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EXPERIMENT NO. : 1

Objectives:

1. To learn Resistor colour code
2. To determine the stated value of a resistor by interpreting the colour code indicated on the resistor.
3. To verify series and parallel combination of R, C using voltage and current division rule.

Software Used : NI Multisim

Theory :

a) Resistor Colour code:

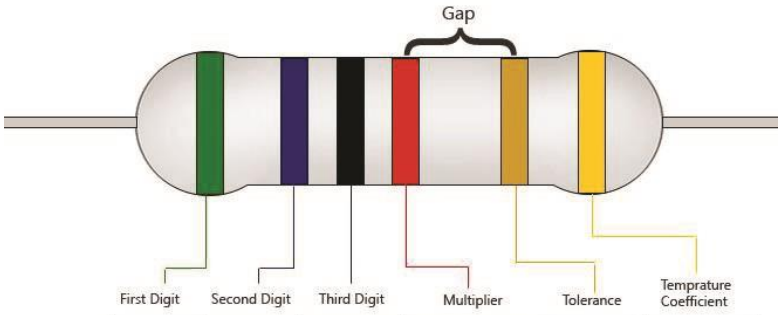
1. Hold a resistor in your hand. The section with more number of band should be on left side. After the gap, on right side should be one/two band indicating tolerance or temperature co-efficient.
2. Write on paper in capital letters i.e., BOGY(GAP)YS, the Colour starting from left to right.
3. Replace the colours with numbers that will be the value of resistor resistance i.e., $035\times10^4 \pm 3\%$. Cross verification can be done using digital multi-meter.

b) Series and parallel combination of R and C

1. Pick three resistors rated at $R1=1\ k\Omega$, $R2=2\ k\Omega$, and $R3=3\ k\Omega$. Measure their values in the using multimeter.
2. Construct, one at a time, arrangements shown in Fig 2(a) and Fig. 2(b) on breadboard. Set the supply to 20 V.
3. For each arrangement, measure the indicated variables.
4. Repeat the same experiment with three different value of C. Use

a function generator as AC power supply. Measure the RMS value of voltage and current, using multimeter. To verify series and parallel connection of C and note down absolute value of reading.

Circuit diagram(s): Resistor comes in 4, 5 or 6-bands. A 6-band resistor is shown in Fig. 1.



	First Digit	Second Digit	Third Digit	Multiplier	Tolerance	Temprature Coefficient
Black	Nil	0	0	1	Nil	Nil
Brown	1	1	1	10	±1%	100
Red	2	2	2	100	±2%	50
Orange	3	3	3	1000	±3%	15
Yellow	4	4	4	10000	±4%	25
Green	5	5	5	100000	±0.5%	Nil
Blue	6	6	6	1M	±0.25%	10
Violet	7	7	7	10M	±0.10%	5
Grey	8	8	8	100M	±0.05%	Nil
White	9	9	9	1G	Nil	Nil
Gold	Nil	Nil	Nil	÷10	±5%	Nil
Silver	Nil	Nil	Nil	÷100	±10%	Nil

Figure 1: Colour code for a resistor.

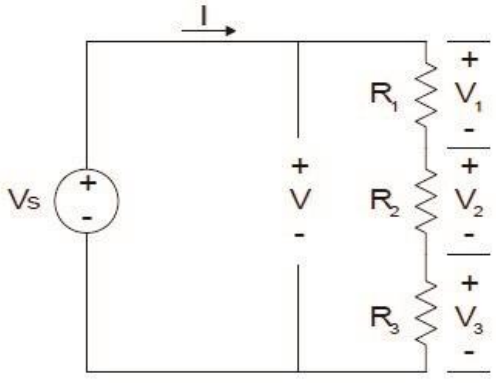


Figure 2a: Series combination of resistors.

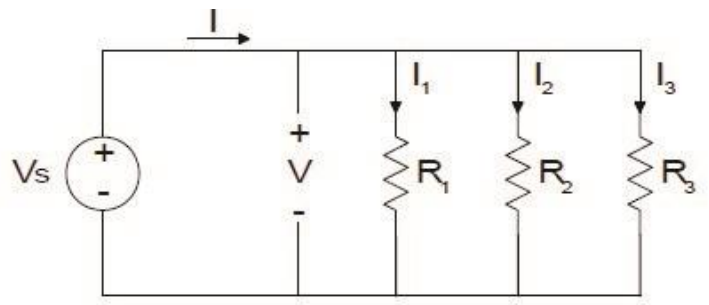


Figure 2b: Parallel combination of resistors.

RESULTS & OBSERVATIONS :

	Resistance Value	Tolerance
	**22 x 10^2**	**±5%**
	**56 x 10^4**	**±10%**
	**47 x 10^3**	**±10%**
	**10 x 10^1**	**±5%**

EXPERIMENT NO. : 10

Objective : To Verify Thevenin's theorem.

