

**List of instruments/ equipment of Electromechanical Energy Conversion-1 Lab :**

Sr. No.	Name of Item	Short Specs	QTY
1	DC POWER SUPPLY	Mains Supply : 230 V $\pm$ 10%, 50Hz Outputs Variable DC : 0 -180V Fixed DC : 180V Transformer Rating : 2kVA Primary Voltage : 0-230V Secondary Voltage : 0-150V, 0-150V Meters Used Voltmeter (MC) : 300V Ammeter (MC) : 10A Auto Transformer : 270V, 10A MCB : 10 A	1
2	AC / DC LOAD	Mains Supply : AC / DC, 230V $\pm$ 10% Load Range : 0 - 1.2 kW, in steps of 100W Load Type : Resistive (Lamp Load) Ammeter (MI) : 10A	2
3	Three Phase Induction Motor Trainer	The Trainer Should able to demonstrate: <ul style="list-style-type: none"> <li>• Study of Running and Reversing of Three Phase Induction Motor</li> <li>• Study of No Load Test performed in a Three Phase Induction Motor</li> <li>• Study of Block Rotor Test performed in a Three Phase Induction Motor</li> <li>• Measurement of Slip in a Three Phase Induction Motor</li> <li>• Study of Speed-Torque characteristics in a Three phase Induction Motor</li> </ul> Technical Specifications Mains Supply : Three Phase 415 V $\pm$ 10 %, 50 Hz Motor's Specifications Type : Squirrel Cage Rating : 1 HP RPM : 1410 (No Load) Meters used Wattmeters : 1000 W (2 Nos.) Voltmeter (MI) : 500 V Ammeter (MI) : 5 A MCB : 10 A	1
4	Single Phase Induction Motor Trainer	The Trainer Should able to demonstrate: <ul style="list-style-type: none"> <li>• Study of Single Phase Induction Motor</li> <li>• Study of Running and Reversing of Single Phase Induction Motor</li> <li>• Study of the No-Load Test in a Single Phase Induction Motor</li> <li>• Study of the Blocked Rotor Test in a Single</li> </ul>	1

		<p>Phase Induction Motor</p> <ul style="list-style-type: none"> <li>• Study of Load Test of a Single Phase Induction Motor</li> </ul> <p>Specifications:  Mains Supply : 230 V <math>\pm</math>10%, 50 Hz  Induction Motor  Type : Capacitor start  Phase : Single  Current type : AC  Rating : 1 HP  Voltage rating : 230 V <math>\pm</math> 10%  Meters Used  Voltmeter : 0-300 V  Ammeter : 0-10 A  Wattmeter : 1000 W  MCB : 10 A</p>	
5	D.C.Machines Lab.-I	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>• Study of No Load Characteristics (OCC) of DC Shunt Motor</li> <li>• Study of Load Characteristics of separately excited DC Shunt Generator</li> <li>• Study of Speed Control of DC Shunt Motor by field current control and armature voltage control methods</li> <li>• Study of Load Characteristics of separately excited DC Shunt Motor</li> <li>• Study of self excited DC Shunt Motor</li> </ul> <p><u>Technical Specifications</u>  DC Power Supply  Fixed : 180 - 200 V  Variable : 0 - 180/200 V  (Please refer specifications on the motor)  DC Machines  Type : DC Shunt  Rating : 1 HP  RPM : 1500 (No Load)  Meters used  Voltmeter (MC) : 300 V (2 Nos.)  Ammeter (MC) : 1 A (2 Nos.)  Ammeter (MC) : 5 A (2 Nos.)  Tachometer : 20,000 RPM</p>	1
6	Sumpner Test Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>- Study of Polarity Test with Two Single Phase Transformers</li> <li>- Study of Sumpner's Test-Open Circuit Test Short Circuit Test and Determination of the Efficiency and Voltage Regulation of Two Single Phase Transformers.</li> </ul> <p><u>Technical Specifications</u></p>	1

