Mohammed Khider University of Biskra
Faculty of Science and Technology
Common Core Science and Technology
2nd year of engineering
Module : PW of fundamental electricity

Biskra on: …../……/2025

Name and surname of Grp No:
1. ……..
2. ……..
3. ……..
4. ……..

PW N°02: Electrical measurements (Part2) (Oscilloscope)

Objectives of the practical work:

1. Verification of Thevenin's theorem for a resistive network
2. Visualize a voltage (or more) on the oscilloscope.

A. Thevenin's theorem

Either a linear network powered by a generator e_g according to the following diagram, with

$R_g = 0; R_1 = R_3 = 1K\Omega\,; R_2 = R_c = 100\Omega$

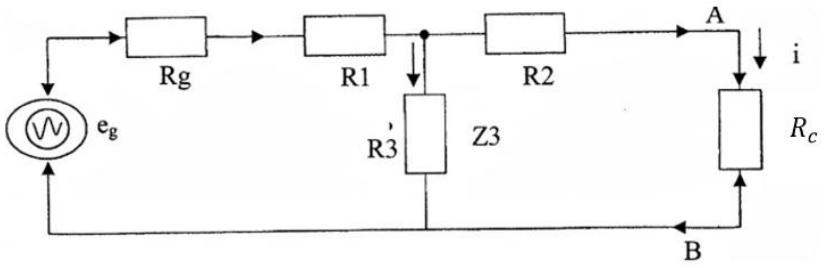

Figure 1

We want to determine the current flowing through the load R_c. To do this, we use Thevenin's theorem in two steps:

1. **Disconnect the load R_c**

Measure the voltage between terminals A and B This voltage is the Thévenin equivalent voltage E_{Th} . (Using an oscilloscope)

……

2. **Keep the load disconnected and short-circuit the sources**

Replace the voltage sources with short circuits while keeping their internal resistance. Then calculate the equivalent Resistance seen from terminals A and B. This is the Thévenin equivalent impedance R_{Th}.

…….

Now that you have measured E_{th} and R_{th}, apply Thevenin's theorem to give the equivalent circuit of Figure.1. with respect to the load Rc.

……..

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3. **from which we deduce the current in the load Rc :(formula)**

formula (deduced from the equivalent circuit):…….…….

…….

measured:…….

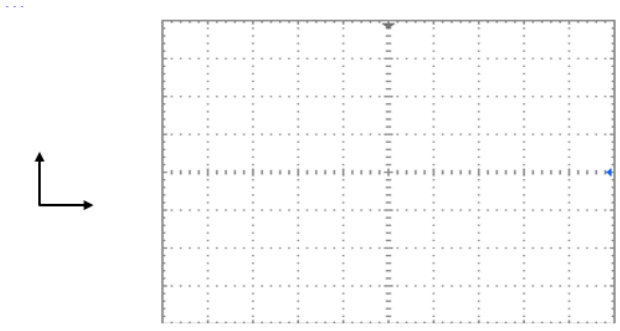
B. Take measurements with the oscilloscope

In this section, we will learn how to visualise the shape of a signal (using an oscilloscope). Let us try the following experiment: Adjust the LFG (Low Frequency Generator) so that it delivers the following signal:

$$U(t) = 6\sin(2\pi.100.t) + 2\ [V]$$

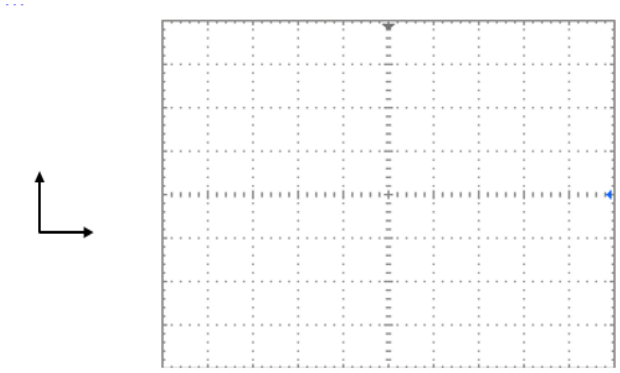
V_{max}=……V	Form=…….	Frequency=……Hz	B=……V

1. Visualise the voltage U(t) across the GBF terminals using the oscilloscope in DC mode and take measurements using the oscilloscope's ‘measure’ button.



T=..... […]
F=..... […]
Vmax=..... […]
Vmin=..... […]
Vmoy=..... […]
Veff=..... […]

2. Visualise the voltage U(t) across the GBF terminals using the oscilloscope in AC mode.



T=..... […]
F=..... […]
Vmax=..... […]
Vmin=..... […]
Vmoy=..... […]
Veff=..... […]

3. **Take measurements with the voltmeter:**

$$U(t) = 6\sin(2\pi.100.t) + 2 \qquad [V]$$

Measure the voltage across the GBF using the voltmeter in DC mode.

V_{DC}= .....V it represents ☐U_{moy} ☐ U_{eff} ☐ Autre :.....

Measure the voltage across the GBF using the voltmeter in AC mode.

V_{AC}= .....V it represents ☐U_{moy} ☐ U_{eff} ☐ Autre :.....

Note: Always choose the largest gauge for the value to be measured