



# National Accreditation Board for Testing and Calibration Laboratories

## SCOPE OF ACCREDITATION

**Laboratory Name :**

NATIONAL CENTRE FOR QUALITY CALIBRATION, 4, ABHISHREE CORPORATE PARK, ISCKON-AMBLI ROAD, AMBLI, AHMEDABAD, AHMEDABAD, GUJARAT, INDIA

**Accreditation Standard**

ISO/IEC 17025:2017

**Certificate Number**

CC-2128

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**Last Amended on**

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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrum	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
Permanent Facility					
1	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	1P & 3P Active Energy @ 50 Hz - UPF to 0.5 PF Lag/Lead (240 V / 0.05 A to 5 A)	Using Accucheck by Direct / Comparison Method	6 Wh to 3.6 kWh	0.36%
2	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Current @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	1 A to 10 A	0.17 % to 0.25 %
3	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Current @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	30 µA to 1 A	0.43 % to 0.17 %
4	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC High Voltage @ 50 Hz	Using HV Probe with Multimeter by Direct Method	1 kV to 27 kV	6.1%
5	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC High Voltage @ 50 Hz	Using HV Probe with Multimeter by Direct Method	1 kV to 5 kV	6.92%



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6	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Voltage @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	1 mV to 10 mV	4.81 % to 0.53 %
7	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Voltage @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	10 mV to 1000 V	0.53 % to 0.098 %
8	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0.33 A to 1.1 A	4.6 % to 0.22 %
9	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1.1 A to 3 A	3.4 % to 0.19 %
10	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	30 µA to 330 µA	1.69 % to 0.23 %
11	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 µA to 330 mA	0.231 % to 0.533 %



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12	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 50 Hz	Using Fluke Multi-product Calibrator (5522A) with Current Coil by Direct Method	20 A to 1000 A	0.43%
13	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 50 Hz to 5 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	11 A to 20 A	0.19 % to 3.5 %
14	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 50 Hz to 5 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	3 A to 11 A	0.19 % to 3.48 %
15	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Power - - 0.2 to UPF (Lead/Lag) @ 50 Hz (100 V to 480 V / 0.01 A to 20 A)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 W to 9.6 kW	0.13 % to 1.16 %
16	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 100 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	3.3 V to 33 V	0.16 % to 0.11 %
17	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 500 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 mV to 33 mV	1.86 % to 0.11 %





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18	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 500 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	33 mV to 330 mV	0.52 % to 0.068 %
19	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 500 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 mV to 3.3 V	0.04 % to 0.33 %
20	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 50 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 V to 1000 V	0.026 % to 0.038 %
21	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 50 Hz to 20 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	33 V to 330 V	0.04 % to 0.03 %
22	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Capacitance @ 1 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0.5 nF to 330 nF	3.09 % to 3.90 %
23	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Capacitance @ 100 Hz	Using Fluke Multi-Product calibrator model 5522 A by direct method	0.33 µF to 100 µF	3.9 % to 4.13 %



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24	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Inductance @ 1 kHz	Using Decade Inductance Box by Direct Method	100 μH to 1000 mH	1.33 % to 1.16 %
25	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Phase Angle @ 50 Hz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 ° to 90 °	0.13°
26	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Capacitance	Using 6½ Digital Multimeter by Direct Method	1 μF to 100 mF	1.74 % to 2.43 %
27	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Capacitance	Using 6½ Digital Multimeter by Direct Method	1 nF to 1 μF	5.21 % to 1.74 %
28	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ Digital Multimeter by Direct Method	1 A to 10 A	0.084 % to 0.19 %
29	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ Digital Multimeter by Direct Method	10 μA to 100 mA	0.36 % to 0.065 %