		<p>Mains Supply : 230V <math>\pm</math>10%, 50Hz  Transformers  Rating : 1 kVA  Primary Voltage : 0 - 125 V, 0 - 125 V  Secondary Voltage : 0 - 125 V, 0 - 125 V  Meters Used  Voltmeter (MI) (2Nos.) : 100 V, 300 V  Ammeter (MI) (2Nos.) : 1 A, 10 A  Wattmeter (MI) (2Nos.) : 100 W, 1000 W  Auto Transformer : 270 V, 10 A  MCB : 10 A</p>	
7	D.C.Machines Lab.-II	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>• Speed Control of DC Shunt Motor by Field Current and Armature Voltage Control</li> <li>• Load Characteristics of DC Shunt Motor</li> <li>• N-I Characteristics of DC Shunt Motor</li> <li>• N-V Characteristics of DC Shunt Motor</li> <li>• Study of self excited DC Shunt Motor</li> </ul> <p><u>Technical Specifications</u>  DC Power Supply  Fixed : 180 - 200 V  Variable : 0 - 180/200 V  (Please refer specifications on the motor)  DC Machine  Type : DC Shunt  Rating : 1 HP  RPM : 1500 (No Load)  Meters used  Voltmeter (MC) : 300 V  Ammeter (MC) : 1 A  Ammeter (MC) : 5 A  Tachometer : 20,000 RPM</p>	1
8	Scott Connections Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>• Study of Teaser Transformer</li> <li>• Study of Scott Connection (Three Phase to Two Phase Conversion)</li> </ul> <p>TECHNICAL SPECIFICATIONS:  Input : 415 V AC <math>\pm</math>10%, 50 Hz  Main Transformer  Input Winding : 0 - 200 V (50%) <math>\pm</math>10%, 50 Hz  : 0 - 200 V (50%) <math>\pm</math>10%, 50 Hz  Output Winding : 0 - 230 V <math>\pm</math>10%, 50 Hz  Teaser Transformer  Input Winding : 0 - 115.6 V (28.9%) <math>\pm</math>10%, 50 Hz  : 346.4 V (86.6%) <math>\pm</math>10%, 50 Hz  : 400 V <math>\pm</math>10%, 50 Hz  Output Winding : 0 - 230 V <math>\pm</math>10%, 50 Hz  Step down Transformers (2Nos.)  Input Winding : 0 - 230 V <math>\pm</math>10%, 50Hz</p>	1

		<p>Output Winding : 0 - 18 V <math>\pm</math>10%, 50Hz</p> <p>Meters Used</p> <p>Voltmeter (MI) : 500 V (2 Nos.)</p> <p>Ammeter (MI) : 1 A (2 Nos.)</p>	
9	Three Phase Synchronous Generator Lab	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>To study the Open Circuit Characteristics (OCC) of Three Phase Synchronous Generator</li> <li>To study the short circuit characteristics (SCC) of three Phase Synchronous Generator</li> </ul> <p>Specifications:</p> <p>DC Input supply : Variable, 0-180/200 V Fixed, 180 - 200V</p> <p>Machines Specification (2 Nos.) Both the Machines are Flexibly Coupled and Mounted on a M.S channel Base DC Machine acts as Prime Mover Type : DC Shunt Rating : 2 HP RPM : 1500 (no load) Insulation : Class 'B' Three Phase Synchronous Motor acts as Generator Type : Salient Pole Motor Current type : AC Rating : 3 HP Excitation Voltage : 120 V Voltage rating : 415V <math>\pm</math> 10%</p> <p>Meters Used</p> <p>Ammeter (MC type) : 2 Nos Voltmeter (MC type) : 2 Nos</p>	1
10	Parallel Operation of Two Single Phase Transformer Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>Study of polarity test under two single phase transformers</li> <li>Study of parallel operation of two single phase transformers under equal voltage ratio</li> <li>Study of parallel operation of two single phase transformers under unequal voltage ratio..</li> </ul> <p><u>Technical Specifications :</u></p> <p>Mains supply : 230 V AC <math>\pm</math>10%, 50Hz</p> <p>Transformers (2Nos.) Rating : 1kVA Primary Voltage : 0 - 230 V Secondary Voltage : 0 - 200 - 230 V</p> <p>Meters Used</p> <p>Voltmeter (MI) : 500 V (2 Nos.) Ammeter (MI) : 10 A (2 Nos.) MCB (Single Phase) : 10 A</p>	1

11	Swinburne Test on D.C. Machines Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>- Study and Determine the losses of DC Machine and correspondingly calculate the efficiency of DC Machine by Swinburn's Test Method.</li> </ul> <p>Specifications:  DC Input supply : Variable, 0-180/200 V  Fixed, 180 - 200V  DC Machine Specification  Type : DC Shunt  Rating : 1 HP  RPM : 1500 (no load)  Meters used  Voltmeter (MC type) : 1 No.  Ammeter (MC type) : 1 No.</p>	1
12	Hopkinsons Test on D.C. Machines Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>• Study and obtain the losses separately and correspondingly. Determine the efficiency of a DC Shunt Machine by Hopkinson's test.</li> </ul> <p><b>TECHNICAL SPECIFICATION:</b>  DC Input supply : Variable, 0-180/200 V  Fixed, 180 - 200V  DC Machines Specification (2 Nos.)  Both the Machines are flexibly coupled and mounted on a M.S channel Base acts as a Motor Generator set.  Type : DC Shunt  Rating : 1 HP  RPM : 1500 (no load)  Insulation : Class 'B'  Meters used  Voltmeter : 300 V  Ammeter (2 Nos.) : 1 A, 5 A</p>	1
13	D.C.Series Motor Lab Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>• Study of Operating Characteristics of DC Series Motor</li> <li>• Study of Speed Control of DC Series Motor using Field Current Control</li> <li>• Study of Speed Control of DC Series Motor using Armature Voltage Control</li> </ul> <p><u>Technical Specifications</u>  DC Input Voltage : Variable, 0-180/200 V  Fixed, 180 - 200V  DC Machine  Type : DC Series  Rating : 1 HP  RPM : 1500 RPM</p> <p>Meters used  Voltmeter (MC) : 300 V (1 No.)  Ammeter (MC) : 5 A (2 Nos.)  Tachometer : 20,000 RPM</p>	1

