	Standard Accessories		Product Catalogue		2 Years
178.	Thermo-hygrometers	Thermo-hygrometers complete in all aspect with key specifications as: <ul style="list-style-type: none"> • Measuring rate 18 s • Storage temp. -40 to +70 °C • Battery type 9V block battery • Battery life approx. 1 year • Material/Housing ABS • Display LCD, 2 lines 	Thermo-hygrometers with min. features as: <ul style="list-style-type: none"> • Continuous display of temperature, humidity and dew point • Max. and min. value display • Battery monitor • LED alarm reports limit value violations • High accuracy ± 2 %RH • CE/ Latest ISO 9001 certified factory product 	Standard Accessories		Product Catalogue		2 Years
179.	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 	<ul style="list-style-type: none"> *Set of drill bits of difference sizes (12 pieces) each for concrete, Steel, and wood. *Depth Gauge *Chuck Key 		Catalogue		2 Years

			construction — provides smooth power transmission and extended tool life *Soft grip for a secure hold	*Carrying Case				
180.	SMPS Tester	<ul style="list-style-type: none"> • PC Power Supply Tester • 20/24 Pin PSU ATX SATA HDD • SMPS LED Display 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> - To be installed at the designated ITI in Himachal Pradesh. - Training to the staff should be provided as required at the institute premises 	2 Years Minimum

Lot-4: Electrical machinery

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.	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', Speed : 1500 RPM \pm 10% at full load</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>	<ul style="list-style-type: none"> The components fitted on the Panel should be labelled with the name of the component. <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 	<ul style="list-style-type: none"> Patch cords for connecting Machine to panel Any other special tool required for assembling/dissembling 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>

			understand the concept of machine.					
2.	AC 3 Phase motor with control panel	<p>A.C. SQUIRREL CAGE INDUCTION MOTOR 2 HP WITH Automatic STAR DELTA STARTER with Mechanical Load</p> <p>-</p> <p>A.C. SQUIRREL CAGE INDUCTION MOTOR :- Rating: 2 HP 415 volts, 50 Hz, Squirrel cage Induction Motor 1440 RPM, TEFC, Insulation: class 'F' , frame 100, horizontal foot mounted with 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. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given Appendix-F</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/dissembling 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 Motor and major components used on the control panel.</p> <p>- Service providers contact details.</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>

3.	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, Insulation: class 'B' , 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-J</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 components used on the control panel. - Service providers contact details. 	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.
4.	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 -</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be 	<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 	<ul style="list-style-type: none"> - User Manual / Operation Manuals. - Test / 	To be installed the designated training	2 year Warranty for Generator

		<p>440 volts, slip ring Induction Motor, class 'F' insulation, 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-G</p>	<p>labelled 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>special tool required for assembling/disassembling the Setup supplied.</p>	<p>patch cords.</p> <ul style="list-style-type: none"> • One set of spare fuses. 	<p>Experiment list and procedure manual.(if applicable).</p> <p>- Warranty Certificate of Motor and major components used on the control panel.</p> <p>- Service providers contact details.</p>	<p>institute in Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>, Motor and each component mounted on the Panel.</p>
5.	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>-</p> <p>AC MOTOR :- It should be A.C. 3 Phase 5 HP 415 volts, 50 Hz, Squirrel cage Induction Motor 1440 RPM, TEFC, class 'F' insulation, frame 100, horizontal foot</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories 	<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 	<p>- User Manual / Operation Manuals.</p> <p>- Test / Experiment list and procedure manual.(if</p>	<p>To be installed the designated training institute in Himachal Pradesh.</p> <p>- Training to</p>	<p>2 year Warranty for Generator, Motor and each component</p>

		<p>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. <ul style="list-style-type: none"> - 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>should be connected with internal wiring ferrules etc.</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. 	Setup supplied.	spare fuses. .	applicable). -Warranty Certificate of Motor and major components used on the control panel. - Service providers contact details.	be provided as required to the Institute faculty.	mounted on the Panel.
6.	Auto Electrical test bench	<p>Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo, alternator, regulators and starter motors of Vehicles with following specifications:</p> <p>Power Requirements</p> <ul style="list-style-type: none"> • 220V single phase, 15 Amperes <p>Drive Specifications:</p> <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers 	<ul style="list-style-type: none"> • Table top model. • Fitted with digital ammeter/voltmeter for easy reading. • Provision for checking and testing alternators at 2 speeds 	<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 	<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 each component mounted on the Panel.</p>

