



**CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGINEERING
CHITTAGONG-4349, BANGLADESH.**

Course No. EEE-182

Course Title: Basic Electrical Engineering Sessional

Experiment No. 4

VERIFICATION OF SUPERPOSITION THEOREM

PRELAB WORK:

- **Read this laboratory manual carefully before coming to the laboratory class, so that you know what is required.**
- **Try to follow the lecture notes of EEE 111.**
- **DONOT copy others blindly!!!**
- **Submit your lab report before the roll call.**

OBJECTIVE:

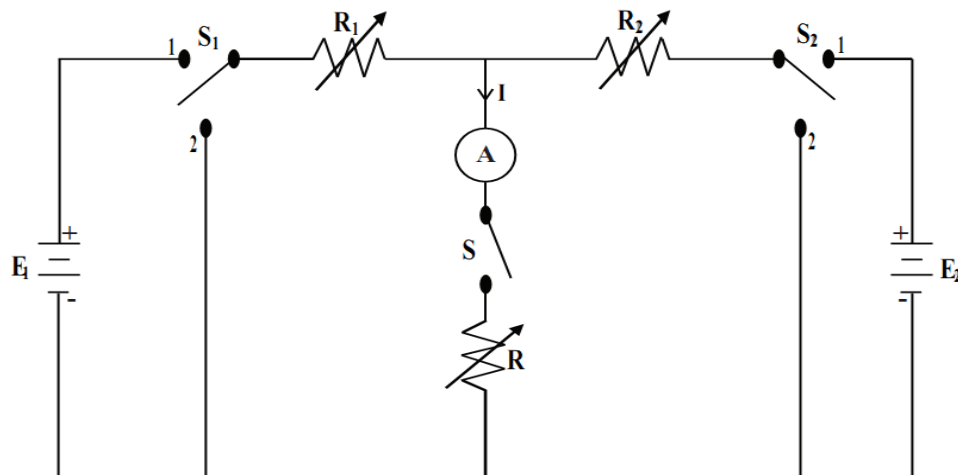
To verify experimentally the Superposition theorem. This is an analytical technique of determining current in a circuit with more than one e.m.f. source.

THEORY:

In a linear circuit containing multiple independent sources and linear elements (e.g. resistors, inductors, capacitors) the voltage across (or the current through) any element when all the sources are acting simultaneously may be obtained by adding algebraically all the individual voltages (or the currents) caused by each independent source acting alone, with all other sources deactivated. An independent voltage source is deactivated (made zero) by shorting it and an independent current source is deactivated (made zero) by open circuiting it. However, if a dependent source is present it must remain active during the superposition process

APPARATUS:

1. Two DC power supplies.
 2. Three rheostats.
 3. One DC Voltmeter (0~300V).
 4. One DC Ammeter (0~5A).
 5. Multimeter.
 6. Two SPDT Switches and one SPST switch.
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CIRCUIT DIAGRAM:**Figure: Verification of Superposition Theorem.****PROCEDURE:**

1. Connect the circuit as in Fig. 1.
2. Keep both sources active by keeping S_1 and S_2 in the proper position (position 1).
3. Apply 25 volts from E_1 , and 20 volts from E_2 .
4. Set the rheostats R_1 , R_2 & R_3 above 20Ω .
5. Measure the current, I and record it in the given table.
6. Render E_2 inactive (keeping E_1 active) & measure the current, I in the branch R_1 .
7. Render E_1 inactive (keeping E_2 active) & measure the current, I in the branch R_2 .
8. Verify if $I = I' + I''$ which would validate the superposition theorem for this particular circuit.
9. Repeat steps 4 to 7 by changing R_1 , R_2 & R_3 and take a few more sets of readings.

EXPERIMENTAL DATA:

No. of obs.	R_1 ohms	R_2 ohms	R_3 ohms	I_2 (with E_1 & E_2 active) amps	I_2' (with only E_1 active) amps	I_2'' (with only E_2 active) amps

REPORT:

1. Show the results in tabular form.
2. Comment on the results obtained and discrepancies (if any).

CAUTION:

1. Do not switch on the supply until the circuit has been checked by your teacher.
2. Take care of the apparatus.
3. Do not touch any open ended wire or cable with applying voltage supply at the other end.

HOME TASK:

Answer the following questions –

1. How can you make a voltage source inactive?
 2. How can you make a current source inactive?
 3. What are the benefits of this theorem?
 4. Discuss the feasibility of this theorem with an AC supply of the same magnitude.
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