List of Experiments:

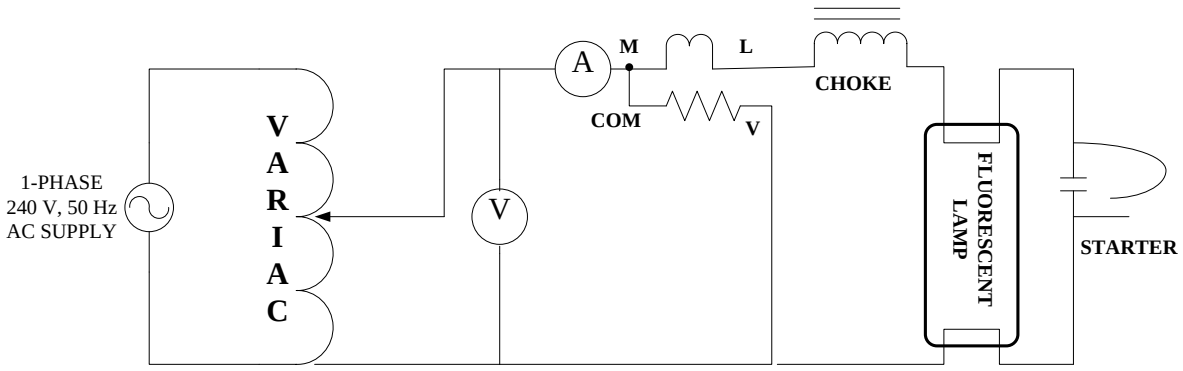
1. Characteristics of Fluorescent lamp
2. Characteristics of Tungsten & Carbon Filament lamp
3. Verification of Superposition Theorem
4. Verification of Thevenin's Theorem
5. Verification of Norton's Theorem
6. Calibration of Ammeter & Voltmeter
7. Starting & Reversing of DC shunt motor
8. Study of series RLC circuit
9. Calibration of Energy meter
10. Y-Δ relation of 3-phase Electrical Network
11. OC and SC test of 1-phase transformer

Experiment no: 1

Title: Characteristics of Fluorescent lamp

Objective: To understand the operation and characteristics of fluorescent lamp

Circuit Diagram:



Circuit diagram for Fluorescent Lamp

Data Table

Sl no	**Increasing Voltage**				**Decreasing Voltage**			
	Striking Voltage=				**Cut-off voltage=**			
	Supply voltage in V	Current in A	Power in W	Power factor $\cos\emptyset = W/(V \times I)$	Supply voltage in V	Current in A	Power in W	Power factor $\cos\emptyset = W/(V \times I)$
1								
2								
3								
4								
5								
6								

Discussion

1. Plot Power factor versus Voltage curve
2. Explain role of starter and choke

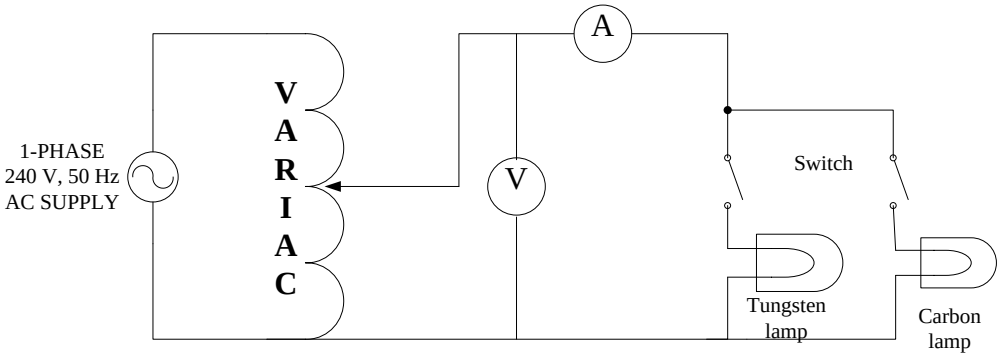
Student Name: Signature of the teacher
Student Roll No:
Signature:

Experiment no: 2

Title: Characteristics of Tungsten & Carbon filament lamp

Objective: To understand the working & characteristics of Tungsten & Carbon filament lamps as well as their nature of resistivity.

