



Bharatiya Vidya Bhavan's  
**SARDAR PATEL INSTITUTE OF TECHNOLOGY**

(Autonomous Institute Affiliated to Mumbai University)

Munshi Nagar, Andheri (W) Mumbai-400 058

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**Annexure-III**

**PART-A (Electrical and Electronic Equipment's)**

<b>LIST OF EQUIPMENTS:</b>		
<b>Item 1:- 50MHz 2 CH. DSO</b>		<b>Qty Required : 24 Units</b>
<b>Sr. No</b>	<b>Parameter Name</b>	<b>Technical Specification</b>
1.	Instrument Criteria	Digital Storage Oscilloscope , 50MHz Bandwidth , 2Analog CH.
2.	Input Channel Characteristics	The DSO should have 20K record length on each channelsimultaneously
		Max 1GS/s sampling on Channel simultaneously.
		Input impedance 1 MΩ±2 % in parallel with 14 pF ±2 pF,
		1mV/div to 10V/div vertical scale setting and 2 ns/div to 100 sec/divtime scale with ±20ppm Time base Accuracy or better.
3.	Control and Measurement Facilities	<ul style="list-style-type: none"><li>• Should have individual vertical control for each Channel.</li></ul>
		<ul style="list-style-type: none"><li>• Auto Set Feature, Cursor measurement and Automatic Measurement of Time and Amplitude parameters with facilityto Enable / Disable of by password protection as and when require.</li></ul>
		<ul style="list-style-type: none"><li>• Dedicated control knobs in the front panel for Zoom, and navigate on the scope Acquisition</li></ul>
		<ul style="list-style-type: none"><li>• In-built help Function, Graphical representation with description of all measurement parameters should be available.</li></ul>
		<ul style="list-style-type: none"><li>• Facility to load Experimental Documents drawings and images in the DSO and should be able to Read through the Documentsin the DSO screen without needing PC connection.</li></ul>

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		<ul style="list-style-type: none"> <li>Should have Snapshot feature to display All available Measurement Parameters on the Screen at a time.</li> </ul>
		<ul style="list-style-type: none"> <li>32 or more Automatic Measurements for Time and Amplitude paraments including Burst Width , Phase , Positive and Negative Pulse Count , Rising and Falling Edge count ,Delay FR ,Delay FF and Delay RR measurement.</li> </ul>
		<ul style="list-style-type: none"> <li>Should support Gating , MATH and FFT measurement. Dual window FFT with simultaneous time and frequency domain views</li> </ul>
4.	Acquisition and Trigger	DSO should support Sample, Peak Detect , Average, Hi-Resolution and Roll Acquisition mode
		Trigger Modes as Edge, Pulse Width and Runt. 20nS to 8Sec Trigger Hold Off Range,
		Trigger Source as CH1, CH2, External and AC line trigger.
5.	Display	7-inch TFT color display with adjustable , Interpolation Sin (x)/x display, variable and infinite persistence,
		Display should have 15 Horizontal Div. &10 Vertical Division, Quick Search Function, Built-in Tips for Faster Function , On Screen Scope Basics for New user learning .
6.	Save and Recall Function	The DSO should have facility to save and Recall Waveform, Scope Settings in the Internal and External Memory . Should able to display min. two saved waveform along with both Live channel waveform and one Math Waveform.
7.	Interface Ports and Connectivity	USB Host & Device port Connectivity, Should Support PC connectivity.
8.	Regulatory	The DSO should Comply to Electromagnetic compatibility of EC Council Directive 2014/30/EU Safety UL61010-1, UL61010-2-030, CAN/CSA-C22.2 No. 61010.1, CAN/CSA-C22.2 No. 61010-2:030; complies with the Low Voltage Directive 2014/35/EU for Product Safety

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9.	Warranty	The DSO should Cover 5 Years Comprehensive Warranty including the In-built Display. Std. Probes Supplied should cover 1 year Replacement Warranty.
10	Recommended Brands, not limited to.	Tektronix, Aplab, Rishabh
<b><u>Special Instruction :</u></b>		
Ø Vendor Should submit Compliance statement for each parameter along with Complete product data sheet marking the Specification. Should clearly mention deviation from the tender specs, if any and Demonstrate for the Technical Parameter on their Quoted Instrument as & when asked by Technical Team from the Respective Dept. of the Institute for Technical Evaluation.		
Ø Vendor Should Provide OEM Authorization Certificate for the Quoted Instrument Brand. OEM or Vendor should have Service Centre in Maharashtra State for Quick Service / Support.		