		<p>Output Supply</p> <ul style="list-style-type: none"> • 12V/24V fixed <p>Vice</p> <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters <p>Instrumentation/meters Installed on panel:</p> <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes in case of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 	<p>Large V/poly - V groove pulley for high speeds Small V - pulley for low speeds.</p> <ul style="list-style-type: none"> • 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. • Working area covered with a rubber mat • Latest ISO 			major components used on the control panel. - Service providers contact details.		
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			9001 Certified factory product					
7.	Auto Electrical test bench	<p>Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo, alternator ,regulators and starter motors of Vehicles with following specifications:</p> <ul style="list-style-type: none"> • 220V single phase, 15 Amperes <p>Drive Specifications:</p> <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers <p>Output Supply</p> <ul style="list-style-type: none"> • 12V/24V fixed <p>Vice</p> <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters <p>Instrumentation/meters Installed on panel:</p> <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes incase of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 	<ul style="list-style-type: none"> • Table top model. • Fitted with digital ammeter/voltmeter for easy reading. • 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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissassembling 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 each component mounted on the Panel.</p>

			alternator. • Provided with 12V battery supply for testing a wide range of electrical components like horns, bulbs, relays child parts of starters and alternators. • Working area covered with a rubber mat • Latest ISO 9001 Certified factory product					
8.	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 of Vehicles with following specifications: Power Requirements • 220V single phase, 15 Amperes Drive Specifications: • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers Output Supply • 12V/24V fixed Vice • Heavy duty, fast mounting for alternators and starters Instrumentation/meters Installed on panel: • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel	• Table top model. • Fitted with digital ammeter/voltmeter for easy reading. • 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	• Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissassembling 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 Motor and major components used on the control panel. - Service providers contact details.	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 year Warranty for each component mounted on the Panel.

		meter of suitable • Circuit breakers of suitable sizes incase of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc	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. • Working area covered with a rubber mat • Latest ISO 9001 Certified factory product					
9.	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.	• Brake loading arrangement for loading the motor with following facilities; o Attachable to the base frame of	Standard Accessories		Manuals/ catalogues	Installation and Training: Installation sole responsibility of the supplier. Training to be provided in	2 Years

			<ul style="list-style-type: none"> 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 				the institute for the faculty of the institute at no extra cost.	
10.	Bus bar with brackets	200 Amps,1 Meter each, four buses of RYBN of Copper material with extension assembly. Bus bars with connectors and hardware shall be of copper material. Housed in enclosure with locking arrangement.				Product Catalogue		2 Years
11.	Capacitor start induction motor	<p>Single Phase Capacitor Motor of 1 HP 240 VOLT WITH STARTER/SWITCH</p> <p>1. MOTOR :</p> <p>A.C. Single Phase Capacitor Start Induction Motor 1 HP 230volts AC, 50 Hz, 1440 RPM, TEFC, class 'B' insulation, frame 90, horizontal foot mounted. Terminals 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:</p> <p>- Refer Appendix "N" for General</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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissassembling 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 	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>requirements.</p> <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>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>used on the control panel.</p> <ul style="list-style-type: none"> - Service providers contact details. 		
12.	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</p> <p>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,</p>	<p>The Current Transformer Test set provides the following Features-</p> <ol style="list-style-type: none"> 1. Separate terminals to connect standard C.T. and Test C.T. secondaries. 2 Ratio error and phase angle error calibrated dials 3 Range selecting Switch 4 Polarity check indicator 	standard	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare fuses. . 	Operational Manual		2 Years

		<p>single ph. Variable Current Source Model 0-4V@100A, 400VA, single ph. Complete with control panelB) 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</p>	<p>5 Ammeter to measure current injected in percentage 6 Null detector with sensitivity control 7 Terminals to connect burden box on both std. & under test 8 Aux. power supply to energies electronic null detector 9 High permeability magnetic core 10. Secondary current selector 1A . or 5A Additional Features shall include: - 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</p>					
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			Current Meter & Timer - Current Transformer 100:5Amps 3nos. - Burden Box • latest ISO 9001 Certified factory product					
13.	Cut out Relays	16A, 440V Cut out Relays with following specifications: ·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		2 Years
14.	D.C. Compound Generator with AC Motor along with control panel	Specifications for above shall as follows: DC Compound Generator: 2.5 KW, 220V, . Self Excited with variac, 4 Pole. Standard ISI Product. Insulation Class "B", Horizontal foot mounted	• The components fitted on the Panel should be labelled with the	• Patch cords for connecting Machine to panel • Any other special tool	Spares: • One spare set of patch	- User Manual / Operation Manuals. - Test / Experiment	To be installed the designated training institute in	2 year Warranty for Generator , Motor

