

**Faculty of Engineering and Technology**

**Department of Electrical And Computer Engineering**

**Electronics Lab**

**(ENEE3112)**

**Experiment #11 (Prelab)**

**Oscillators**

**Student’s name: Mohammed Fkheidah**

**Student’s ID: 1172294**

**Instructor: Dr. Mohammed Ju’beh
Assistant: Eng. Yazan Ismael**

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**Part A: The Wein Bridge Oscillator**

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Figure 1 Wein Bridge Oscillator circuit.

**Part B: The RC Phase Shift Oscillator**



Figure 2 RC Phase Shift Oscillator circuit.

**Part C: The Colpitts Oscillator**

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Figure 3 Colpitts Oscillator circuit.

**Part D: The RC Astable Oscillator**

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Figure 4 RC Astable Oscillator circuit.

**Part E: The 555 Timer Chip as an Astable Multivibrator**



Figure 5 555 Timer Chip as an Astable Multivibrator circuit.

**At R=10k**

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|  |  |  |
| --- | --- | --- |
| **R1** | **Frequency [Hz]** | **Duty cycle** |
| **Measured** | **Calculated** | **Measured** | **Calculated** |
| **10k** | **4.81k** | **4.77k** | **66%** | **66%** |
| **20k** | **2.93k** | **2.9k** | **61%** | **60%** |
| **30k** | **2.1 K** | **2K** | **56%** | **56%** |
| **40k** | **1.65K** | **1.6K** | **55%** | **55%** |
| **50k** | **1.1K** | **1.05K** | **53%** | **54%** |

**Measured (for 10k)**

$$T=0.693\left(R2+2R1\right)C=0.693\left(10k+2\*10k\right)\*0.1u=208u$$

**F =** $\frac{1}{T}=4810Hz=4.81K$

$DC=\frac{R2+R1}{R2+2R1}=\frac{10k+10k}{10k+2\*10k}$**= 0.66 = 66%**

**Calculated (for 10k)**

**The frquancy is =** $\frac{1}{(497.569u-289.431) u}=4772Hz$

**Ton=**$(427.646u-289.431) u=209us$

**DC =**$\frac{Ton}{T}=\frac{209u}{497.569u-289.431) u}=66\%$