

**TENDER SCHEDULE NO:- X/3**

Bill of Quantities/ Schedule of Requirements for TRADE : "ELECTRICIAN "

## LIST OF SHORTFALL OF MACHINERY

DELEVERY POINTS:- ITC Kanyapur, P.O. Asansol :4, Dist. Burdwan, PIN - 713304

Sl.No.	Description of Item with Specification	QtyRequired	UNIT	RATE (Rs)	TOTAL AMOUNT (Rs)	
					In figures	In words
1	Starters for 3 phase , 400v , 50 cycles , 2 to HP AC motor a) Auto Transformer type starter b) Star delta starter with manual , semi auto and automatic c) Direct on line starter	1No.	each			
2	Electrical Machine Trainer (Basic Unit) with flat Demo panel table top rack with set of panels. Essential accessories and following 300W chasis mounted machines (7Nos.) DC machine with swinging stator has torque speed sensor mounted to measure shaft power. a] Integrated DC m/c mounted as Dynamometer & with speed/torque sensor. b] Integrated 3 phase AC 300W m/c chasis mounted c] Integrated 1 phase AC 300W motor chasis mounted d] Integrated 1 phase AC generator & Sync.300W M e] Universal Motor AC/DC, 300W, Chasis mounted f] Repulsion motor chasis mounted g] Squirrel cage 3 phase AC 300W, 2 speed chasis mounted motor.	1Set.	set			
3	MG Set Consisting of Squirrel Case Induction Motor 7HP 400V, 50 cycles with directly coupled DC shunt generator 5 KW 250V with built in panel board laboratory type MG Set should be mounted on a base plate. The Panel Board Consist of : 3-Phase Cir Circuit Breakers Star Delta Starter (Contact type & points) Shuck Field Regulator DC Circuit Breaker	1Set	set			

	<p>Suitable voltmeter on AC &amp; DC side  Suitable line ammeters on AC &amp; DC side  Field Circuit ammeter  Indicating lamps on both the sides (AC &amp; DC)  Accessories: • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual</p>					
4	<p>Motor Generator ( DC to AC ) Set Consisting of :  Motor shunt 5 HP , 440 volts with starting compensator and switch directly coupled to generator AC , 3.5 KVA , 400/230 volts , 3- phase , 4 wire , 0.8 PF 50cycles with exciter and 1 switch board mounted with regulator , circuit breaker , ammeter , voltmeter</p>	1Set	set			
5	<p>Motor Series DC , 220 volt , 0.5 to 2 HP ,  coupled with mechanical load.</p>	1No.	each			
6	<p>DC Shunt Motor 3HP 250V with 3 point starter and speed regulator  Laboratory type Motor should be mounted on a base plate.  The Panel Board Consist of :  <ul style="list-style-type: none"> <li>• 3 Point DC Starter.</li> <li>• Speed Regulator.</li> <li>• Suitable Analog Voltmeter.</li> <li>• Suitable Analog Ammeter.</li> </ul> Accessories: • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual</p>	2Nos.	each			
7	<p>AC Squirrel Case Induction Motor 3HP , 400V with DOL Starter  Laboratory type Motor should be mounted on a base plate.  The Panel Board Consist of :  <ul style="list-style-type: none"> <li>• DOL Starter</li> <li>• Suitable Analog Voltmeter.</li> <li>• Suitable Analog Ammeter.</li> </ul> Accessories : • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual</p>	1No.	each			
8	<p>Motor AC Phase Wound Slip Ring type 5HP 400 volts , 3phase ,  50cycles with starter and switch.</p>	1No.	each			
9	<p>DC Compound 3HP 250V with 4 Point Starter and  Laboratory type Motor should be mounted on a base plate.  The Panel Board Consist of :</p>	2Nos.	each			