		<p>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: - 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-A</p>	<p>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>required for assembling/dismounting the Setup supplied.</p>	<p>cords.</p> <ul style="list-style-type: none"> • One set of spare fuses. 	<p>list and procedure manual.(if applicable).</p> <p>- Warranty Certificate of Motor and major components used on the control panel.</p> <p>- Service providers contact details.</p>	<p>Himachal Pradesh.</p> <p>- Training to be provided as required to the Institute faculty.</p>	<p>and each component mounted on the Panel.</p>
15.	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. Insulation Class "B", 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.</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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dismounting the Setup supplied. 	<p>Spares:</p> <ul style="list-style-type: none"> • One spare set of patch cords. • One set of spare 	<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</p>	<p>2 year Warranty for Generator, Motor and each component mounted</p>

		<p>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> <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. <ul style="list-style-type: none"> - 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>connected with internal wiring ferrules etc.</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. 		fuses. .	<p>-Warranty Certificate of Motor and major components used on the control panel.</p> <ul style="list-style-type: none"> - Service providers contact details. 	as required to the Institute faculty.	on the Panel.
16.	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. 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 	<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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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.

		<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-D 	<p>mounts 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>components used on the control panel.</p> <ul style="list-style-type: none"> - Service providers contact details. 		
17.	DC Series Motor coupled with spring balance load fitted with control panel	<p>DC series 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 2 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. 	<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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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>- 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>mat for the operator for safe working.</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. 			providers contact details.		
18.	DC Shunt Motor	<p>DC Shunt 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 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</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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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> <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>

		Machine. Control Panel Board shall consist of items/component as given ELECTRICAL PANEL BOARD given in Appendix-D	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.					
19.	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</p>	<p>Min. Functions: Auto start & Stop, Inbuilt AMF features, Emergency Stop, LCD display, acknowledgment & Fault Reset. Centralized lifting for easy handling and safety. Shall 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>	Standard Accessories	Standard Spares	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.	2 Years

		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	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. Fuel Tank Capacity (Lt.) :Min. 50 Liters Base Frame: Pressed CRCA Channel					
20.	Dual Magnetization Yoke	Dual Magnetization Yoke : AC / HWDC, 230 VAC, 50Hz	ISO 9001 Certified factory product			manual		2 Years
21.	Dual Magnetization Yoke	Dual Magnetization Yoke : AC / HWDC, 230 VAC, 50Hz	ISO 9001 Certified factory product			manual		2 Years
22.	Electrical Machine Trainer	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	Following Essential accessories should be provided with trainer: A) Hand held tachometer – 1 No. B) Shrouded patch chords C) Well written	<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 	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>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>	<p>students workbook explaining atleast 50 experiments with instructor guide some of them are as follows:</p> <ul style="list-style-type: none"> • Study the Characteristic of DC Motor & Speed Control of DC Motor • Open Circuit Characteristic or Magnetization Characteristic of Shunt DC Generator • Saturation Characteristic of a Separately Excited DC Generator • Load Characteristic of a Separately Excited DC Generator • Load vs. Speed Characteristic of a DC Motor No Load, • Input Power Measurement Test of an Induction Motor • Load vs. Excitation Current 			<p>components used on the control panel. - Service providers contact details.</p>		
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			Characteristic of an Alternator <ul style="list-style-type: none"> • Speed vs. Load Characteristics of an Alternator • No Load Test & Short Circuit Test of an Alternator • Starting and Reversing of a DC Shunt Motor • The Retardation (or running down) Test on a DC Machine • To Determine Efficiency vs. Load Characteristics of a DC Shunt motor by Swinburn's method • Determination and Separation of Losses in DC Machine D) DEMO CD to help student to work by themselves – 1 No.					
23.	Electrical test bench	Auto Electric Test bench shall be table model of heavy duty designed for testing of dynamo, alternator, regulators and starter motors of Vehicles with following specifications: Power Requirements <ul style="list-style-type: none"> • 220V single phase, 15 Amperes 	<ul style="list-style-type: none"> • Table top model. • Fitted with digital ammeter/voltmeter for easy reading. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 	Spares: <ul style="list-style-type: none"> • One spare set of suitable current capacity 	Manuals/catalogues of standard products used in the Panel. - Experiment List cum	Installation and Training: Installation sole responsibility of the supplier.	2 year Warranty for each component mounted on the