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30	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ Digital Multimeter by Direct Method	100 mA to 1 A	0.065 % to 0.084 %
31	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC High Voltage	Using HV Probe with Multimeter by Direct Method	1 kV to 5 kV	6.10 % to 1.22 %
32	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ Digital Multimeter by Direct Method	1 mV to 10 mV	0.41 % to 0.046 %
33	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ Digital Multimeter by Direct Method	10 mV to 1000 V	0.046 % to 0.011 %
34	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ Digital Multimeter by Direct Method	1 kohm to 10 Mohm	0.025 % to 0.059 %
35	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ Digital Multimeter by Direct Method	1 ohm to 1 k ohm	0.37 % to 0.025 %





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36	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ Digital Multimeter by Direct Method	10 Mohm to 1 Gohm	0.059 % to 2.33 %
37	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 A to 10 A	0.05 % to 0.065 %
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 µA to 330 µA	0.26 % to 0.026 %
39	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 A to 20 A	0.065 % to 0.39 %
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	20 A to 1000 A	0.39 % to 1.43 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	3.3 mA to 1.0 A	0.017 % to 0.05 %



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42	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 $\mu$ A to 3.3 mA	0.026 % to 0.017 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Power (10 V to 1000 V / 0.1 A to 20.5 A)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 W to 20 kW	0.14 % to 0.22 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Fluke Multi-product Calibrator (5522A / 5500E) by Direct Method	0.1 mV to 330 mV	1.98 % to 0.01 %
45	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Fluke Multi-product Calibrator (5522A / 5500E) by Direct Method	330 mV to 330 V	0.01%
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 V to 1000 V	0.01%
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire	Using Fluke Multi-product Calibrator (5522A) by Direct Method	110 Mohm to 1100 Mohm	0.066 % to 1.83 %





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48	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire & 4 Wire	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0.1 ohm to 330 kohm	0.14 % to 0.01 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire & 4 Wire	Using Fluke Multi-product Calibrator (5522A / 5500E) by Direct Method	11 Mohm to 110 Mohm	0.031 % to 0.066 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire & 4 Wire	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 kohm to 11 Mohm	0.01 % to 0.031 %
51	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 2 Wire	Using Resistance Decade Box by Direct Method	1 ohm to 999 Mohm	0.59 % to 3.31 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 2 Wire	Using High Resistance Jig (Box) by Direct Method	10 Gohm to 1000 Gohm	2.48 % to 5.9 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 2 Wire	Using Resistance Decade Box by Direct Method	5 Mohm to 10 Gohm	2.31 % to 2.48 %



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54	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 4 Wire	Using 4 Wire Low Resistance Standards by Direct Method	10 µohm to 1 ohm	6.14 % to 1.3 %
55	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Amplitude (AC @ 1 kHz & 1 MOhm Load)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 mV to 70 V	0.6 % to 0.2 %
56	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Amplitude (AC @ 1 kHz & 50 Ohm Load)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 mV to 6.6 V	0.6 % to 0.2 %
57	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Bandwidth	Using Fluke Multi-product Calibrator (5522A) by Direct Method	50 kHz to 1 GHz	7%
58	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Time Base	Using Fluke Multi-product Calibrator (5522A) by Direct Method	5 ns to 5 s	0.37%
59	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (L Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 900 °C	0.47°C



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60	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (S Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.59°C
61	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (B Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	600 °C to 1820 °C	0.54°C
62	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (C Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 2316 °C	1.02°C
63	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (E Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 1000 °C	0.63°C
64	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (J Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 210 °C to 1200 °C	0.37°C
65	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (K Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1372 °C	0.52°C





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66	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (N Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1300 °C	0.53°C
67	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (PT-100)	Using 6½ Digital Multi Meter by Direct Method	(-) 200 °C to 800 °C	0.28°C
68	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (R Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.65°C
69	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (T Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 400 °C	0.75°C
70	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (U Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 600 °C	0.68°C
71	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - R Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.7°C



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72	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - E Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 1000 °C	0.6°C
73	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - K Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1372 °C	0.5°C
74	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - B Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	600 °C to 1820 °C	0.53°C
75	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - C Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 2316 °C	1°C
76	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - J Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 210 °C to 1200 °C	0.33°C



