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**Physics Department**

**Physics 112**

**Experiment no.2**

**Source Internal Resistance, Loading Problems And Circuit Impedance Matching**

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**Abstract:**

1. **the aim of the experiment is:** to find the value of the load resistance RL that satisfies the condition of the maximum power transfer which is **RL= R+Rin**
2. **the method used:** by reading different measurements of the current passing through the circuit in different values of the RL (variable resistance in the circuit).
3. **the main result is:**

 9.75 volt

 477.75 Ω 7.75 Ω

 490 Ω

**Calculation:**

From the linear graph and its equation:

The slope is = 0.1026

 So 9.75 volt

And the y-intercept is = 0.049 = 49

 477.75 Ω ( R = 470 Ω )

 7.75 Ω

From this value of the internal resistance we can figure that its small and that we need another resistance( R ) to accomplish the condition of the maximum power transfer which is :

From the semi-log graph paper we find that:

 490 Ω

**Result And Conclusion:**

 9.75 volt

 477.75 Ω 7.75 Ω

 490 Ω

We can notice that the value of ε approximately the same as the value we measured when (RL) was zero which is 9.75 volts with a very small percentage of error due to the errors in calibrating the instruments and some error from reading the value .

Theoretically the value of RL should be equal to the sum of the resistance(R) and the internal resistance ( { , } then RL should be 477.75 Ω but experimentally value was 490 Ω so we notice some error in the result due to systemically errors that effected the value and random errors from us in taking the readings from the devices .

* There should be an internal resistance in every circuit
* The load resistance should be<<10 of the value of the internal resistance
* To reach the maximum value of the power transferring the load resistance should be equal to the sum of the additional resistance and the internal resistance.
* There were some percentages of error in finding the load resistance that satisfies the condition of maximum power transfer due to systemic errors and random errors .