		<p>Drive Specifications:</p> <ul style="list-style-type: none"> • 220V single phase, Min. 2HP, Min. 1440 RPM induction motor Protected with circuit breakers <p>Output Supply</p> <ul style="list-style-type: none"> • 12V/24V fixed <p>Vice</p> <ul style="list-style-type: none"> • Heavy duty, fast mounting for alternators and starters <p>Instrumentation/meters Installed on panel:</p> <ul style="list-style-type: none"> • Alternator output current - Digital Panel meter of suitable rating • Alternator output current - Digital Panel meter of suitable • Circuit breakers of suitable sizes in case of sudden surges in voltage • Fuses of suitable sizes to be provided for protection of rectifiers, battery etc 	<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 	<p>mbing the Setup supplied.</p>	<p>patch cords for intercon nections required on the panel board.</p> <ul style="list-style-type: none"> • One set of spare fuses. . 	<p>Instructor Manual in soft and Hard Copy</p> <p>- Safety Test Reports</p>	<p>Training to be provided in the institute for the faculty of the institute at no extra cost.</p>	<p>Panel.</p>
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			alternators. • Working area covered with a rubber mat • Latest ISO 9001 Certified factory product					
24.	Load Bank (Lamp / heater Type)	Load Bank - (heater Type) 6 KW,3Phase,440 volt, Current: 5A to 50A, Frequency: 50Hz	• Latest ISO 9001 Certified factory product			Product Catalogue		2 Years
25.	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 & earthing 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 & earthing 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: - 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	• 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	• Patch cords for connecting Machine to panel • Any other special tool required for assembling/dismantling 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 Motor and major components used on the control panel. - Service providers contact details.	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.

		of items/component as given ELECTRICAL PANEL BOARD given in Appendix-E	connections and student can easily understand the concept of machine.					
26.	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. Insulation Class "B", 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, 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 BOARD given in Appendix-B</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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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. 	To be installed the designated training institute in Himachal Pradesh.	2 year Warranty for Generator, Motor and each component mounted on the Panel.

			concept of machine.					
27.	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 50 Kv or 0 to 60 Kv, or 0 to 100 Kv, • Capacity: Min. 60 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 50-0-50 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"> • 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 	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 instrument)	To be installed the designated training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	2 Years

			winding should be Earthed via measuring circuit to detect the current level flowing through the HV side. <ul style="list-style-type: none"> • Continuously variable Auto-Transformer for smooth variation of output voltage • Safety Standards to Meeting IEC 61010 • Latest ISO 9001 Certified factory product 					
28.	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	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		2 Years

			<ul style="list-style-type: none"> • Latest ISO 9001 Certified factory product 					
29.	Single Phase 220 V Capacitor type AC Meter squirrel cage Induction motor	<p>Single Phase Capacitor Motor of 1 HP 240 VOLT WITH STARTER/SWITCH</p> <p>1. MOTOR : A.C. Single Phase Capacitor Start Induction Motor 1 HP 230volts AC, 50 Hz, 1440 RPM, TEFC, class 'B' insulation, frame 90, 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>	<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 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. 	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.
30.	Single phase Transformer, core type, air cooled	SINGLE PHASE TRANSFORMER, CORE TYPE, AIR COOLED TRANSFORMER SINGLE PHASE 1 KVA A	All Machines should be made of Copper			Manual	To be installed the designated	2 Years