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77	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - L Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 900 °C	0.44°C
78	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - N Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1300 °C	0.5°C
79	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - PT-100	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 800 °C	0.3°C
80	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - S Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.57°C
81	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder/ Universal Calibrator / Calibrator / Multimeter - T Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 400 °C	0.74°C





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82	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder/ Universal Calibrator / Calibrator / Multimeter - U Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 600 °C	0.66°C
83	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6½ Digital Multi Meter by Direct Method	5 Hz to 1 MHz	0.12 % to 0.015 %
84	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	0.01 s to 1 s	0.002 s to 0.01 s
85	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	1 s to 60 s	0.01 s to 0.06 s
86	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	1800 s to 3600 s	0.63 s to 1.51 s
87	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	3600 s to 43200 s	1.51 s to 5 s



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88	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	43200 s to 86400 s	5 s to 24.16 s
89	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	60 s to 900 s	0.06 s to 0.60 s
90	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	900 s to 1800 s	0.60 s to 0.63 s
91	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 Hz to 2 MHz	0.014%
92	MECHANICAL-ACCELERATION AND SPEED	Centrifuge / RPM Measurement	Using Master Tachometer	10 RPM to 12000 RPM	3.5RPM
93	MECHANICAL-ACCELERATION AND SPEED	RPM Meter / Tachometer (Contact)	Using Master Tachometer and RPM Source	10 RPM to 500 RPM	1RPM
94	MECHANICAL-ACCELERATION AND SPEED	RPM Meter / Tachometer (Contact)	Using Master Tachometer and RPM Source	500 RPM to 12000 RPM	3.5RPM
95	MECHANICAL-ACCELERATION AND SPEED	RPM Meter / Tachometer (Non Contact)	Using Master Tachometer and RPM Source	10 RPM to 30 RPM	1RPM



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Site Facility					
1	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	1P & 3P Active Energy @ 50 Hz - UPF to 0.5 PF Lag/Lead (240 V / 0.05 A to 5 A)	Using Accucheck by Direct / Comparison Method	6 Wh to 3.6 kWh	0.36%
2	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Current @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	1 A to 10 A	0.17 % to 0.25 %
3	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Current @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	30 µA to 1 A	0.43 % to 0.17 %
4	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC High Voltage @ 50 Hz	Using HV Probe with Multimeter by Direct Method	1 kV to 27 kV	6.1%
5	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Voltage @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	1 mV to 10 mV	4.81 % to 0.53 %





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6	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Measure)	AC Voltage @ 50 Hz	Using 6½ Digital Multimeter by Direct Method	10 mV to 1000 V	0.53 % to 0.098 %
7	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0.33 A to 1.1 A	4.6 % to 0.22 %
8	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1.1 A to 3 A	3.4 % to 0.19 %
9	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	30 µA to 330 µA	1.69 % to 0.23 %
10	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 10 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 µA to 330 mA	0.231 % to 0.533 %
11	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 50 Hz	Using Fluke Multi-product Calibrator (5522A) with Current Coil by Direct Method	20 A to 1000 A	0.43%



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12	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 50 Hz to 5 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	11 A to 20 A	0.19 % to 3.5 %
13	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Current @ 50 Hz to 5 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	3 A to 11 A	0.19 % to 3.48 %
14	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Power - - 0.2 to UPF (Lead/Lag) @ 50 Hz (100 V to 480 V / 0.01 A to 20 A)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 W to 9.6 kW	0.13 % to 1.16 %
15	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 100 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	3.3 V to 33 V	0.16 % to 0.11 %
16	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 500 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 mV to 33 mV	1.86 % to 0.11 %
17	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 500 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	33 mV to 330 mV	0.52 % to 0.068 %



