

## AC MACHINES LAB

### Course Objective:

- To perform OC and SC test and Sumpner's test on single phase transformer and asses their performance.
- To conduct No-load & Blocked rotor tests and Brake test on three phase Induction motor
- To predetermine the regulation of three-phase alternator by synchronous impedance method
- To obtain the performance curves of three-phase synchronous machine

### Course Outcomes:

CO1: Estimate the efficiency and regulation of single phase transformer

CO2: Obtain performance characteristics of three-phase and single phase Induction motors

CO3: Evaluate the regulation of three-phase alternator by different methods

CO4: Determine  $X_d$  &  $X_q$  and V & Inverted V curves of a synchronous machine

S. No	Name of the Experiment
1	O.C & S.C tests on a single phase transformer
2	Sumpner's test on single phase transformers
3	Scott connection of transformers
4	No- load and Blocked rotor tests on three phase Induction motor
5	Regulation of a three phase alternator by synchronous impedance & m.m.f methods
6	'V' and 'Inverted V' curves of synchronous motor
7	Equivalent circuit of a single phase Induction motor
8	Determination of $X_d$ and $X_q$ of salient pole synchronous motor
9	Brake test on three phase Induction motor
10	Parallel operation of single phase transformers
<b>Additional Experiments</b>	
11	Separation of core losses of a single phase transformer
12	Measurement of sequence impedance of a three phase alternator

**List of Equipments with cost**

S.NO.	NAME OF THE EQUIPMENT	QUANTITY	COST
1	3-phase Induction Motor squirrel cage type, with brake drum arrangement, star delta starters, A.C, 440V, 50Hz 5 H.P, 8A, 1400 r.p.m.(p) Ltd. MAKE: BENN ELECTRICALS	1	23,012.50
2	3-phase Induction Motor slip ring type, with brake drum arrangement, Rotor resistance starter. A.C, 440V, 50Hz, 5 H.P, 8A, 1400 r.p.m. MAKE: BENN ELECTRICALS (p) ltd.	1	39,296.30
3	DC Shunt Motor coupled to Alternator with base plate, Motor: DC, 220V, 5HP, 18A, 1500 r.p.m. Alternator: 3KVA, 400V, 8A, 1500 r.p.m, Field regulator for motor & 3-point starter, static excitation unit. MAKE: BENN ELECTRICALS(P) LTD.	1	55,557.20
4	DC Shunt Motor coupled to Alternator with base plate, Field regulator for motor, 3-point starter, static excitation unit AC 3Φ, 400V, 50Hz, 8A, 1500 rpm	1	56,580.00
5	Synchronous Motor, 3 H.P, 415V, 3-Φ, 50Hz, 1500 r.p.m, Synchronous motor frame (rotor wound stator excited) suitable for DOL starter with 4 wires mechanical loading, excitation unit.	1	40,680.00
6	1-Φ, Induction Motor with brake drum, spring balances, 1H.P, 1-Φ, 230V, 1440r.p.m. 50Hz, AC, Induction Motor capacitor start & run motor	1	16,190.00
7	Pole-changing Inductor Motor with drum arrangement AC-3-Φ, 50Hz, 450V, 1.5 KW.	1	19,930.00
8	DC Compound Motor coupled to a 3-Φ Induction Motor, AC, 50Hz, 415V, 5 H.P, 1500 r.p.m.	1	30,740.00
9	3-Φ squirrel cage Induction Motor panel board with Y/Δ starter. Indicating lamps-3. 3 pole M.C.B (16A, 600V)-1No. Fuses(10A)-3No., R.P.M. meter (0-2000 rpm) Ammeters (0-10A) MI-1No., Voltmeter (0-500V) MI-1No., Waltmeter 600V/10A-2No. separates terminals for each component	1	23,000.00
10	Shunt Motor coupled to Alternator panel board with indicating lamp-1, 3 pole M.C.B. -16A, 600V-1 Fuses(10A)-3, R.P.M. meter (0-2000 rpm) Ammeter (0-20A(MI)-1, Voltmeter 0-500V(MI)-1, Wattmeters 600V/10A-2,Field rheostats for motor-1, Separate terminals for each component.	1	25,000.00

