

ELECTRICAL MACHINES LAB

The Electrical Machines Laboratory is designed to support the theory study for Electromechanical Devices. The objective of this course is to supplement the theory with suitable practical experiments. This Lab Concerns with electrical machines types (DC and AC machines), power, efficiency, characteristics of electrical machines as a motor, generator, determining the parameters and performance characteristics of transformer, methods of control of the speed of motor, control of the generator voltage etc. Through hands-on experiments with real machines, students gain practical experience on transformers and various types of machine drives. The laboratory can also be used for project work related to electrical machines and energy conversion.



Area sqm : 270

Establishment year : 1998

Total Lab cost : Rs. 44,35,729-00

Major Equipment

| NAME OF EQUIPMENT | QTY |
|---|------|
| Regulated DC power supply: With DC stabilizer output rectify unit with on protections, MC meters unit is provided with heavy duty mains Transformer and Full wave rectifier, stabilizer & feed back assembly Ratings: 220v/100 Amps-DC continuous duty-Ripple less than 5%, Regulation-Better than 4% Input voltage-415v, AC, 3 phases. MAKE:ITL | 1No. |
| Distribution panel board for 3-phase A.C and 220-Volts D.C. Supply Consists of the following <ul style="list-style-type: none"> • 3-phase input on/off main switch unit with HRC fuses 125A. • 3-phase on/off switch unit with HRC fuses 63A. • RYB indicating lamps • Analog meters for input voltage For input frequency And output current ammeter • 3-phase distribution points through on /off rotary switch and MCB • D.C. 220 v input on/off through MCB of 63 A • D.C. distribution points through on/off rotary switch and MCB • Analog meters D.C. Volt meter D.C. Ammeter | 1Nos |
| 3.7KW/220V, DC Shunt motor Make: KIRLOSKAR | 2Nos |
| 3.7KW/220V.DC Compound motor Make: KIRLOSKAR | 1Nos |
| 3.5KW DC Compound motor coupled to DC Compound generator set Make: KIRLOSKAR Make | 1Nos |
| 3.5KW/220V/1500RPM DC Series motor coupled to 3.5KW. DC Series generator set make: KIRLOSKAR | 1Nos |
| 3.5KW/220V/1500RPM DC Shunt motor coupled to 3.5KW. DC Shunt generator set make: KIRLOSKAR | 2Nos |
| 3 phase 5HP Squirrel cage induction motor make: KIRLOSKAR | 2Nos |
| 3.5KW/220V/1500RPM DC Shunt motor coupled to 3.5KW. DC Shunt generator make: KIRLOSKAR | 1Nos |
| 3 phase 5KVA Alternator coupled to 5.2KW DC compound motor set make: KIRLOSKAR | 2Nos |
| 3 phase 5HP Slip ring induction motor make: Bharathbijilee | 1Nos |
| SINGLE PHASE INDUCTION MOTOR make: Crompton Greaves | 1Nos |
| 3 PHASE 5 KVA SYNCHRONOUS MOTOR make: KIRLOSKAR | 1Nos |
| 5HP DC Shunt motor MAKE- BENN | 2Nos |
| 3.7KW DC shunt motor coupled to DC shunt generator set. MAKE- BENN | 1Nos |

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| 3 phase 5KVA, Alternator coupled 7.5HP DC compound motor set MAKE- BENN | 1Nos |
| 1H.P Working Cut Machine for DC Shunt Motor. (Benn) | 1Nos |
| 1H.P 3Phase Synchronous M/C Working Cut Machine. (Benn) | 1Nos |
| 1H.P Working Cut Machine 3Phase Squirrel cage induction motor. (Benn) | 1Nos |
| Winding Study Motor-1H.P/415V/3ph. SQIM with 72 Terminals with Patch cords and BDA (make: Benn Electricals) | 1Nos |
| Rotary machine test bench for investigating operation Principles & performances characteristics of AC and DC rotary machines (Make: Emsys Tech.) | 1Nos |
| Universal Electrical work station (Meters and maintenance for universal electrical work station as recurring items) | 1Nos |

LIST OF EXPERIMENTS

- Predetermination of Efficiency & Regulation of 1-phase transformer
- Predetermination of Efficiency & Regulation of two identical 1-phase transformers
- Determination of Efficiency & Regulation of 1-phase Transformer by direct test
- Conversion of Three phase to two phase by using two identical transformers
- Determination of Stray losses in a DC Shunt Motor by Retardation test
- Determination of critical resistance and critical speed of D.C. shunt generator
- Predetermination of Efficiency of D.C. shunt machine & Speed control of D.C. shunt motor
- Performance characteristics of D.C. shunt motor
- Determination of efficiency of DC shunt machine by conducting back to back test
- Separation of stray losses in a D.C. shunt motor
- Load characteristics of a separately excited D.C. Generator
- Calculation of voltage regulation for a 1-phase transformer using lab-view
- Performance characteristics of squirrel cage induction motor.
- Regulation of 3-phase alternator by synchronous impedance & MMF method
- Separation of core losses in a Single Phase Transformer
- Plot the circle diagram of three-phase induction motor
- Plot the V & inverted V curves of a synchronous motor
- Calculation of equivalent circuit parameters for a single-phase induction motor
- Regulation of three-phase alternator by ZPF Method

- Determination of efficiency and regulation of three-phase alternator by direct test
- Performance characteristics of single phase induction motor
- Performance characteristics of three-phase slip ring induction motor
- Calculation of direct and quadrature axis reactances of a salient pole synchronous machine
- Torque-Speed characteristics of Induction motors using Lab- view
- Speed control of Induction motor using MATLAB / Simulink
- Demonstration of high rating synchronous machine with soft starter using software tool.

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