

DC MACHINES LABORATORY

Course Objective:

- To obtain the characteristics of DC motors and generators by performing brake tests and load tests respectively.

Course Outcomes:

CO 1: Estimate the critical field resistance and critical speed of DC generator

CO 2: Determine the efficiency of a given DC Shunt machine

CO 3: Obtain the performance characteristics of DC generator and evaluate the speed control characteristics of DC shunt motor.

CO 4: Determine the efficiencies of DC machines.

LIST OF EXPERIMENTS

Any Ten of the experiments from the following are to be conducted.

S.No.	Title of the Experiment
1	Magnetization Characteristics of DC Shunt Generator. Determination of critical field resistance and critical speed.
2	Load Test on DC Shunt Generator. Determination of Characteristics.
3	Load Test on DC Series Generator. Determination of Characteristics
4	Load Test on DC Compound Generator. Determination of Characteristics
5	Hopkinson's Test on DC Shunts Machines. Predetermination of efficiency
6	Field's test on DC Series Machines. Determination of efficiency
7	Swinburne's Test and Predetermination of efficiencies as Generator and Motor
8	Brake Test on DC compound motor. Determination of performance curves
9	Brake Test on DC shunt motor. Determination of Performance curves
10	Separation of losses in DC shunt motor

Additional Experiments

11	Speed Control of DC shunt Motor by Field and Armature control
12	Internal & External Characteristics of a DC Shunt Generator

List of Equipment with cost

S.NO.	NAME OF THE EQUIPMENT	QUANTITY	COST
1	DC Shunt Motor coupled Shunt Generator with base plate. Motor: 220V, 5HP, 19A, 1500 RPM. Generator:220V,3KW,13.5A,1500 RPM, Field regulator for motor, Field regulator for generator, 3 point Starter	2	50,679.00
2	DC Compound Motor coupled DC Compound Generator with base plate. Motor: 220V, 9A,1500 RPM, Generator: 220V, 9KW, 1500RPM, Field regulator for motor, Field regulator for generator, 4 point Starter	1	37,530.00
3	DC Compound Motor coupled DC Series Generator with base plate, Motor: 220V, 9A, 1500 RPM, Generator:220V, 2KW, 1500RPM, Field regulator for motor, Field regulator for generator, 4 point Starter	1	38,197.00
4	DC Series Motor coupled DC Series Generator with base plate, Motor: 220V,9A,1500RPM, Field regulator for motor, Field regulator for generator,2 point Starter	1	40,750.00
5	DC Shunt Motor coupled Shunt Generator with base plate,Motor:220V,1500RPM, Generator:220V,2KW,1500RPM, Field regulator for motor, Field regulator for generator, 3 point Starter	1	38,840.00
6	DC Shunt Motor 3HP, 220V, 1500RPM with brake drum arrangement, Field regulator, 3-point Starter	3	1,47,453.00
7	DC Compound Motor 3 HP,220 V,1500 RPM with brake drum arrangement, Field regulator, 4-point Starter	1	24,653.00
8	DC Series Motor 3 HP, 220 V, 12 A, 1500 RPM with brake drum arrangement, Field regulator, 2-point Starter	1	26,800.00
9	DC shunt Motor-Shunt Generator panel board with indicating lamps (2.6W, 250V) 3 pole MCB, fuses (15A) 3-No. Rectifier from 3 phase, Variable RPM meter (0-2000) RPM, Ammeter (0-2A MC), (0-20A MC)	2	52,000.00
10	DC Compound Motor-Compound Generator panel board with Indicating lamps (2.6W, 250V), 3 pole MCB. Fuses (15A) 3-No., Rectifier from 3-phase, Variable RPM meter (0-2000) RPM. Ammeter (0-20A) MC, (0-2A) MC	1	25,500.00
11	DC Compound Motor-Series Generator panel board with Indicating lamps (2.6W, 250V) 3 pole MCB, Fuses (15A) 3-No. Rectifier from 3 phase, Variable RPM meter (0-2000) RPM. Ammeter (0-20A) MC, Voltmeter (0-300V) MC, Field rheostat for motor 200Ω/2A	1	25,500.00
12	DC Series Motor-Series Generator panel board with indicating lamps(2.6W,250V) 3 poles MCB, Fuses(15A) 3-No., Rectifier from 3-phase, Variable RPM meter (0-2000) RPM, Ammeter (0-20A) MC, Voltmeter (0-300V) MC, Field rheostat for motor 200Ω/2A	1	30,000.00

13	DC Shunt Motor-Shunt Generator panel board with indicating lamps (2.6W, 250V) 3 poles MCB, Fuses(15A) 3-No., Rectifier from 3-phase, Variable RPM meter (0-2000) RPM, Ammeter (0-20A) MC, Voltmeter (0-300V) MC, field rheostat for motor 200Ω/2A	1	30,000.00
14	DC Shunt Motor panel board, 3-point starter, indicating lamps (2.6W, 250V), 2-Pole MCB, Fuses (15A) 3-No., RPM meter (0-2000)RPM, Ammeter(0-20A)MC, (0-2A)MC, Voltmeter(0-300V)MC, (0-30V)MC	2	28,000.00
15	DC Shunt Motor panel board with 3-point starter, Indicating lamps (2.6W, 250V), 2 pole MCB, Fuses (15A) 3-No., RPM meter (0-2000)RPM, Ammeter (0-20A)MC, (0-2A)MC, Voltmeter (0-300V)MC,(0-30V)MC	1	26,000.00
16	DC Compound Motor panel board with 4 point starter and Field regulator, indicating lamps (2.6W, 250V) 2-Poles MCB, Fuses (15A) 20 No. RPM meter (0-2000) RPM, Ammeter(0-20A) MC, (0-2A) MC, Voltmeter (0-300V)MC	1	14,000.00
17	DC Machines Lab control panel with indicating lamps 4 No., Ammeter (MC) (0-100A), (MI) (0-100A), Voltmeter (MI) (0-500V) (MI)(0-300V). Frequency meter (45-55) Hz, selector switch-2-No. S.F.U-2-No., 3 pole MCB 15-No., 2-Poles MCB 15-No.	1	14,000.00
18	DC voltmeter (0-300V)	6	6,210.00
19	DC voltmeter (0-50V)	10	10,800.00
20	DC voltmeter (0-75/150V)	12	12,600.00
21	DC voltmeter (0-75/150/300/600V) (MC)	23	23,805.00
22	Knife switches:		
	SPST	10	3,400.00
	DPDT	10	8,710.00
	SPDT	5	2,165.00
	TPDT	5	6,545.00
	TPST	3	3,111.00
Total			RS.7,27,248.00