

***Physics Department***

***Physics 112***

**Experiment 6:**

**Damped Oscillations**

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**Abstract:**

1. **the aim of the experiment is:** to find the value of resistors that satisfy the three situation of damping and the time constant of the under damping situation.
2. **the method used:** by reading from the OSC screen that connected to the RLC circuit.
3. **the main result is:**

**Under Damping : Critical Damping : Over Damping:**

**When R = 0** $t\_{1/2}=1.05×10^{-4} s$$R\_{C}=1832 Ω$$R\_{O}=5496 Ω $

$ω^{'}=96664.4 rad /s$$t\_{1/2}=1.0×10^{-5} s$$t\_{1/2}=3.6×10^{-5} s$

**When R=100**$ Ω$$λ\_{C}=6.9×10^{4} s^{-1}$$λ\_{O}=1.925×10^{4} s^{-1}$

$t\_{1/2}=5×10^{-5} s$

**Conclusion :**

**Under Damping : Critical Damping : Over Damping:**

**When R = 0** $t\_{1/2}=1.05×10^{-4} s$$R\_{C}=1832 Ω$$R\_{O}=5496 Ω $

$ω^{'}=96664.4 rad /s$$t\_{1/2}=1.0×10^{-5} s$$t\_{1/2}=3.6×10^{-5} s$

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$t\_{1/2}=5×10^{-5} s$

The theoretical value of $t\_{1/2}$ in over damping case when R=100 $Ω$ equals $6×10^{-5} s$ ,we see that it is very close to the exp. One although there is percentage of errors such as the mistakes in reading the measurements and due to some defects in the devices and the instruments . When comparing the theo. and the exp. values of $R\_{C}$ we will find that they are close to each other but there is little difference between them due to the uncertainty in reading CRO . when comparing the decay constant for the Critical Damping and Over Damping we will see that $λ\_{C}>λ\_{O} $this is because in the critical damping the voltage reach the min value faster than the over damping one .