	<ul style="list-style-type: none"> <li>• 4 Point DC Starter.</li> <li>• Field Regulator</li> <li>• Suitable Analog Voltmeter.</li> <li>• Suitable Analog Ammeter.</li> </ul> <p>Accessories: • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual</p>					
10	Motor AC Single Phase, 230Volt, 1HP Repulsion type complete with starter and switch.	1No.	each			
11	Motor AC Single Phase 230volt 50 cycles ¼ HP with starter / switch	1No.	each			
12	Motor AC Single Phase 230 volt 50cycles 1 HP capacitor type with starter switch 1 HP	1No.	each			
13	<p>Universal Motor 750W AC/DC 250V Laboratory type Motor should be mounted on a base plate. The Panel Board Consist of :</p> <ul style="list-style-type: none"> <li>• Suitable Analog Voltmeter.</li> <li>• Suitable Analog Ammeter.</li> </ul> <p>Accessories: • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual</p> <p>DC Shunt Motor 3HP 250V with 3 point starter and speed regulator Laboratory type Motor should be mounted on a base plate. The Panel Board Consist of :</p> <ul style="list-style-type: none"> <li>• 3 Point DC Starter.</li> <li>• Speed Regulator.</li> <li>• Suitable Analog Voltmeter.</li> <li>• Suitable Analog Ammeter.</li> </ul> <p>Accessories: • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual</p>	1No.	each			
14	<p>DC Compound 3HP 250V with 4 Point Starter and Laboratory type Motor should be mounted on a base plate. The Panel Board Consist of :</p> <ul style="list-style-type: none"> <li>• 4 Point DC Starter.</li> <li>• Field Regulator</li> <li>• Suitable Analog Voltmeter.</li> <li>• Suitable Analog Ammeter.</li> </ul>	1No.	each			

	Accessories: • Tachometer for Speed Measurement. • The circuit diagram will be supplied with the Motor. • Instruction Manual				
15	<p>Oscilloscope</p> <p>Dual Trace /Double beam 20 MHz</p> <p>Vertical Deflection System</p> <p>Deflection Factor Range: 5mV per Division to 10V per Division in a 1 - 2 - 5 sequence of 11 steps</p> <p>Accuracy: (+) 3% Approx.</p> <p>Variable Control Range: Continuously variable and uncalibrated between step setting. Increases deflection factor by at least 2.5 to 1</p> <p>Bandwidth (-3 db): 20 MHz or more</p> <p>Rise Time: 17.5 nS or less</p> <p>AC Coupled Cut Off Frequency: 10 Hz or less</p> <p>Common Mode Rejection Ratio: At least 10 to 1 at 20 MHz</p> <p>Input Characteristics Direct Input Via 10 : 1 probe</p> <p>Resistance 1 M.Ohms + 2% 10 M.Ohms + 5%</p> <p>Capacitance 30 pF + 5 pF 20 pF + 5 pF</p> <p>Max. Safe Input Voltage (DC or AC Coupled) 400 V ( DC + AC ) Peak</p> <p>Channel Isolation: Greater than 100 : 1 at 10 MHz</p> <p>Visual Delay Time: 40 ns or more</p> <p>Invert Mode: In Channel 2 only</p> <p>Trigger System</p> <p>Trigger Sensitivity (For Auto &amp; Norm. Mode)</p> <p>Internal Signal: 0.1 Div</p> <p>External Signal: 0.2 V p-p</p> <p>TV Field Mode (Composite Sync.)</p> <p>Internal: 2 Div</p> <p>External: 0.3 Div</p> <p>Horizontal Deflection System</p> <p>Sweep Rate: 0.2s per Div to 0.1 Micro Sec per Div in a 1 - 2 - 5 sequence of 20 steps. Magnification extends Max. usable sweep speed to 20ns per Div.</p> <p>Accuracy: ( + ) 3 % Approx.</p> <p>Variable Control: &gt; or = 2.5 : 1</p> <p>Sweep Linearity: ( + ) 10 %</p>	2Nos.	each		

