Objective: To verify principle of superposition theorem for DC circuit.

Apparatus Used : A DC voltage source of 12 volts, a current source of 100 ma, a dc voltmeter (0-12v) , a dc ammeter (0-200ma), three resistances of 100 ohms each and connecting wires or dc theorem kit having all the above.

Theory :This theorem states that in a linear network containing several sources (including dependent sources), the overall response (voltage/current) at any point in the network equal to the sum of responses of each source taken one source at a time while making other sources in-operative.

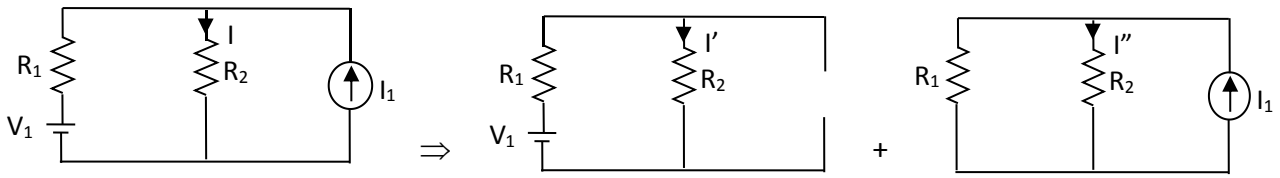

Figure 1a Figure 1b Figure 1c

By Super position theorem

$$I = I' + I''$$

Circuit Diagram:-

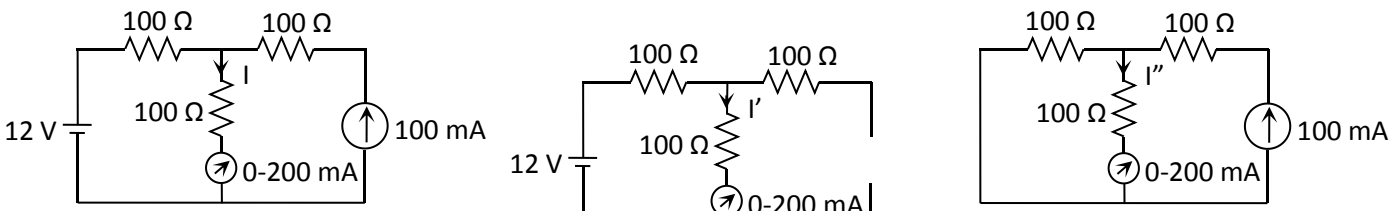

Figure 2a: Overall current (I)

Figure 2b: Current due to voltage source only (I')

Figure 2c: Current due to current source only (I'')

Observation Table:-

S.No	I (mA)	I' (mA)	I" (mA)	I_x=I'+I" (mA)	% Error = $\frac{(I-I_x)}{(I)}\times 100$

Result: - As we see from above table I is almost same as Ix. The difference is shown by an error. Hence Superposition theorem is proved.

Precaution:

1. Check all the resistances and connecting wires are properly connected.
2. Terminals of voltage source of the kit should not be short circuited only circuit on the board should be short circuited.
3. Current in the ammeter is in mille amperes not in amperes while voltage is in volts.
4. Check the connecting lead if voltage or current is not displayed on respective meters.
5. The current and voltage given to ammeter & voltmeter respectively should not exceed beyond their maximum range.

Answer the following questions:

Q1. What do you understand by open circuit and short circuit?

Q2. Why the load resistance is open circuited in Thevinin's and short circuited in Norton's?

Q3. AC is more dangerous or DC and why?