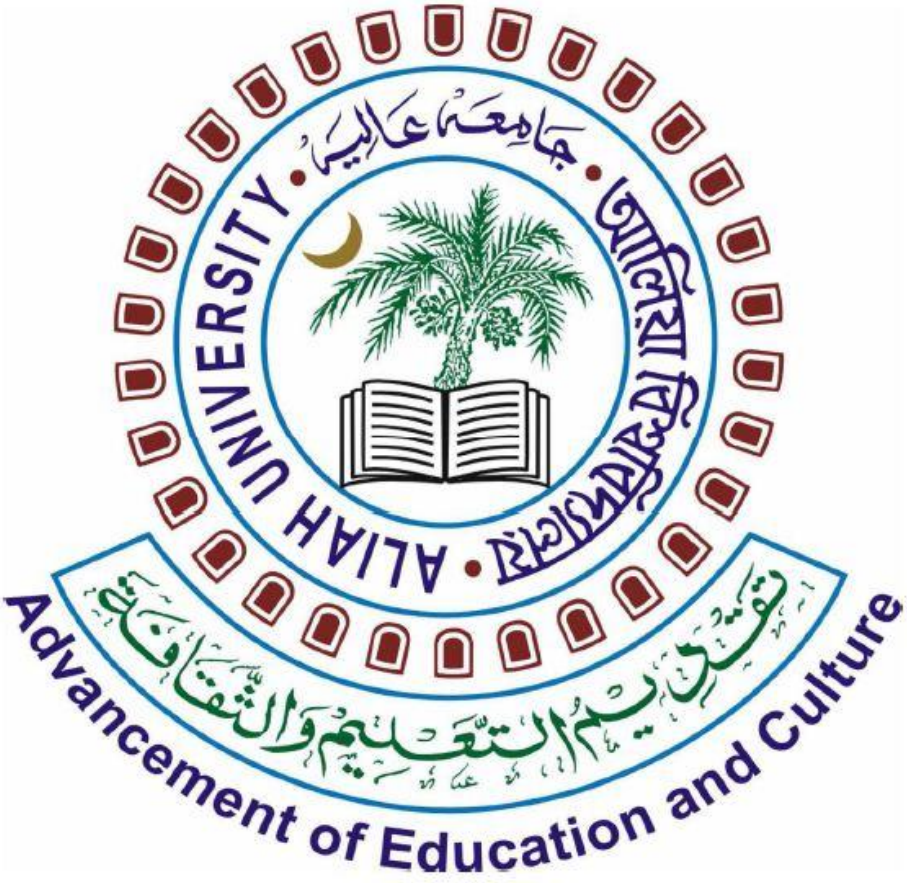

MANUAL ON

Power System Laboratory

Electrical Engineering Department
EEN 3rd Year, 5th Semester |
EENUGPC12

Course: **Power System Lab**
Course code: **EENUGPC12**

Power System Laboratory is one of the important labs for graduate students. In this lab, hardware based experiments are conducted. Here, students come to know the structure of power system components like different types of cable, conductor, insulator, etc for the first time.

On completion of this course, students shall be able:

- to visualize the concept of preliminary ideas of power system components
- to get knowledge about different rating of cables used in industry.
- to Measure string efficiency, power factor and breakdown strength of insulating oil.

The expected outcomes of the course are:

- to demonstrate the designing and conducting experiments, to analyze power system related problem.
- to provides the ability to visualize and work on laboratory.
- to study of different rating of cables, insulators.
- to study the transmission line parameters.

Assessment Criteria:

- Instrumental operation skill and familiarization of hardware.
- Experimental procedure, simulation results, internal observation, lab record
- End-semester final examinations.

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Power System lab
EENUGPC12

List of the experiments:

1. Power factor improvement

2. String efficiency

3. DC distribution

4. AC distribution

5. Performance of long transmission line

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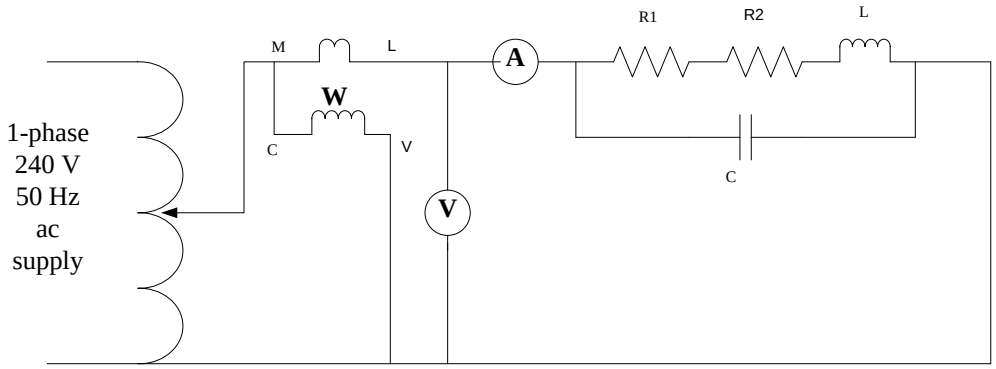
Experiment no: 1

Title: Power factor improvement

Objective: To study the power factor of R, RL, RLC circuit

Circuit Diagram:



Circuit diagram of power factor improvement

Data Table:

Component	**Voltage (V)**	**Current (A)**	**Power (W)**	$\cos\phi = \frac{P}{VI}$
R				
RL in series				
RL and C in parallel				

Discussion:

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

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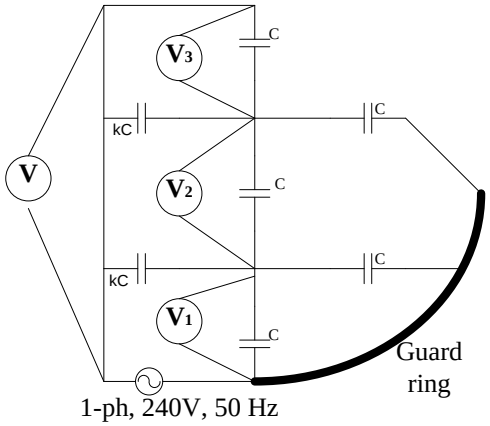
Experiment no: 2

Title: String efficiency of disc insulator

Objective: To study the string efficiency of disc insulator (a) with guard ring, (b) without guard ring

Circuit Diagram:



Circuit diagram of String efficiency

Data table:

Guard ring Connected	**No of disc (*n*)**	**V_1 (V)**	**V_2 (V)**	**V_3 (V)**	**V (V)**	$\eta = \frac{V}{n \times V_1}$
No						
Yes						

Discussion:

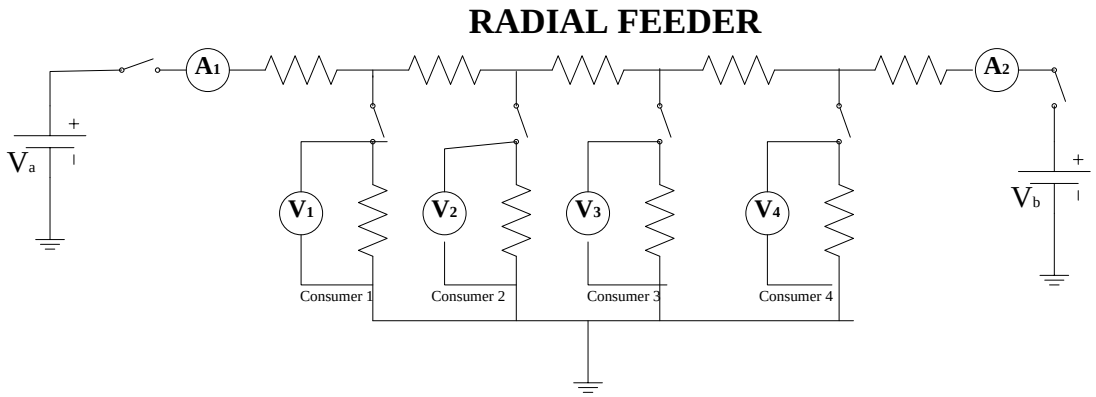
Student Name: **Signature of the teacher**
Student Roll No:
Signature:

Experiment no: 3

Title: DC Distribution network

Objective: To study the DC distribution network analyzer (I) single end feeding, (II) both end feeding, (III) Ring main system

Circuit Diagram:



Circuit Diagram of DC distribution network with single / double end feeding system

Data table:

Type of feeding	**V_a (V)**	**V_b (V)**	**Mode of operation**	**I_1(A)**	**I_2(A)**	**When all the consumers are connected**
Single end			Con1 is connected			Voltage at Consumer 1 terminal =
			Con 1, 2 are connected			Voltage at Consumer 2 terminal =
		X	Con 1, 2, 3 are connected			Voltage at Consumer 3 terminal =
			Con 1, 2, 3, 4 are connected			Voltage at Consumer 4 terminal =

Type of feeding	**V_a (V)**	**V_b (V)**	**Mode of operation**	**I_1(A)**	**I_2(A)**	**When all the consumers are connected**
Double end			Con1 is connected			Voltage at Consumer 1 terminal =
			Con 1, 2 are connected			Voltage at Consumer 2 terminal =
			Con 1, 2, 3 are connected			Voltage at Consumer 3 terminal =
			Con 1, 2, 3, 4 are connected			Voltage at Consumer 4 terminal =

Discussion:

Student Name:
Student Roll No:
Signature:

Signature of the teacher

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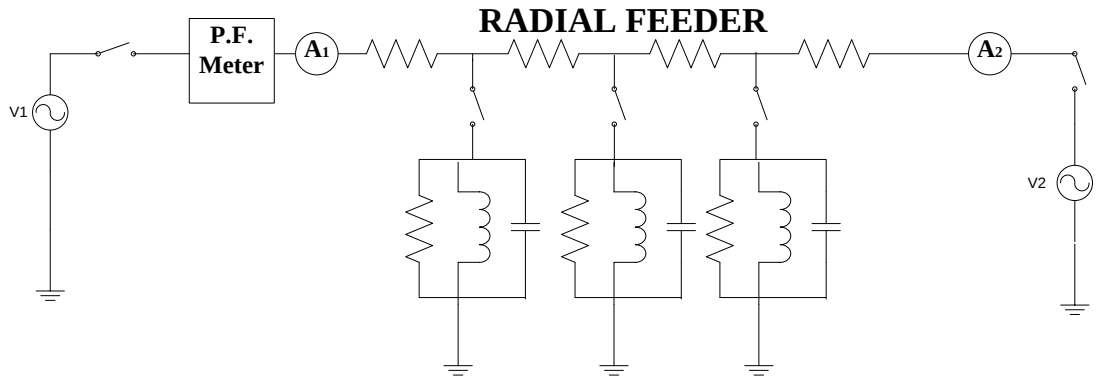
Experiment no: 4

Title: AC Distribution network

Objective: To study the AC distribution network analyzer under different loading condition

Circuit Diagram:



Circuit Diagram of AC distribution network with single / double end feeding system

Data Table:

Type of feeding	Type of load connected									I_1 (A)	I_2 (A)
	Consumer 1			Consumer 2			Consumer 3				
	R_1	L_1	C_1	R_2	L_2	C_2	R_3	L_3	C_3		
Single end feeding	√										
	√			√							
	√			√			√				
	√	√		√			√				
	√	√		√	√		√				
	√	√		√	√		√	√			
	√	√	√	√	√		√	√			
	√	√	√	√	√	√	√	√			
	√	√	√	√	√	√	√	√	√		

Type of feeding	**Type of load connected**									**I_1 (A)**	**I_2 (A)**
	Consumer 1			**Consumer 2**			**Consumer 3**				
	R_1	**L_1**	**C_1**	**R_2**	**L_2**	**C_2**	**R_3**	**L_3**	**C_3**		
Double end feeding	√										
	√			√							
	√			√			√				
	√	√		√			√				
	√	√		√	√		√				
	√	√		√	√		√	√			
	√	√	√	√	√		√	√			
	√	√	√	√	√	√	√	√			
	√	√	√	√	√	√	√	√	√		

Discussion:

Student Name:
Student Roll No:
Signature:

Signature of the teacher

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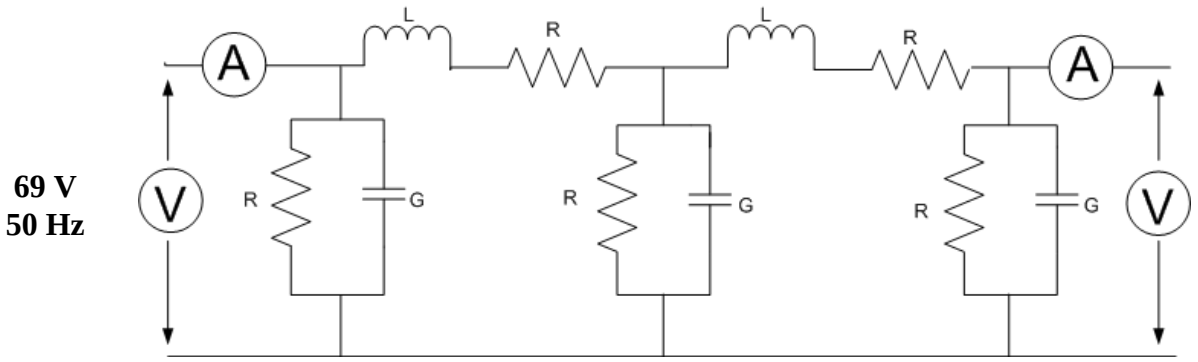
Experiment no: 5

Title: **Study of Different types of transmission line.**

Objective: To study the performance of a transmission line. Also compute its ABCD parameters.

Circuit Diagram:



Circuit Diagram: Long Transmission Line

Date Table:

Sl No.	V_s (V)	I_s (A)	V_r (V)	$A=V_s/V_r$	$C=I_s/V_r$ (℧)
1					
2					
3					

Sl No.	V_s (V)	I_s (A)	I_r (A)	$B=V_s/I_r$ (Ω)	$D=I_s/I_r$
1					
2					
3					

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