	<p>X-Y Operation  Deflector Factor: 0.2V/div ~0.5V/div  Frequency Bandwidth (-3dB): DC:0~1MHz; AC: 10Hz ~ 1MHz  Calibration Signal  Deflection Factor: 5mV per Division to 10V per Division in a 1 - 2 - 5 sequence of 11 steps  Accuracy: (+) 3% Approx.  Bandwidth: DC to at least 1 MHz  Phase Difference Between X and Y Axis Amplifiers: &lt; 'OR' = 3° from DC to 50 kHz  Z Modulation  Sensitivity: 5V cause noticeable modulation positive going input decreases intensity  Usable Frequency Range: DC - 1 MHz  Max. Safe Input Voltage: 50 V (DC + AC)pk  Input Resistance: 10 K.Ohms  Trace Rotation: Possible  Probe Adjustment Signal Output  Voltage into 1M.Ohms load: 0.5V + 2%  Repetition Rate: 1 KHz + 2%  Wave Form: Square Wave  Cathode Ray Tube  Display Area: 8 Div x 10 Div ( 1 Div = 1 cm )  Nominal Accelerating Voltage: 2 KV  Power Requirement  Line Voltage Range: 220V + 10%  Line Frequency: 50 Hz + 2 Hz  Max. Power Consumption: 40W  Mechanical Characteristics  Weight: 7.2kg  Dimensions: 320mm (L) x 124mm (W) x 380mm (D)</p>					
16	<p>Oil Testing Kit  Confirms to IS 6792, IEC 156  Tests insulating oils to IS, IEC, ASTM, etc.  Test voltage to 0 – 60 kV.</p>	2Nos.	each			

	<p>One piece construction with safety interlock  Test voltage can be held at any level up to maximum  kV meter continues to indicate 'bdv' even after breakdown  Light weight, portable, rugged and reliable  Specifications  Input : 240 V <math>\pm</math>10%, AC, 1Phase, 50/60Hz.  Display : Analog models: 96mm square  Accuracy : <math>\pm</math>4% of full scale deflection/range  Shut down sensitivity in HV circuit : 20mA approx.  Rate of rise of voltage : Motorized sets only: 2kV/second  approx. (<math>\pm</math>20% max.)  Dimension : 50x55x48</p>					
17	<p>Stepper Motor Demonstrator  Features :  Single stepping and free running modes of operation with speed variation  and direction reversal – internal TTL circuit. 360° motion servo –  potentiometer position –  pickup for motor dynamics operation through microprocessor kit –  sample control programs provided.  Stepper Motor Specification  Torque : 2.8 kg – cm  Step Angle : 1.8°  Power : 12 , 1A / Phase  220<math>\pm</math>10% , 50 Hz mains operation Complete in all respects ,  except a measuring CRO High Performance 8085A CPU operating at 3  MHz 4K Powerful monitor firmware in 2732 . includes all standard  commands , codes , functions  and utility sub – routines 4K user RAM 6116  Versatile keyboard / display controller using 8279  Serial I/O lines , 22 parallel lines from 8155 and 24 from 8255 Built in  audio cassette interface 6 digit seven segment LED display.</p>	2Nos.	each			
18	<p>DC Speed Control System  Features and Specifications  • Speed control of a 12V, 4W permanent magnet d.c. motor  • Speed range: 0 to 2000 rpm (typical)</p>	2Nos.	each			

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| <ul style="list-style-type: none"><li>• Opto-interrupter based speed sensing</li><li>• 4-digit speed display in rpm</li><li>• Electronic tachogenerator for feedback</li><li>• Separate unit for motor in a see-through cabinet</li><li>• Smooth, non-contact eddy current brake</li><li>• Built-in 3½ digit DVM for signal measurements</li><li>• 220V±10%, 50Hz mains operation</li><li>• Supporting literature and patch cords included</li></ul> Essential accessory –<br>20MHz CRO |  |  |  |  |  |
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We agree to supply the above goods in accordance with the technical specification as per terms and conditions specified in Tender Notice.

We also confirm that the normal commercial Warrantee/Gurantee of 12 months shall apply to all the offered goods.

We also confirm that we have taken steps to ensure that no person acting for us or on our behalf will engage in corrupt, fraudulent, collusive, coercive or obstructive practice.

We agree to make necessary arrangements of Inspection and Testing of all the above items at places within Kolkata Metropolitan area before dispatch to the consignee.

Signature of Supplier