**LAB NOTE**

**Subject: Electronic Design Principles**

**Topic: Voltage Controlled Oscillator**

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# Objectives

* Build a Relaxation Oscillator with a Voltage Control Oscillator.
* Show your design in using Multisim in your pre-lab.
* Prepare a table for measurement in advance to prove that your circuit works by comparing your calculated values with the actual values.

# Theory and Calculation

## Theory

Relaxation oscillators are characterized by an RC timing circuit and a device that periodically changes state.

## Design and Calculation

A diagram of a circuit

Description automatically generated

Figure 2‑1: Relaxation Oscillator’s design

For this design the following equipment are use:

* 7 Resistors 10k
* IC LM348N
* Function Generator
* Power Supply

Formula to calculate Vout:

A group of equations with numbers

Description automatically generated with medium confidence

Figure 2‑2: Formula to calculate Vout

Formula to calculate the Period:

Figure 2‑3: Formula to calculate Period

* **Power supply:**

**A black and white line

Description automatically generated with medium confidence**

Figure 2‑4: LM348N's datasheet

From the datasheet, it said that it recommended that the power supply of Vcc+ should be in range from 4V to 18V, and for Vcc- should be from -4 to -18.

# Design and Result

For this assignment, 6 cases will be tested, 3 will be with DC power and 3 will be from AC power.

## Multisim’s design.

A diagram of a circuit

Description automatically generated

Figure 3‑1: Multisim's design

## Breadboard’s design

5 A white circuit board with a silver object

Description automatically generated with medium confidence

Figure 3‑2: Breadboard’s design

## Result

|  |  |  |
| --- | --- | --- |
| Theory | Multisim | BreadBoard |
| 455Hz | 439Hz | 431Hz |

Table 3‑1: Output for Oscillator

|  |  |
| --- | --- |
| Multisim | BreadBoard |
|  |  |

Table 3‑2: Multisim's and BreadBoard's result

# CONCLUSION

From the result of all cases:

* All cases have Theory’s result, Multisim’s result and Breadboard’s result nearly the same.

**REFERENCES**