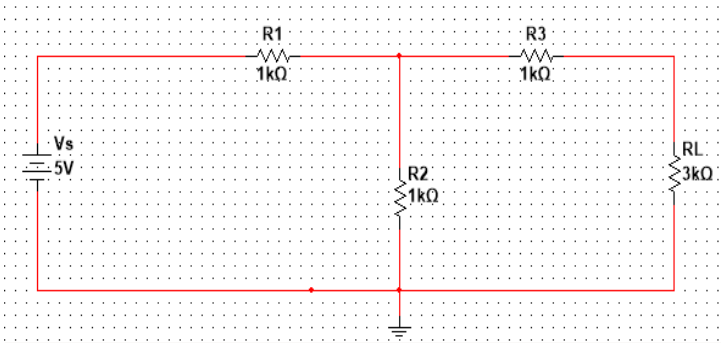
Software Used : NI Multisim

Theory :

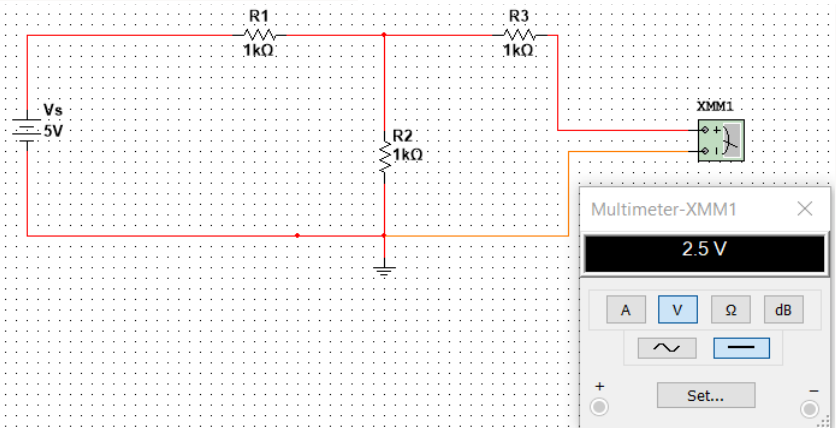
Any linear, bilateral network having a number of voltage, current sources and resistances can be replaced by a simple equivalent circuit consisting of a single voltage source in series with a resistance, where the value of the voltage source is equal to the open circuit voltage and the resistance is the equivalent resistance measured between the open circuit terminals with all energy sources replaced by their ideal internal resistances.

- **" Thevenin's Theorem** states that any complicated network across its load terminals can be substituted by a voltage source (VTH) with one resistance (RTH) in series **" .**
- This theorem helps in the study of the variation of current in a particular branch when the resistance of the branch is varied while the remaining network remains the same.

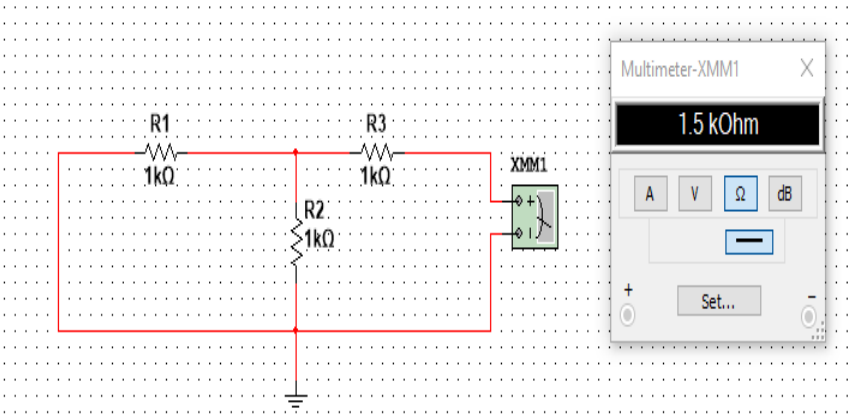
CIRCUIT DIAGRAM :



For calculation of V_{th} :



For calculation of R_{th} :



RESULTS & OBSERVATIONS :

Source Voltage(Vs)	R_1 (Ohm)	R_2(Ohm)	R_3(Ohm)	V_{th}(Theoretical value)	V_{th}(Multisim value)	R_{th}(Theoretical)	R_{th}(Multisim)(Ohm)
5V	1K	1K	1K	2.5V	2.5V	1.50K	1.50K
5.5V	2K	1.5K	1.2K	2.357V	2.357V	2.057K	2.057K
6.2V	1.3K	1.5K	1.2K	3.321V	3.321V	1.896K	1.896K
7.1V	1.3K	3K	2.2K	4.953V	4.953V	3.107K	3.107K
8V	1.4K	3.2K	2.4K	5.565V	5.565V	3.374K	3.374K