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18	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 10 Hz to 500 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 mV to 3.3 V	0.04 % to 0.33 %
19	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 50 Hz to 10 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 V to 1000 V	0.026 % to 0.038 %
20	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	AC Voltage @ 50 Hz to 20 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	33 V to 330 V	0.04 % to 0.03 %
21	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Capacitance @ 1 kHz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0.5 nF to 330 nF	3.09 % to 3.90 %
22	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Capacitance @ 100 Hz	Using Fluke Multi-Product calibrator model 5522 A by direct method	0.33 µF to 100 µF	3.9 % to 4.13 %
23	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Inductance @ 1 kHz	Using Decade Inductance Box by Direct Method	100 µH to 1000 mH	1.33 % to 1.16 %





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24	ELECTRO-TECHNICAL-ALTERNATING CURRENT (< 1 GHZ) (Source)	Phase Angle @ 50 Hz	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 ° to 90 °	0.13°
25	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Capacitance	Using 6½ Digital Multimeter by Direct Method	1 µF to 100 mF	1.74 % to 2.43 %
26	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Capacitance	Using 6½ Digital Multimeter by Direct Method	1 nF to 1 µF	5.21 % to 1.74 %
27	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ Digital Multimeter by Direct Method	1 A to 10 A	0.084 % to 0.19 %
28	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ Digital Multimeter by Direct Method	10 µA to 100 mA	0.36 % to 0.065 %
29	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ Digital Multimeter by Direct Method	100 mA to 1 A	0.065 % to 0.084 %



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30	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC High Voltage	Using HV Probe with Multimeter by Direct Method	1 kV to 5 kV	6.10 % to 1.22 %
31	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ Digital Multimeter by Direct Method	1 mV to 10 mV	0.41 % to 0.046 %
32	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ Digital Multimeter by Direct Method	10 mV to 1000 V	0.046 % to 0.011 %
33	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ Digital Multimeter by Direct Method	1 kohm to 10 Mohm	0.025 % to 0.059 %
34	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ Digital Multimeter by Direct Method	1 ohm to 1 k ohm	0.37 % to 0.025 %
35	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ Digital Multimeter by Direct Method	10 Mohm to 1 Gohm	0.059 % to 2.33 %



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36	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 A to 10 A	0.05 % to 0.065 %
37	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 $\mu$ A to 330 $\mu$ A	0.26 % to 0.026 %
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 A to 20 A	0.065 % to 0.39 %
39	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	20 A to 1000 A	0.39 % to 1.43 %
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	3.3 mA to 1.0 A	0.017 % to 0.05 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 $\mu$ A to 3.3 mA	0.026 % to 0.017 %





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42	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Power (10 V to 1000 V / 0.1 A to 20.5 A)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 W to 20 kW	0.14 % to 0.22 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Fluke Multi-product Calibrator (5522A / 5500E) by Direct Method	0.1 mV to 330 mV	1.98 % to 0.01 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Fluke Multi-product Calibrator (5522A / 5500E) by Direct Method	330 mV to 330 V	0.01%
45	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 V to 1000 V	0.01%
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire	Using Fluke Multi-product Calibrator (5522A) by Direct Method	110 Mohm to 1100 Mohm	0.066 % to 1.83 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire & 4 Wire	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0.1 ohm to 330 kohm	0.14 % to 0.01 %



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48	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire & 4 Wire	Using Fluke Multi-product Calibrator (5522A / 5500E) by Direct Method	11 Mohm to 110 Mohm	0.031 % to 0.066 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance - 2 Wire & 4 Wire	Using Fluke Multi-product Calibrator (5522A) by Direct Method	330 kohm to 11 Mohm	0.01 % to 0.031 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 2 Wire	Using Resistance Decade Box by Direct Method	1 ohm to 999 Mohm	0.59 % to 3.31 %
51	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 2 Wire	Using High Resistance Jig (Box) by Direct Method	10 Gohm to 1000 Gohm	2.48 % to 5.9 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 2 Wire	Using Resistance Decade Box by Direct Method	5 Mohm to 10 Gohm	2.31 % to 2.48 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance / Insulation Resistance - 4 Wire	Using 4 Wire Low Resistance Standards by Direct Method	10 µohm to 1 ohm	6.14 % to 1.3 %