14	Three Phase Synchronus Motor Lab Trainer	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>- To study the Inverse V curve of the Three Phase Synchronous Motor</li> <li>- To study the V curve of Three Phase Synchronous Motor</li> </ul> <p><u>Technical Specifications</u>  Mains Supply : Three Phase  415V <math>\pm</math>10%, 50Hz  Machines Specification (2 Nos.)  Both the Machines are flexibly coupled and mounted on a M.S channel base.  Three Phase Synchronous Motor  Type : Salient Pole Motor  Current type : AC  Rating : 3 HP  Excitation Voltage : 120 V  Voltage rating : 415 V <math>\pm</math> 10%  DC Machine  Type : DC Shunt  Rating : 2 HP  Voltage Rating : 200 V  RPM : 1500 (no load)  Insulation : Class 'B'  Meters Used  Ammeter(MC type) : 2 Nos  Voltmeter (MC type) : 2 Nos  Wattmeter : 2 Nos  Three Phase MCB : 10 A</p>	1
15	Ward-Leonard Method of speed control Trainer for D.C. Motor	<p>The Trainer Should able to demonstrate:</p> <ul style="list-style-type: none"> <li>- To study the speed control of Separately Excited DC Shunt Motor in either direction by Ward Leonard Method.</li> </ul> <p><u>Technical Specifications</u>  Input mains Supply : Three Phase 415V, <math>\pm</math>10%, 50Hz  Machines Specification (2 Nos.)  Both the Machines are flexibly coupled and mounted on a M.S.channel base acts as a Motor Generator set.  AC Three Phase Squirrel Cage Induction Motor acts as a Prime Mover  Rating : 1 HP  Voltage Rating : 415 V  RPM : 1440 (No Load)  Insulation : Class 'B'  DC Shunt Motor  Rating : 1 HP  Voltage Rating : 200 V  RPM : 1500 (No Load)  Insulation : Class 'B'  Extra D.C. Shunt Motor 200 V for which the speed can be Controlled using Motor Generator set.  Rating : 1/2 HP  Voltage Rating : 200 V</p>	1

		RPM : 1500 (No Load) Insulation : Class 'B' Meters used Voltmeter (MC) : 1 Nos. Ammeter (MC) : 2 Nos.	
16	D.C.Compound Motor Lab Trainer	The Trainer Should able to demonstrate: <ul style="list-style-type: none"> <li>• Cha. Of Short shunt compound motor</li> <li>• Cha. Of Long shunt compound Motor</li> </ul> <b>TECHNICAL SPECIFICATIONS:</b> DC Input supply : Variable, 0-180/200 V Fixed, 180 - 200V  Type: Compound, 1 HP ,1500 RPM, INSU;Class B	1
17	Induction motor-Compound Generator Lab Trainer	The Trainer Should able to demonstrate: <ul style="list-style-type: none"> <li>• Study &amp; Verify Load cha. Of Long shunt cumulative compound generator</li> <li>• Study &amp; Verify Load cha. Of short shunt cumulative compound generator</li> <li>• Study &amp; Verify Load cha. Of Long shunt differentially compound generator</li> <li>• Study &amp; Verify Load cha. Of short shunt differentially compound generator</li> </ul> <b>TECHNICAL SPECIFICATIONS:</b> Input supply : 3-Ph,415 V,50 Hz Both the machines shall be common C channel Mounted IM: 2HP,1440rpm,3-Ph,Class-B, Sq.Cage DC M/C:Compound, 1 HP, 1500 RPM, Class B With appropriate meters mounted on the panel	1
18	Shunt motor – Series Generator Lab.	The Trainer Should able to demonstrate: <ul style="list-style-type: none"> <li>• Study and Verification of No-load Cha. Of d.c series generator</li> <li>• Study and Verification of load Cha. Of d.c series generator</li> </ul> <b>Technical Specifications:</b> DC Input Voltage : Variable, 0-180/200 V Fixed, 180 - 200V Both the machines shall be flexibly coupled with common mounting on a “c” channel DC Motor: 1 HP, Shunt, 1500 RPM, Class B DC Generator: 1 HP, Series, 1500 RPM, Class B	1
19	Digital Multi-meters ( Make: Fluke , Any model meeting the requirements)	0-500-1000 Volts AC/DC , 0-10 A AC/DC, Continuity Tester & Other regular Features	6
20	Digital Clip-on Meter/Tong Tester (For AC / DC)	0-500 Volts AC/DC , 0-50 A AC/DC, Continuity Tester & Other regular Features	1
21	Megger (Handheld-Analog)(IR – Tester)	500 V-1kV	1
22	Megger (Automatic-Digital)(IR – Tester)	500 V-1KV	1

23	Charts for Electrical Machines	-	-
24	Screw Driver Set	-	2
25	Supply Tester	500 Volts AC / DC	2