ISLAMIC UNIVERSITY OF TECHNOLOGY

Organization of Islamic Cooperation

Board Bazar, Gazipur

Course Name: Physics II Lab

Course No. PHY 4242

Experiment No. 04

Name of Experiment:

Verification of Maximum Power Transfer Theorem

Date of Performance: 01 July, 2019

Date of Submission: 15 July, 2019

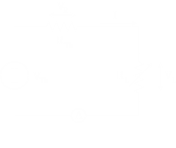
Objective:

To verify the maximum power transfer theorem.

Equipment Used:

Jumpers, Multi-meter, Ammeter, Bread Board, Variable Voltage Source, Resistors, Potentiometer

Circuit Diagram:



Data Table:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Obs. No. | / | / | / | / | / | / | / | / | / |
| 01 |  |  |  |  |  |  |  |  |  |
| 02 |  |  |  |  |  |  |  |  |
| 03 |  |  |  |  |  |  |  |  |
| 04 |  |  |  |  |  |  |  |  |
| 05 |  |  |  |  |  |  |  |  |
| 06 |  |  |  |  |  |  |  |  |
| 07 |  |  |  |  |  |  |  |  |
| 08 |  |  |  |  |  |  |  |  |

Questions and Answers:

* Define efficiency of power transfer and voltage regulation.

The efficiency of power transfer is the ratio of output power to input power. Voltage regulation is a measure of change in the voltage magnitude between the sending and receiving ends of a component.

* Calculate the efficiency of power transfer and the voltage regulation for the maximum power transfer condition.

For maximum power transfer, .

The closest observation was observation 05.

Efficiency of Power Transfer

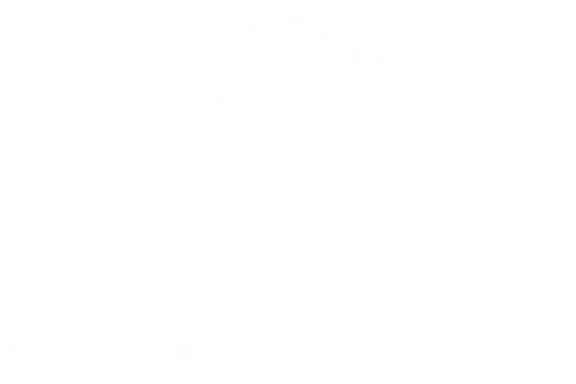
Voltage Regulation

* Calculate the efficiency of power transfer, voltage regulation and power loss for every observation.

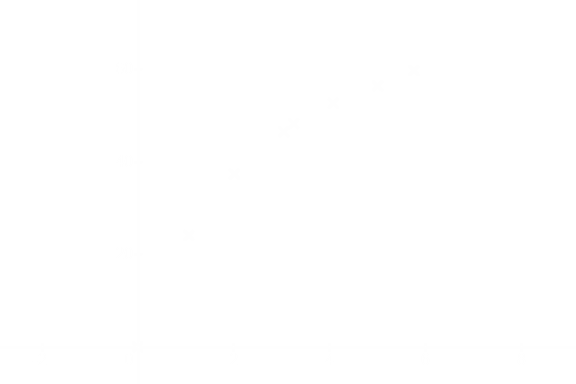
|  |  |  |  |
| --- | --- | --- | --- |
| Obs. No. | Efficiency | Voltage Regulation | Power Loss  / |
| 01 |  |  |  |
| 02 |  |  |  |
| 03 |  |  |  |
| 04 |  |  |  |
| 05 |  |  |  |
| 06 |  |  |  |
| 07 |  |  |  |
| 08 |  |  |  |

* Plot VS , VS , %Voltage Regulation VS .

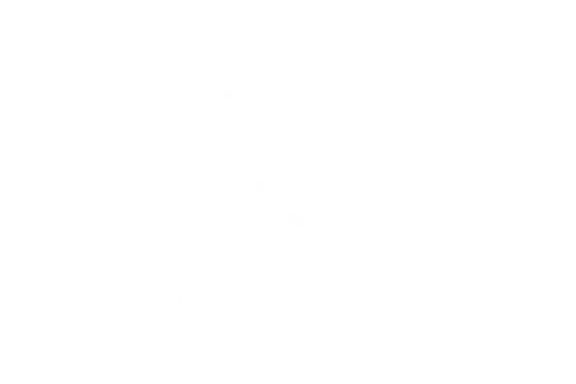
VS



VS



%Voltage Regulation VS



* Where is maximum power transfer used?

In car engines, the power delivered to the starter motor of a car is maximized if the internal resistance of the battery is equal to the effective resistance of the motor.

In communications systems, for example the public address system, the source (amplifier) resistance and the load (speakers) resistance are made equal to ensure maximum power transfer.

* Would you suggest using the maximum power transfer technique in all cases?

Maximum power transfer may not always ensure efficiency, so in scenarios where efficiency is more important, like in transformers, this technique would be ill advised.

Discussion:

All connections were thoroughly checked to avoid loose connections. Readings were taken multiple times. The steps ensure the accuracy of the results.