Item 2:- Single Output- DC regulated Power Supply		Qty Required : 24 Units
Sr. No	Parameter Name	Specification
1.	Output Voltage	0-15V/0-32V
2.	Output Current	0-2A
3.	Load & Line Regulation	0.05% max.
4.	Ripple & Noise	1 mV (r. m. S.) Max.
5.	Features	<ul style="list-style-type: none"><li>• Protected Against Overload &amp; Short Circuit by Means of Automatic Crossover Characteristics.</li><li>• Continuous Metering of Output Voltage &amp; Current.</li></ul>
6.	Operating Temperature Range	0-55
7.	Warranty	1 year standard
8.	Recommended Brand	Aplab, Rishabh, ZOMA

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<b>Item 3:- 0.3Hz to 3MHz, Dual output Channel Function Generator Qty Required : 30 Units</b>		
<b>Sr. No.</b>	<b>Parameter Name</b>	<b>Specification</b>
1.	Frequency Range	0.01Hz to 1MHz in 8 decade ranges.
2.	Frequency Indication	±1% ±1 digit.
3.	Output Impedance	50 ohms
4.	Frequency Indication Accuracy	±1% +1 digit
5.	Output Waveforms	Sinusoidal, Triangle, Square, Ramp, Pulse, TTL (Sync) & DC Outputs.
6.	Sine Distortion	<1% (typical).
7.	Square Wave Rise / Fall Time	<75nsec.
8.	Frequency Stability	<0.5% of the set frequency (after ½ Hour warm up).
9.	Duty Cycle	10% to 90% variable.
10.	Maximum Output Voltage ● Into 50 ohms ● Open Circuit	10V p-p output. 20V p-p output.
11.	Amplitude Indication	3 digit seven segment display (Vp-p) ±5%.
12.	Amplitude Flatness	±0.5dB upto 100KHz range / ±1.0dB for 1MHz range.
13.	Attenuator	Two step attenuators of 20dB & 40dB. Fine attenuation of 20dB through vernier control. (Total 80 dB attenuation).
14.	Attenuator Accuracy	±0.5dB per 20dB at 1KHz.
15.	DC Offset	±10V ±5% (DC + AC peak) in open circuit ±5V ±5% (DC + AC peak) in 50 ohms.
16.	Warranty	Instrument should be covered under min. 5 years of Standard Comprehensive Warranty including LCD Display.
17.	Recommended Brands, not limited to.	Aplab, Scientech, keysight

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<b>Mandatory Instruction:</b>
Vendor Should submit Compliance statement for each parameter along with Complete product data sheet , clearly mentioning deviation from the tender specs , if any and Demonstrate for the Technical Parameter mentioned in the Tender on their Quoted Instrument , as & when asked by Technical Team from the Respective Dept. of the Institute for Technical Evaluation .
Vendor Should Provide Authorization Certificate for the Quoted Brand of the Instrument.
Certificates for the genuineness of the warranty and service center(s) in India should be provided by the manufacturer.
After-sales service support for repairs/ replacement of non-functional part(s) should be available in India (including all services under warranty).

<b>Item 4 :- 8085 Trainer Kits</b>		<b>Qty Required : 12 Units</b>
<b>Sr. No.</b>	<b>Specification</b>	
1.	<ul style="list-style-type: none"> <li>8085 based Microprocessor Trainer kit with SMPS</li> </ul>	
2.	Warranty	Instrument should be covered under min. 5 years of Standard Comprehensive Warranty including LCD Display.
3.	Recommended Brands, not limited to.	Micro-embedded, Dynalog
<b>Mandatory Instruction :</b>		
Vendor Should submit Compliance statement for each parameter along with Complete product data sheet , clearly mentioning deviation from the tender specs , if any and Demonstrate for the Technical Parameter mentioned in the Tender on their Quoted Instrument , as & when asked by Technical Team from the Respective Dept. of the Institute for Technical Evaluation .		
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Item 5:- Klystron Mount		Qty Required : 02 Units								
Sr. No.	Specification									
1.	Klystron Mount with Klystron Tube 2K2									
	<table border="1"> <thead> <tr> <th>Band</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>Frequency(GHz)</td> <td>8.2-12.4</td> </tr> <tr> <td>Waveguide</td> <td>WR-90</td> </tr> <tr> <td>Flange</td> <td>UG-39/U</td> </tr> </tbody> </table>		Band	X	Frequency(GHz)	8.2-12.4	Waveguide	WR-90	Flange	UG-39/U
Band	X									
Frequency(GHz)	8.2-12.4									
Waveguide	WR-90									
Flange	UG-39/U									
2.	Warranty	Instrument should be covered under StandardComprehensive Warranty.								
3.	Recommended Brands, not limited to.	NVIS 203, LAMBDA								
<b>Mandatory Instruction :</b>										
Vendor Should submit Compliance statement for each parameter along with Complete product data sheet , clearly mentioning deviation from the tender specs , if any and Demonstrate for the Technical Parameter mentioned in the Tender on their Quoted Instrument , as & when asked by Technical Team from the Respective Dept. of the Institute for Technical Evaluation .										
Vendor Should Provide Authorization Certificate for the Quoted Brand of the Instrument.										
Item 6 :- Decade Resistance and Inductance Box		Qty Required : 20 each								
Sr. No.	Specification									
1.	<p>a. <b>Decade Resistance Box 1ohm-1 Megaohms:</b> Accuracy: <math>\pm(0.01\% + 2 \text{ m}\Omega)</math> after subtraction of zero resistance, at 23°C Zero Resistance: <math>&lt;1 \text{ m}\Omega</math> per decade, at dc Maximum Voltage to Case: 2000 V peak Switch Type: 11 positions, “0”-“10”; multiple solid silver alloy contacts Switch Capacitance:<math>&lt;4 \text{ pF}</math> per switch, low loss</p> <p>b. <b>Decade Capacitance Box:</b> Decades of 1nF, 10nF, 100nF, 1μF, 10μF, Accuracy:1% at 1 kHz</p> <p>c. <b>Decade Inductance Box:</b> Decades of 10μH, 100μH, 1mH, 10mH, 100mH, Accuracy: 1% at 1 kHz</p>									
2.	Warranty	Instrument should be covered under StandardComprehensive Warranty.								