11	Salient pole Alternator panel board with indicating lamp-1No., Fuses-3 No., MCB-1No., Ammeter-20A, Voltmeter -500V, Ammeter-2A , DC RPM meter separate terminal for each component	1	32,000.00
12	Transformer indicating lamps-1, 3-pole MCB-16A, 600V-1, Fuses-10A-2, Ammeters(MI) (0-10A)-1 , (0-5A)-1, Voltmeters (MI) (0-300V)-1, Wattmeters (300V/2.5A)-1, (75V/5A)-1, Separate terminals for each component	1	23,000.00
13	Scott connected Transformer indicating lamp (2.6W, 250V, AC/DC):-1 No.	1	23,000.00
14	Synchronous motor indicating lamp (26W, 250V AC/DC) 3No., 3 pole MCB (415V, 20A,50Hz) 1No. Fuses (10A)-3 No., RPM meters (0-2000 rpm) -1, Ammeters(0-15A) MI-1, (0-5A) MI- 1 , Voltmeters (0-300V) MI -1, Frequency meter (45-55HZ) -1, Wattmeters (300V/5A)- 1, Field rheostat (600Ω/2A)- 1, Separate terminals for each component	1	22,000.00
15	Changing I.M. indicating lamps -3No., 3 pole MCB-1No., RPM meter -1No.(0-2000), Ammeters (0-10A) MI -1, Voltmeters (0-500V) MI-1, Wattmeters (600V/10A) -2, Separate terminals for each component	--	12,000.00
16	DC Machines control panel with indicating lamps-4 ammeters (mc) (0-100A)-1 (MI) (0-100A)-1 voltmeters (MI) (0-500V)-1 (MC) (0-300V)-1 frequency meters (45-55Hz)-1 selector switches-2 S.F.U-2, 3 pole MCB-15, 2 pole MCB-15, CT-1 set, PT-1 set, Busbar-1	1	32,000.00
17	A.C. Machine control panel indicating lamps-3 Ammeters (MI) (0-100A)-1, Voltmeter (MI) (0-500V)-1, Frequency meters (45-55Hz)-1, Selector switches-2 S.F.U-1, 3 pole MCB-12 ,CT-1 set, PT-1 set, Bus bar-1	1	32,000.00
18	Ammeters -A.C ,(0-20)A	2	2000 .00
	0-10A	4	4000.00
	0-5A	3	3000.00
	0-2A	4	4000.00
	0-1A	2	2,270.00
19	Ammeter (0-2.5/5/10A)	12	12,420.00
20	Voltmeter (0-300V)	1	1,000.00
21	Voltmeter (0-600V)	3	3,000.00
22	Voltmeter (0-50V)	2	2,000.00
23	Voltmeter (0-250V)	3	3,240.00
24	Voltmeter (0-50V)	1	1,015.00
25	Voltmeter (0-75/150/300/600V)	14	14,490.00
26	Wattmeter (75V/5A )	2	3,300.00
27	Wattmeter (75/150V,10A )	3	5,197.50
28	Wattmeter (600V,10A)	2	6,900.00

29	Wattmeter (600V,20A)	1	3,450.00
30	Wattmeter (75V/15A/300V/5/10A )	6	11,340.00
31	Wattmeter (150/300/600V, 5/10A)	6	21,384.00
32	Wattmeter(75/150/300,2.5/5A)	5	19,775.00
33	P.F meter (5/10A, 100/300/600V)	1	2,756.00
34	1- $\Phi$ Auto transformer 15A, 0-270V	1	3,588.00
35	3- $\Phi$ auto transformer 15A, 0-470V	2	20,080.00
36	1- $\Phi$ auto transformer 15A, 230V/0-270V	1	3,588.00
37	1- $\Phi$ auto transformer 8A, 230V/0-270V	2	4,202.00
38	1- $\Phi$ auto transformer 10A, 230V/0-270V	1	2,467.00
39	3- $\Phi$ auto transformer 15A, 0-470V	1	12,337.00
40	Transformer 1- $\Phi$ 230V/115V, 2KVA	2	12,824.40
41	Transformer 1- $\Phi$ 230V/115V, 1KVA	2	7,529.80
42	Transformer 1- $\Phi$ 230V/115V, 2KVA	2	16,400.00
43	Scott transformer with scott tapping at 50% & 89.69% on HV side 3.5% regulation 1 KVA 230V/115V	2	9,800.00
44	Transformer 1KVA 230V/115V	1	5,500.00
45	STEP down transformer 1- $\Phi$ , 2 K.V.A	2	13,000.00
46	Digital tachometers	3	5,940.00
47	Frequency meter indication read type	1	1,741.00
48	Frequency meter vibrating type read type	1	1,741.00
49	Synchroscope	1	3,753.00
50	Phase sequence meter	1	523.00
<b>Total</b>			<b>757537.00</b>