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| Term: 2021-1 | Submission Date: 7th August, 2020 |
| Lecture date: 7th August, 2020 | Practical Number: 01 |
| Course Code: PHY249 | Section: G2903 |
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**1. Concepts Learnt:**

I learnt what a cathode ray oscilloscope is and how it operates. How it amplifies the signal vertically (to increase amplitude) and horizontally (to increase strength) and how an electron gun is used to produce the plots. Finally I learnt how to interpret the output of CRO to make meaningful observations.

**2. Key observations:**

Frequency and voltage of three different types of waves were measured and have been reported in section 4. The voltage was measured with full accuracy in all cases, while the frequency was measured with relative errors of 3.85%, 0.8% and 2% for the sine, triangular and pulsed waves, respectively.

**3. Applications:**

CROs can be used to measure voltage signals and can be useful for measuring the frequency and amplitude of AC voltage, as well as ampltidue of DC voltage. They can be particularly useful for testing an electronics circuit we’re designing.

**4. Report:**

Sine wave

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Vpp | Vm | Vrms | T | f | |Δf| |
| 4\*2 = 8V | 4V | 2.82 | 5.2 ms | 192.3 Hz | 7.7Hz |

Input Voltage: 4V

The expected frequency was 200Hz

Vrms is calculated as follows:

Vrms = 0.707Vm

Error Analysis:

Absolute error in frequency = 200-192.3 Hz = 7.7Hz

Relative error = (7.7/200)\*100 = 3.85%

Triangular wave

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Vpp | Vm | Vrms | T | f | |Δf| |
| 6\*2 = 12V | 6V | 4.24 | 6.2ms | 161.3 Hz | 1.3 |

Input Voltage: 6V

Expected frequency = 160Hz

Error Analysis:

Absolute error in frequency = 1.3 Hz

Relative error = 100\*(1.3/160) = 0.8%

Square Pulse

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Vpp | Vm | Vrms | T | f | |Δf| |
| 6\*2=12V | 6V | 4.24 | 4.9\*2= 9.8 | 102 | 2 |

Input voltage: 6V

Expected Frequency: 100Hz

Error Analysis

Absolute error in frequency = 2 Hz

Relative error = 100\*(2/100) = 2%