		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.	windings. Circuit diagram shall be painted/printed on panel				training institute in Himachal Pradesh. - Training to be provided as required to the Institute faculty.	
31.	Single Phase Variable Auto Transfer	Single Phase(Air cooled) Auto Transformer Amperage 10 Amp input voltage0-270 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
32.	Split phase induction motor with Control panel	Phase Split Motor of 1 HP 240 VOLT WITH STARTER/SWITCH 1. MOTOR : A.C. Split phase Induction Motor 1 HP 230volts AC, 50 Hz, 1440 RPM, TEFC, class 'B' insulation, frame 90, 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:	<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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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. 	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 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 	insulation rubber mat for the operator for safe working. <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. 			- Service providers contact details.		
33.	Starter motor axial type, pre-engagement type & Co-axial type	Pre-engagement type Starter Motor with solenoid switch with following Specifications: <ul style="list-style-type: none"> • System Voltage : 12 Volts • Polarity: Negatively earth • Operating Temperature range : -5 OC to +93OC • Power Output : Min. 2 Kw • Lock Torque : 3.0 kg.m (min.) at 5.6 V and 850 Amps (Max.) Current • Run Torque : 0.6 kg.m. (min.) at 9.8 V and 300 Amps (Max.) Current with 2300 RPM • Earth, Main and Solenoid terminals of Steel Axial type Starter motor with solenoid switch with following Specifications: <ul style="list-style-type: none"> • System Voltage : 12 Volts • Operating Temperature range : -5 OC to +93OC 	ISO 9001 Certified factory product <ul style="list-style-type: none"> • Flange mounted to engine flywheel housing • Spigot diameter location, with two or three fixing holes to suit the installation • Protected against water and oil ingress 	Standard Accessories		Catalogue		2 years

		<ul style="list-style-type: none"> • Power Output : Min. 4.5 Kw • Lock Torque : 6.2 kg.m (min.) at 11 V and 1200 Amps (Max.) Current • Run Torque : 3.5 kg.m. (min.) at 16 V and 700 Amps (Max.) Current • Main and Solenoid terminals • Pre-engagement type Starter Motor <p>Co-Axial type Starter motor with solenoid switch with following Specifications:</p> <ul style="list-style-type: none"> • System Voltage : 12 Volts • Operating Temperature range : -5 OC to +93OC • Power Output : Min. 2 Kw 						
34.	Stepper Motor with Digital Controller	<p>4 wire bipolar Stepper Motor with stepper drive along with Digital controller:</p> <p>Stepper Motor: Configuration: 4 wire bipolar Step Angle : 1.8 deg</p> <p>Stepper Drive: Suitable for Stepper motor</p> <p>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</p>	<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.	2 Years
35.	Synchronous motor along with control panel.	<p>SYNCHRONOUS MOTOR 3 PHASE, 3 HP, 440V, 50HZ, 4 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</p>	<ul style="list-style-type: none"> • The components fitted on the Panel should be labelled with the name of the component. • All accessories 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling the Setup 	<p>Spares:</p> <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 / Experiment list and procedure manual.(if 	To be installed the designated training institute in Himachal Pradesh. - Training to	2 year Warranty for Generator , Motor and each component

		<p>and starting/ prime mover arrangement , excitation arrangements.</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. <ul style="list-style-type: none"> - 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>should be connected with internal wiring ferrules etc.</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. 	supplied.	spare fuses. .	<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. 	be provided as required to the Institute faculty.	mounted on the Panel.
36.	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> <ul style="list-style-type: none"> - AC MOTOR :- It should be A.C. 3 Phase 5 HP 415 volts, 50 Hz, Squirrel cage Induction Motor 1440 RPM, TEFC, class 'F' insulation, frame 100, horizontal foot mounted. Six terminals are brought out on terminal box. <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. 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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 	<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>	<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. 			major components used on the control panel.		
37.	Three phase transformer, shell type oil cooled with Delta/ Star	<p>THREE PHASE TRANSFORMER, SHELL TYPE OIL COOLED</p> <p>Working Model For Conducting Various Experiments.</p> <p>TECHNICAL SPECIFICATIONS:-</p> <ol style="list-style-type: none"> 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 	<p>All Machines should be made of Copper windings.</p> <p>Circuit diagram shall be painted/printed on panel</p>			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