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3.	Recommended Brands, not limited to.	Made in India preferred.
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Vendor Should Provide Authorization Certificate for the Quoted Brand of the Instrument.		

Item 7:- Raspberry Pi development board		Qty Required : 05 Units
Sr. No.	Specification	
1.	Raspberry Pi 3B or higher version Boards with PiCAM , SD card, HDMI to VGA and power cable	
2.	Warranty	Instrument should be covered under Standard Comprehensive Warranty.
3.	Recommended Brands, not limited to.	Made in India preferred.
<b>Mandatory Instruction :</b>		
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Item 8:- LCR Meter-Handheld		Qty Required : 2 Units
Sr. No.	Specification	
1.	20,000 counts resolution, 0.2% accuracy, Wide LCR ranges with 3 selectable test frequencies (100Hz, 120Hz, and 1kHz) Auto identification (Ai) automatically determines and displays component type and measurements Detailed component analysis with ESR, Z, D, Q, $\theta$ functions Battery life of 16 hours/AC-powered ,IR-to-USB connectivity for data logging to PC	
2.	Warranty	Instrument should be covered under StandardComprehensive Warranty.
3.	Recommended Brands, not limited to.	Gwimstek, keysight or any other brand. Made in India preferred.
<b>Mandatory Instruction :</b>		
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Vendor Should Provide Authorization Certificate for the Quoted Brand of the Instrument.		

Item 9:- IC Tester (analog and digital)		Qty Required : 02 Units
General Specifications		
<ul style="list-style-type: none"> <li>Handy Universal IC Tester support upto 40 pins</li> <li>Should Tests a wide range of Digital IC's, Microprocessor and Peripherals, Analog IC's , Opamp, 555</li> </ul>		
Warranty	Instrument should be covered under StandardComprehensive Warranty.	
Recommended Brands, not limited to.	Micrologic or any other brand (Made in India preferred)	
<b>Mandatory Instruction :</b>		
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Vendor Should Provide Authorization Certificate for the Quoted Brand of the Instrument.

Item 10:- Analog multimeter		Qty Required : 20 Units
Sr. No.	Specification	
1.	a. DCV: 0 – 0.1V ±1% 0.25V/2.5/10V/50V/250/1000 ±3%. b. ACV :0-10/50/250/1000V±4%*DCA:0- 50µA/2.5mA/25mA/250mA±3%. c. Resistance: 0 – 2K/20K/200K/2M/20Mohm ±3% *dB: -10 dB – 22 dB. d. Diode check (including LED). e. Continuity: Both Buzzer & flash. f. Transistor leak current. g. can use it to measure AC/DC voltage, DC current, resistance, diode check, continuity, and transistor leak current, for DC current, it can measure as low as 10 micro amps and up to 250 mA, which is hard to do with a digital multimeter.	
2.	Warranty	Instrument should be covered under Standard Comprehensive Warranty.
3.	Recommended Brands, not limited to.	Made in India preferred.
<b>Mandatory Instruction :</b>		
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Vendor Should Provide Authorization Certificate for the Quoted Brand of the Instrument.		

Item 12:- Development Board		Qty Required : 05 units
Sr. No.	Specification	
1.	STM 32 B-L475E-IOT01A2 DISCOVERY KIT STM32L4 SPSGRF-868, STM32 L4 Transceiver; 802.11 b/g/n (Wi-Fi, WiFi, WLAN), Bluetooth® Smart 4.x Low Energy (BLE) 868MHz Evaluation Board	
2.	Warranty	Instrument should be covered under Standard Comprehensive Warranty.

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3.	Recommended Brands, not limited to.	Digikey or any other brand. Made in India preferred.
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<b>Item 13:- Digital Wattmeter</b>		<b>Qty Required : 05 units</b>
<b>Sr. No.</b>	<b>Specification</b>	
1.	Digital Wattmeter Single phase Output Voltage 0-600VAC (Dual Range Available) Power Frequency 50~60Hz / 400Hz Optional	
2.	Warranty	Instrument should be covered under Standard Comprehensive Warranty.
3.	Recommended Brands, not limited to.	Made in India preferred.
<b>Mandatory Instruction :</b>		
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