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54	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Amplitude (AC @ 1 kHz & 1 MOhm Load)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	10 mV to 70 V	0.6 % to 0.2 %
55	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Bandwidth	Using Fluke Multi-product Calibrator (5522A) by Direct Method	50 kHz to 1 GHz	7%
56	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope - Time Base	Using Fluke Multi-product Calibrator (5522A) by Direct Method	5 ns to 5 s	0.37%
57	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (L Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 900 °C	0.47°C
58	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (S Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.59°C
59	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (B Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	600 °C to 1820 °C	0.54°C





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60	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (C Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 2316 °C	1.02°C
61	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (E Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 1000 °C	0.63°C
62	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (J Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 210 °C to 1200 °C	0.37°C
63	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (K Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1372 °C	0.52°C
64	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (N Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1300 °C	0.53°C
65	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (PT-100)	Using 6½ Digital Multi Meter by Direct Method	(-) 200 °C to 800 °C	0.28°C



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66	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (R Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.65°C
67	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (T Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 400 °C	0.75°C
68	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Calibrator / Universal Calibrator / Multimeter (U Type)	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 600 °C	0.68°C
69	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - R Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.7°C
70	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - E Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 1000 °C	0.6°C
71	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - K Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1372 °C	0.5°C



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72	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - B Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	600 °C to 1820 °C	0.53°C
73	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - C Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 2316 °C	1°C
74	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - J Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 210 °C to 1200 °C	0.33°C
75	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - L Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 900 °C	0.44°C
76	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - N Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 1300 °C	0.5°C





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77	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - PT-100	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 800 °C	0.3°C
78	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder / Universal Calibrator / Calibrator / Multimeter - S Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	0 °C to 1767 °C	0.57°C
79	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder/ Universal Calibrator / Calibrator / Multimeter - T Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 250 °C to 400 °C	0.74°C
80	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Temperature Indicator / Controller / Recorder/ Universal Calibrator / Calibrator / Multimeter - U Type	Using Fluke Multi-product Calibrator (5522A) by Direct Method	(-) 200 °C to 600 °C	0.66°C
81	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6½ Digital Multi Meter by Direct Method	5 Hz to 1 MHz	0.12 % to 0.015 %



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82	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	0.01 s to 1 s	0.002 s to 0.01 s
83	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	1 s to 60 s	0.01 s to 0.06 s
84	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	1800 s to 3600 s	0.63 s to 1.51 s
85	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	3600 s to 43200 s	1.51 s to 5 s
86	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	43200 s to 86400 s	5 s to 24.16 s
87	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	60 s to 900 s	0.06 s to 0.60 s



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88	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time (Timer, Stop Watch)	Using Digital Timer by Comparison Method	900 s to 1800 s	0.60 s to 0.63 s
89	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Fluke Multi-product Calibrator (5522A) by Direct Method	1 Hz to 2 MHz	0.014%
90	FLUID FLOW-FLOW MEASURING DEVICES	Digital or Analog Liquid Flow Meter	Using Hand Hold Clamp on Type Ultra Sonic Flow Meter by Comparison Method	1.8 m <sup>3</sup> /hour to 100 m <sup>3</sup> /hour	2.2%
91	FLUID FLOW-FLOW MEASURING DEVICES	Digital or Analog Liquid Flow Meter	Using Hand Hold Clamp on Type Ultra Sonic Flow Meter by Comparison Method	100 m <sup>3</sup> /hour to 360 m <sup>3</sup> /hour	1.3%
92	MECHANICAL-ACCELERATION AND SPEED	Centrifuge / RPM Measurement	Using Master Tachometer	10 RPM to 12000 RPM	3.5RPM
93	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Bench Center (Co-axiality of Center)	Using Plunger Dial Indicator, Cylindrical Test Mandrel & Taper Mandrel as per IS 5980	0 to 500 mm	6.2µm