		<p>banana terminals 30 Amp. With color code provided on the top of the transformer and on 6mm Bakelite sheet</p> <p>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.</p> <p>10) Plain unidirectional M.S. Roller will be fitted to the tank for movement</p> <p>11) Electrical performance would confirm</p> <p>12) The transformer provided with transformer oil. The oil confirm to (The tendered quote the grade and quantity in litters required)</p> <p>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.</p>						
38.	Thyristor /IGBT controlled D.C. motor drive with tacho-generator 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</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</p>	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissassembling 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 	<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>Installation and Training: Installation sole responsibility of the supplier. Training to be provided in the institute for the faculty of the institute at no extra cost.</p>	<p>2 year Warranty for Generator , Motor and each component mounted on the Panel.</p>

		<p>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-L</p>	<p>RPM of motor on Digital RPM meter. Reverse and Forward Direction switch. Field Failure protection. Current Limiter</p> <p>DC Drive features</p> <ol style="list-style-type: none"> 1) Relay output (2 Nos.) for status of drive (fault & ON) 2) speed reference 0-10V for speed control 3) Under/over voltage, short circuit protection. <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. 		<p>spare fuses.</p> <p>.</p>				
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			<ul style="list-style-type: none"> • 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. 					
39.	Thyristor/IGBT Controlled AC Motor With VVVF Control	<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 ,Class : E Class ,RPM : 1500 approx. Windings :Stator winding Input Terminal :6</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. - 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 	<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 	<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>Installation and Training: Installation sole responsibility of the supplier. Training to be provided in the institute for the faculty of the institute at no extra cost.</p>	<p>2 year Warranty for Generator , Motor and each component mounted on the Panel.</p>

		of items/component as given ELECTRICAL PANEL BOARD given in Appendix-M	wound • All Meters shall Be digital Type. • Diagrammatic representation for the ease of connections and student can easily understand the concept of machine.					
40.	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 	<ul style="list-style-type: none"> • Patch cords for connecting Machine to panel • Any other special tool required for assembling/dissembling 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>

			representation for the ease of connections and student can easily understand the concept of machine.					
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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/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	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	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	4 point starter for DC Motor	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	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	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				
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/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	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 Squirrel Cage Motor				
Sl.No	Item	Min. Rating	Quantity	Min. Standard to conform
1	Voltmeter with selector switch Off/R/Y/B/BR	0-500V	1	IEC 61010
2	Ammeter	0-10A	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	16 Amps, 440 V	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 Certified 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 Certified factory product
7	RPM Inductor with Sensor	Suitable Rating	1	An ISO 9001 Certified factory product
7	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	Min. Standard to conform
	DC Side			
1	Voltmeters	Suitable rating	1	IEC 61010
2	Ammeters	Suitable rating	1	IEC 61010
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	Suitable Rating	1	IS 13703 / IEC 60269
	AC Side			
1	Voltmeters	Suitable rating	1	IEC 61010
2	Ammeters	Suitable rating	1	IEC 61010
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	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	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	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	Rating
	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 prime mover/ 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 compound 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> <ul style="list-style-type: none"> · AC 3ph fixed 440 V. · Phase control lamps, L1, L2, L3. · Push button emergency. · Each AC or DC source complete with main switches and safety devices such as TPN MCB or DP MCB. <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.</p> <p>Output terminals for Alternator and DC Generators shall be provided with safety devices such as TPN or DP MCBs of suitable ratings as required</p> <p>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 Thyristor /IGBT controlled D.C. motor drive with tacho-generator feedback arrangement				
Sl.No	Item	Rating	Quantity	Min. Standard to conform
	DC Side			
1	Voltmeters	Suitable rating	1	IEC 61010
2	Ammeters	Suitable rating	1	IEC 61010
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	Suitable Rating	1	IS 13703 / IEC 60269
	AC Side			
1	Voltmeters	Suitable rating	1	IEC 61010
2	Ammeters	Suitable rating	1	IEC 61010
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	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/RY/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	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 loading arrangement.

Machine Control Panel & Operating Area:

- Control panel board shall consist of high grade FRP material or better material in compliance with relevant IS/IEC safety standards.
- The Electrical Control Panel dimensions: Minimum size of size Length = 900 mm; Depth = 250 mm; Height = 750 mm.
- The rear of the panel should be covered with transparent sheet (removable) so that the circuit connections are visible and electrically safe with suitable locking arrangement.
- 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.
- BS10 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 in an x-y plane as per operator requirement.

Mechanical Loading Arrangement:

All the Motors 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.

4. Drawings

Not Applicable