**Introduction:**

The objectives of the first half of the lab experiment were to calculate the resistance of a resistive circuit setup based off of the options of circuit diagram available in Figure 2.4 of the Lab Manual. The corresponding values of each resistor from any of the diagrams can be referenced and seen in Figure 2.3.

The objectives of the second half of the lab experiment is to determine the Thevenin Equivalent Circuit (TEC) and Maximum Power Transfer (MPT) of the specified circuit connected to a turn-dial variable load resistance.

**Procedure/Discussion:**

For the first half of the experiment, once the resistive circuit was chosen (#9 had been chosen in the case of this particular experiment) and set up on the provided circuit board. Once the circuit set up, the input resistance must be calculated based on the selected circuit diagram. Since the circuit #9 was selected, the input resistance was calculated as follows :

Rin(calc) =

Whereas the experimental value for Rin was :

Rin(expt) =

And the Ohmmeter-measured value was :

Rin(OM) =

For the second half of the experiment, The Gray and Green terminals of the on-board SPDT switch S are connected together so that S acts as a SPST switch which can be used to connect or disconnect the load RL from the circuit to the left of terminals a-b, whose TEC is to be determined (Refer to Figure 2.6).

After disconnecting the load resistance, the open circuit voltage was calculated to be :

VT =

After reconnecting the load resistance and adjusting the turn dial until VL = 0.5VT (i.e. 5.683 v), the number of turns N was at 4.15 and RL was at 1230.

In order to test the MPT theorem, the load resistance was adjusted to be above and below the value of load resistance when VL = 0.5VT. The results that *should* yield is the load power rise from Ra to Rb to RL and then fall from RL to Rc to Rd.

|  |  |  |
| --- | --- | --- |
| Load Resistance RL | Load Voltage VL volts | Load Power PL = (VL)2/RL W |
| Ra = 500 | 4.03 v | 0.03248 W |
| Rb = 900 | 4.75 v | 0.02507 W |
| **RL = 1230** | **5.683 v** | **0.2626 W** |
| Rc = 1600 | 6.4647 v | 0.02612 W |
| Rd = 2000 | 7.958 v | 0.02518 W |

**Conclusion/Results:**

The results for the first half of the experiment were determined straightforward using Ohm’s Law and a multimeter.

The results for the second half of the experiment were as expected except for the load power of Ra. It is the highest value of all the calculated values determined within the table above. The correct load voltage for Ra should have been 3.283 v since RT is 1230 and VT = 11.36 v. So VL for Ra is as follows :

VL

Perhaps this error was due to a false adjustment of the turn-dial of the load resistance, it isn’t really clear why only this particular value is off. Otherwise, the graph of the Load power follow the expected trend of rising until 0.5VT is obtained and then a subsequent fall in power.