Circuit Diagram:



Circuit diagram for Tungsten, Carbon filament lamp

Data Table:

Sl no	Tungsten lamp			Carbon lamp		
	Voltage (V)	Current (A)	Impedance (Ω)	Voltage (V)	Current (A)	Impedance (Ω)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Discussion

1. Plot Impedance v Voltage curve for both the lamps
2. Discuss the difference between two lamps

Student Name: Signature of the teacher
Student Roll No:
Signature:

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Basic Electrical Engineering Laboratory
EENUGES02

Experiment no: 3

Title: Verification of Superposition theorem

Objective: To verify the superposition theorem for linear responses in a multisource DC circuit

Circuit Diagram:

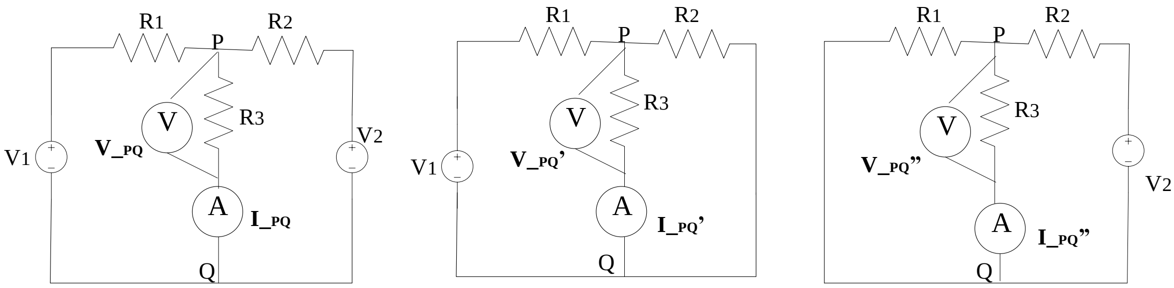


Fig 1 Fig 2 Fig 3

Circuit diagram for verification of Superposition theorem

Data Table

V1 = , V2 = , R1 = , R2 = , R3 =

V_{PQ}	I_{PQ}	V_{PQ}'	I_{PQ}'	V_{PQ}''	I_{PQ}''	V_{PQ}' + V_{PQ}''	I_{PQ}' + I_{PQ}''

V1 = , V2 = , R1 = , R2 = , R3 =

V_{PQ}	I_{PQ}	V_{PQ}'	I_{PQ}'	V_{PQ}''	I_{PQ}''	V_{PQ}' + V_{PQ}''	I_{PQ}' + I_{PQ}''

V1 = , V2 = , R1 = , R2 = , R3 =

V_{PQ}	I_{PQ}	V_{PQ}'	I_{PQ}'	V_{PQ}''	I_{PQ}''	V_{PQ}' + V_{PQ}''	I_{PQ}' + I_{PQ}''

Discussion:

Calculate current flowing through and voltage across R_3 using theoretical calculations.

Student Name: Signature of the teacher

Student Roll No:

Signature:

Experiment no: 4

Title: Verification of Thevenin's theorem

Objective: To verify the Thevenin's Theorem in a linear DC circuit.

Circuit Diagram:

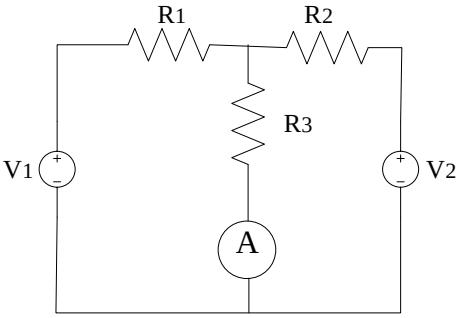


Fig 1

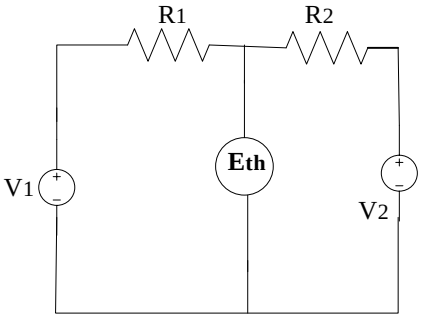


Fig 2

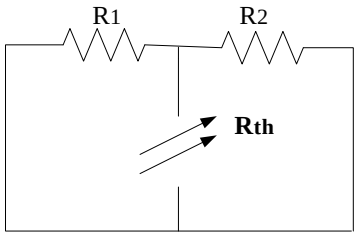


Fig 3

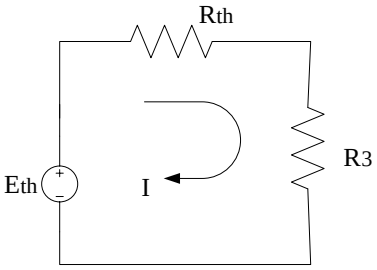


Fig 4

Circuit diagram for verification of Thevenin's theorem

Data table

V_1 =	**As per Fig 1:** $I_{measured}$=	Verification **As per Fig 4** $I_{verified}$= E_{th} /(R_{th} + R_3)	% Error= 100 ×($I_{measured}$ – $I_{verifired}$)/ $I_{measured}$
V_2 =			
R_1 =	**As per Fig 2:** E_{th} =		
R_2 =			
R_3 =	**As per Fig 3:** R_{th}=		

Discussion:
Verify all steps through theoretical calculations.

Student Name: Signature of the teacher
Student Roll No:
Signature:

Experiment no: 5

Title: Verification of Norton's theorem

Objective: To verify the Norton's Theorem in a linear DC circuit

Circuit Diagram:

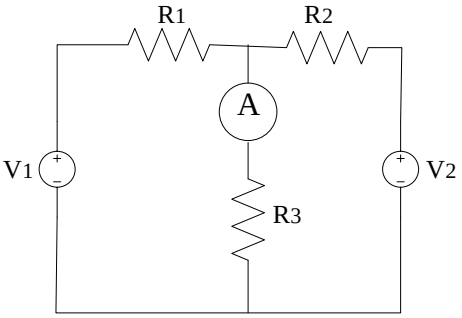


Fig 1

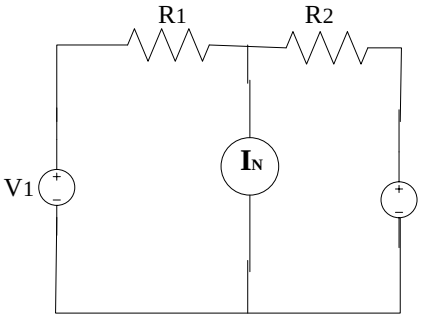


Fig 2

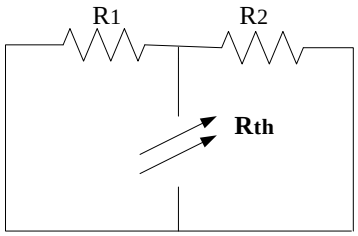


Fig 3

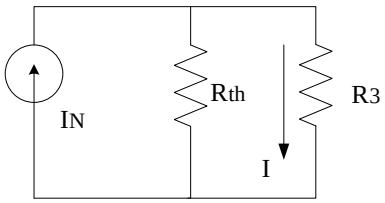


Fig 4

Circuit diagram for verification of Norton's theorem

Data table:

V_1 =	**As per Fig 1:** $I_{measured}$=	Verification **As per Fig 4** $I_{verified}$= $(I_N \times R_{th})$ $/(R_{th} + R_3)$	% Error= 100 ×$(I_{measured} - I_{verifired})$/ $I_{measured}$
V_2 =			
R_1 =	**As per Fig 2:** I_N =		
R_2 =			
R_3 =	**As per Fig 3:** R_{th}=		

Discussion:
Verify all steps through theoretical calculations.

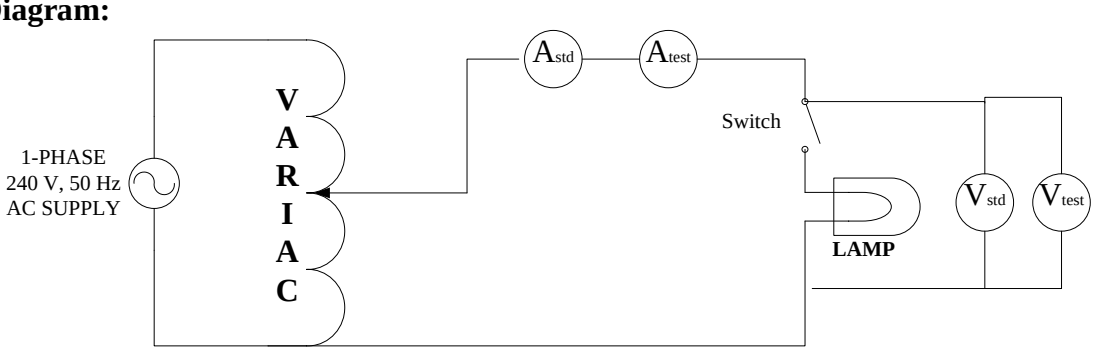
Student Name: Signature of the teacher
Student Roll No:
Signature:

Experiment no: 6

Title: Calibration of Ammeter & Voltmeter

Objective: To find the error in measurement in test meters by checking them against standard meters.

Circuit Diagram:



Circuit diagram for Calibration of Ammeter & Voltmeter

Data Table:

Sl no	Standard Voltage in V (V_{std})	Test Voltage in V (V_{test})	% Error = (100 × (V_{std} - V_{test})/V_{test})	Standard Current in A (I_{std})	Test Current in I (I_{test})	% Error = (100 × (I_{std} - I_{test})/I_{test})
1						
2						
3						
4						
5						
6						
7						

Discussion

Plot (I) Error versus I_{test}, (II) Error versus V_{test}.

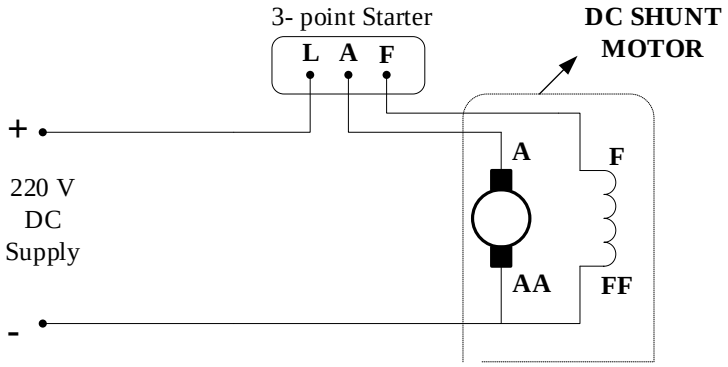
Student Name: Signature of the teacher
Student Roll No:
Signature:

Experiment no: 7

Title: Starting & Reversing of DC shunt motor

Objective: To learn about the starter(s) of a DC motor as well as see its working. Also, learn about the effect of various terminals changes on the direction of the DC motor.

Circuit Diagram:



A - AA: Armature terminal
F - FF: Field terminal
Circuit Diagram for DC Shunt Motor Starting

Data Table:

Scheme	Direction of Rotation (CW/ CCW)	Speed in rpm
Original		
Armature is reversed		
Field is reversed		
Armature & Field both are reversed		
Supply terminal is reversed		

Discussion
Explain Function of 3-point starter.

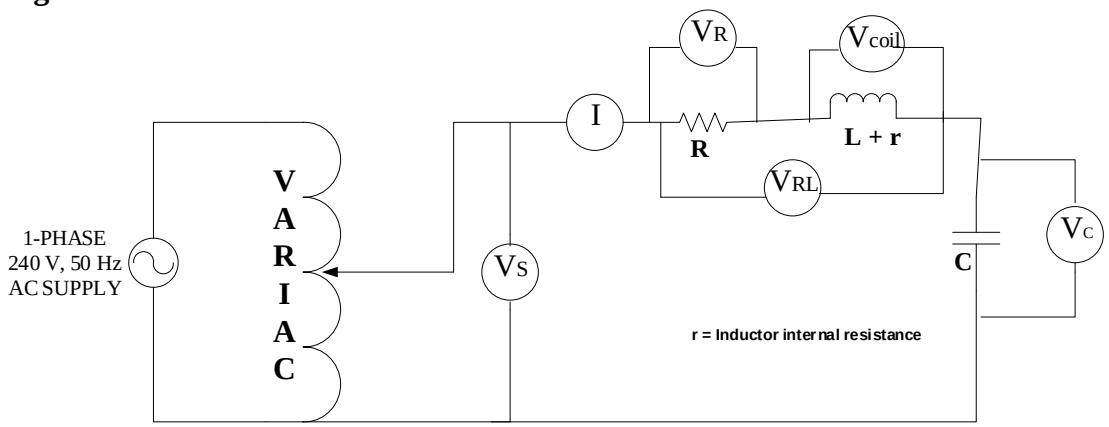
Student Name: Signature of the teacher
Student Roll No:
Signature:

Experiment no: 8

Title: Study of Series RLC circuit

Objective: To find the values of Resistance, Inductance, Capacitance, Inductor internal resistance and power factor of a series RLC circuit

Circuit Diagram:



Circuit diagram of Series RLC circuit

Data Table:

Sl no	V_s (V)	I (A)	V_R (V)	V_{coil} (V)	V_{RL} (V)	V_c (V)
1						
2						
3						
4						
5						

$$r = \frac{{Z_{RL}}^2 - {Z_{coil}}^2 - R^2}{2R}$$

$$X_L = \frac{R^2 + {X_C}^2 + {Z_{coil}}^2 + 2Rr - Z^2}{2X_C}$$

Calculation Table: (use appropriate units)

$Z = V_s/I$	$Z_{coil} = V_{coil}/I$	$Z_{RL} = V_{RL}/I$	$R = V_R/I$	$X_c = V_C/I$	$C = 1/(2\Pi f X_C)$	r	X_L	$L = X_L/(2\Pi f)$	$PF = (R+r)/Z$

Discussion:
Draw phasor diagram of series RLC circuit

Student Name:
Student Roll No:
Signature:

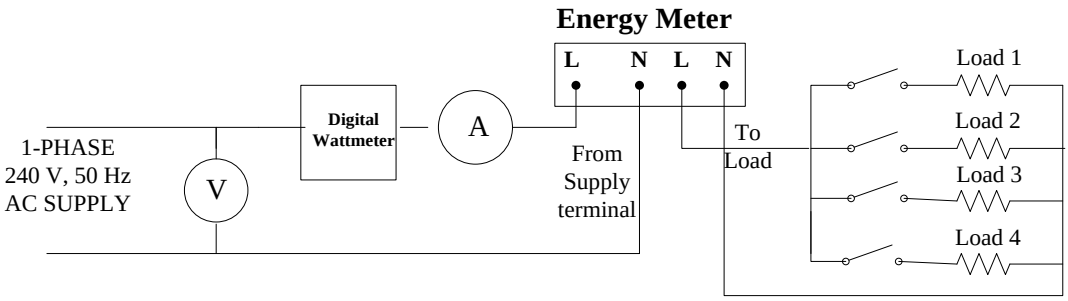
Signature of the teacher

Experiment no: 9

Title: Calibration of Energy meter

Objective: To familiarize with the analog type energy meter and find the discrepancy in measurement of power (energy) by different methods.

Circuit Diagram:



Circuit diagram for Calibration of Energy meter

Data Table:

Time=

Voltage in V	**Current in A**	**Power V× I (W_c)**	**Power (W_m)**	**% error in Power**	**$E_c = W_m \times t$**	**Energy (E_m)**	**% error in Energy**

Discussion:
Explain what is creeping

Student Name:
Student Roll No:
Signature:

Signature of the teacher

Experiment no: 10

Title: Y-Δ relation of 3-phase Electrical Network

Objective: To verify the relations among phase and line quantities of different three-phase connections.

Circuit Diagram:

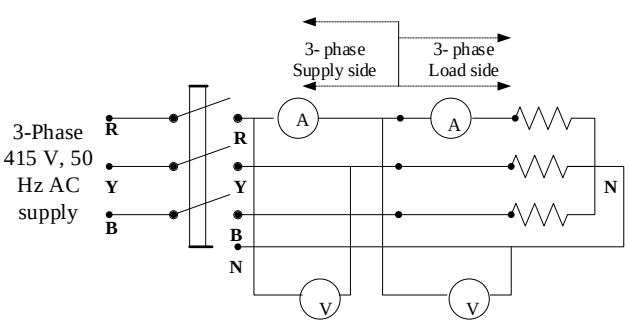


Fig 1

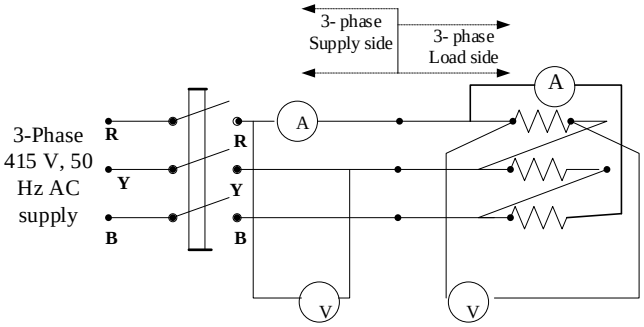


Fig 2

Circuit diagram for 3-phase Electrical Network

Data table:

Sl no	Y- Network (Fig 1)						Δ- Network (Fig 2)					
	Line Voltage in V	Line Current in A	Phase Voltage in V	Phase Current in A	V_{Ph}/V_L	I_{Ph}/I_L	Line Voltage in V	Line Current in A	Phase Voltage in V	Phase Current in A	V_{Ph}/V_L	I_{Ph}/I_L
1												
2												
3												
4												
5												
6												

Discussion:
Derive the relation between V_{line} and V_{phase} and I_{line} and $I_{phase}$for Yand Δ network.

Student Name: Signature of the teacher
Student Roll No:
Signature:

Experiment no: 11

Title: Open circuit and Short circuit test of 1- phase transformer

Objective: To calculate various parameters of 1- phase transformer

Circuit Diagram:

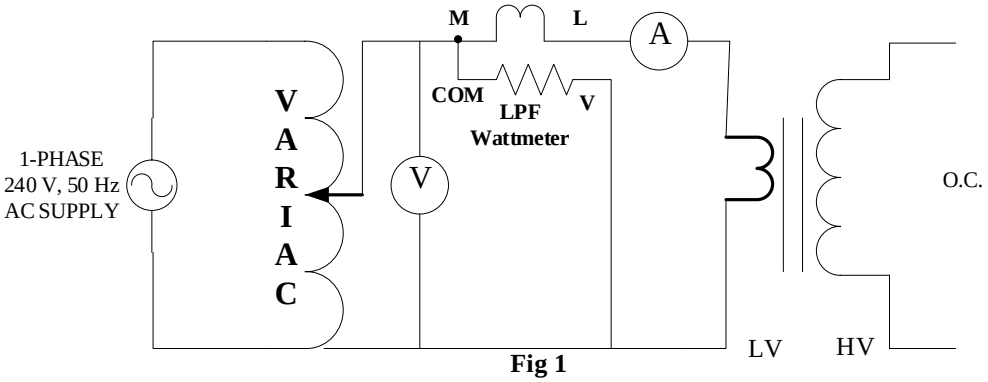


Fig 1

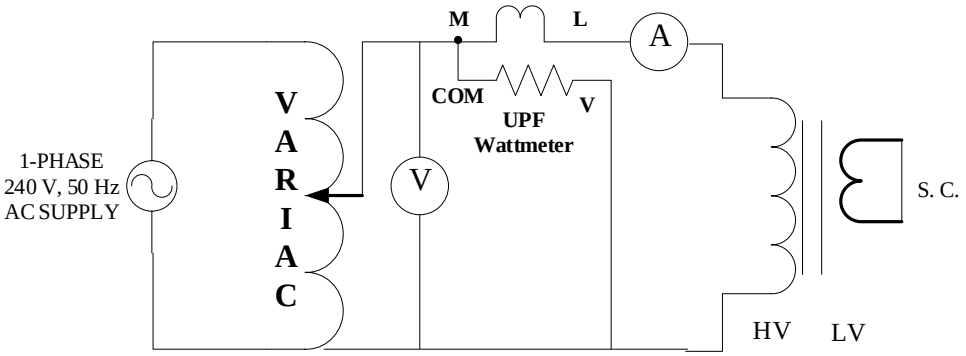


Fig 2

Circuit Diagrams for O.C. & S. C. Test of 1-phase Transformer

Data Table:

OPEN CIRCUIT TEST (Fig 1)			**SHORT CIRCUIT TEST (Fig 2)**		
Voltage in (V)	Current in (A)	Power in (W)	Voltage in (V)	Current in (A)	Power in (W)

Discussion:
Evaluate parameters of 1- phase transformer

Student Name: Signature of the teacher
Student Roll No:
Signature: