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PART B - Exp - 1.

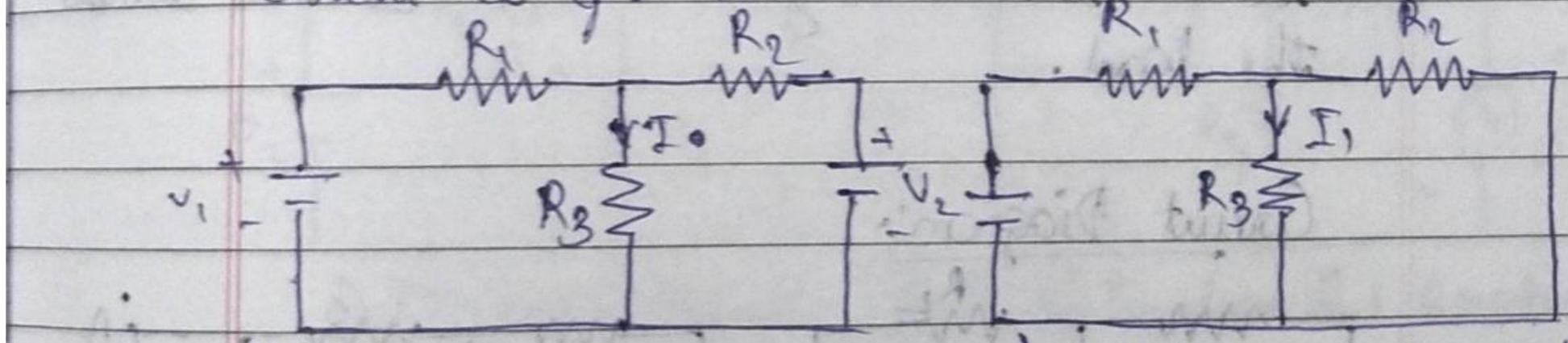
Aim:- Study of different Theorems for DC and AC circuits.

Apparatus:- DC Source, AC Source, Resistor, Current Source, voltage source, wire circuit, R.P.S.

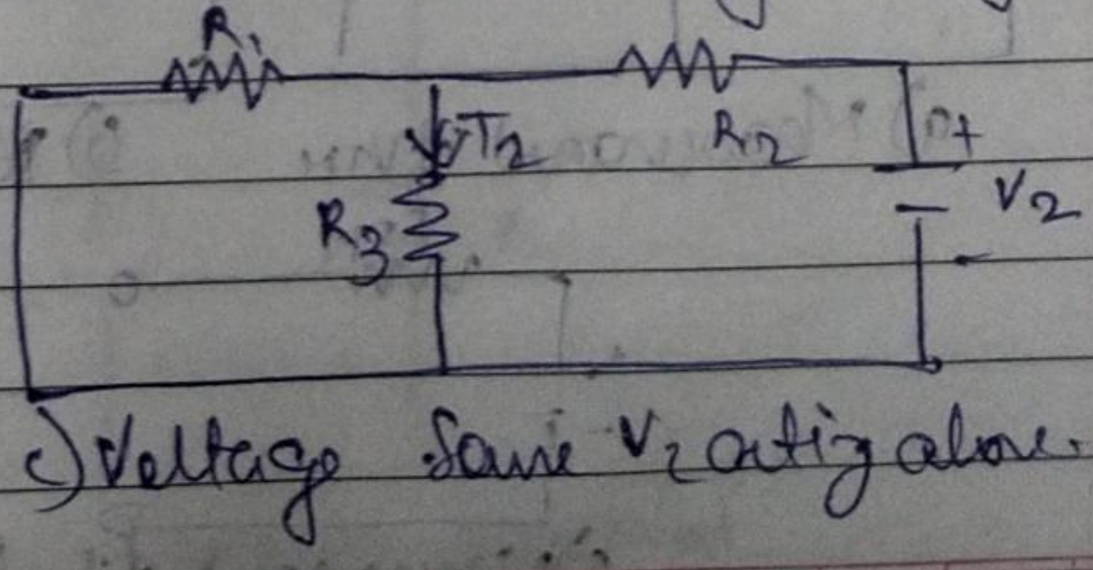
Theory:- a) Superposition Theorem b) Thevinin's thm. c) Norton Theorem d) Max Power transfer thm

a) Super-position:- statement:- In an linear, bilateral network the response in any element is equal to sum of individual response while all other sources are non operative.

Circuit diagram:-



a) Both source are acting (V_1 and V_2)



b) Voltage source V_1 acting alone

c) Voltage source V_2 acting alone.

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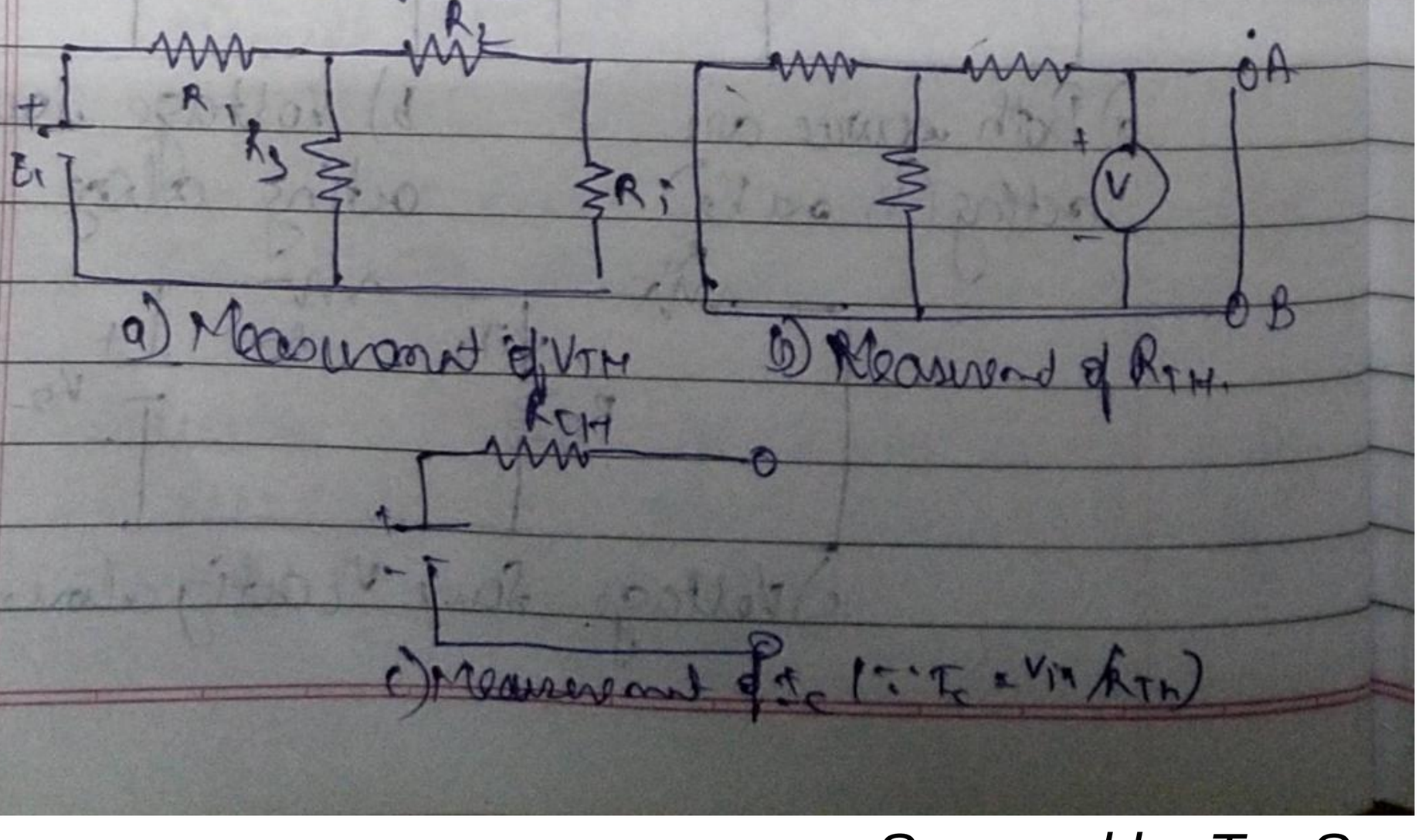
Procedure:- 1) Connect the circuit as shown in fig a) Find current through R_3 and consider as
2) Connect the circuit as shown in b) note down I_1
3) Connect the circuit as shown in c) note down I_2
4) Verify for $I = I_1 + I_2$

Conclusion:- $I = I_1 + I_2$ i.e. Superposition theorem is verified.

5) Thevenin's Theorem:-

Statement:- Any linear bilateral circuit containing several voltage and resistance can be replaced by just one single voltage in series with a single resistance connects across the load.

Circuit Diagram:-



a) Measurement of V_{TH} b) Measurement of R_{TH}.

R_{TH}

c) Measurement of I_L ($\because I_L = V_{TH}/R_{TH}$)

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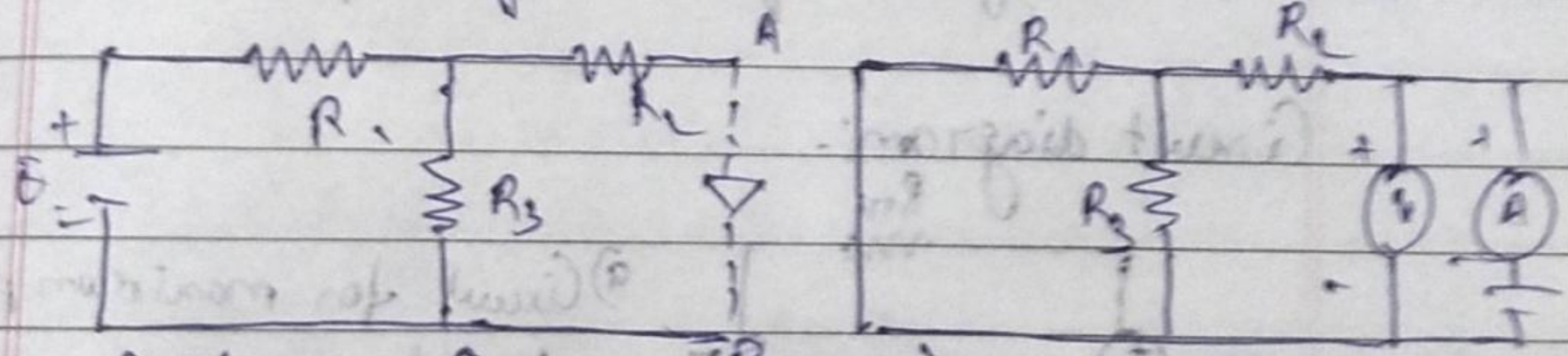
Procedure: i) Connect the circuit diagram as shown in a) Measure V.
ii) Connect the circuit as shown in b) Measure I_{SH}.
iii) Draw the Norton's equivalent circuit as shown in c) & measure R_L.

c) Norton Theorem:-

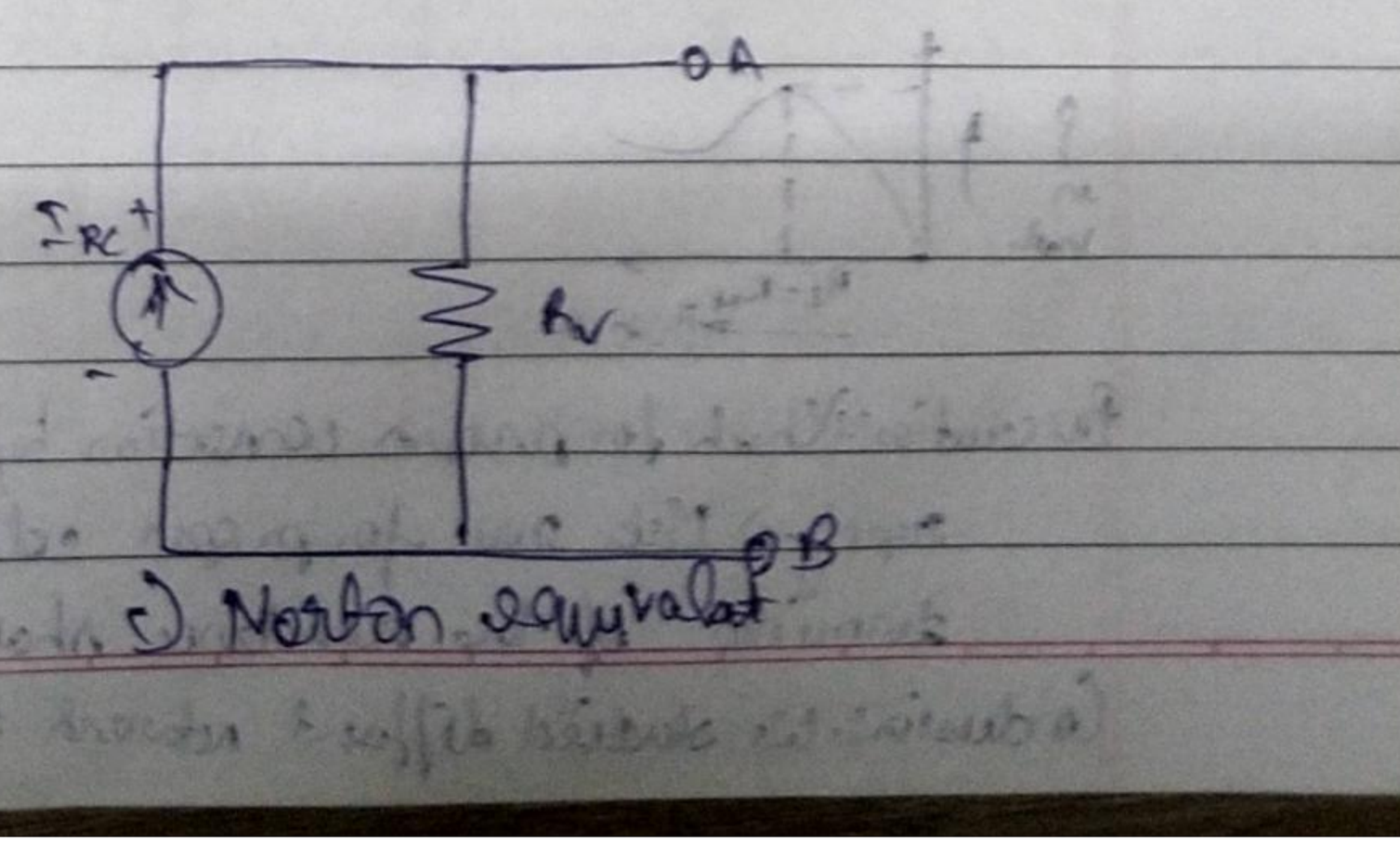
Statement:- Any linear bilateral circuit containing several energy source and resistance can be replaced by a single constant current generator in parallel with a single resistor.

Circuit Diagram:-



a) Norton Circuit
Current circuit

b) Equivalent Resistor Circuit.



c) Norton equivalent

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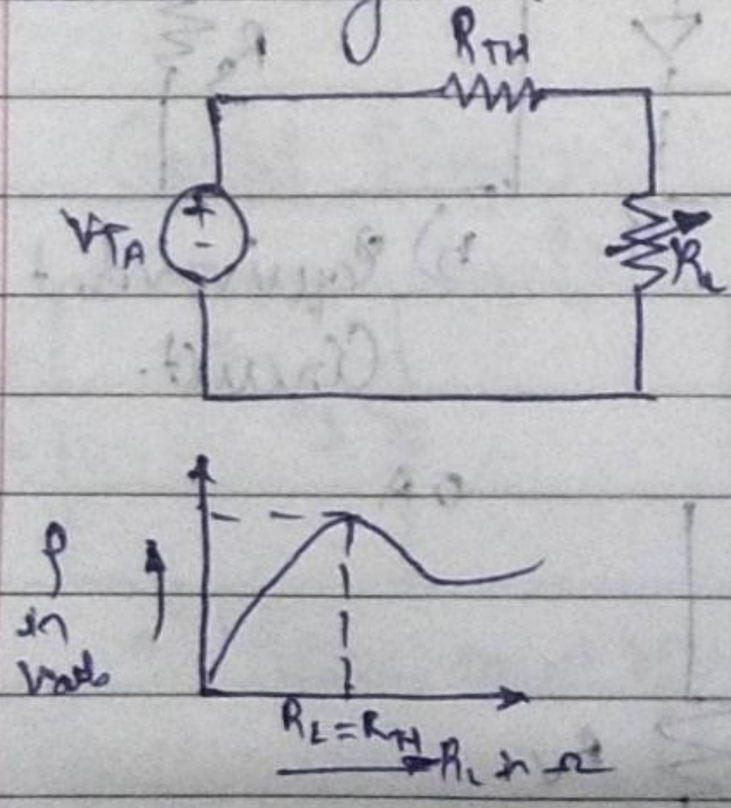
Procedure:- 1) Connect circuit diagram as shown
2) Measure the range of A×B by short circuiting.
3) Connect circuit diagram shown in
4) and measure resistance R_V in R_{TH}.
5) Draw Norton equivalent circuit by connecting in and R_N in parallel shown in 6

d) Max Power Transfer Theorem.

Statement:- The max power transfer theorem states that maximum power is load from a source to an load resistance when the load resistance is equal to source resistance, ($R_L = R_S$ is the condition required for maximum power transfer.

Circuit diagram:-



6) Circuit for maximum power transfer.

$R_L = R_{TH}$

Precautions:- 1) Check for proper connection before switching on the supply. 2) Make sure for proper color resistor. 3) The terminal of the resistance shall be properly connected.

Conclusion:- We studied different network theorem for DC and AC circuits.