



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

Sekolah Pendidikan  
Profesional dan  
Pendidikan Berterusan  
(SPACE)

**JABATAN KEJURUTERAAN ELEKTRIK  
PUSAT PENGAJIAN DIPLOMA (PPD), SPACE  
UNIVERSITI TEKNOLOGI MALAYSIA  
KUALA LUMPUR**

**DDWE 1711 ELECTRICAL ENGINEERING LABORATORY**

**1**

**(CIRCUIT THEORY 1)**

**EXPERIMENT 2**

**PARALLEL AND SERIES-PARALLEL CIRCUITS**

## **EXPERIMENT 2 : PARALLEL AND SERIES-PARALLEL CIRCUITS**

### **OBJECTIVES:**

After performing this experiment, you will be able to:

1. Compute and measure resistances in parallel and series-parallel circuits.
2. Compute and measure currents in parallel and series-parallel circuits.
3. Apply Kirchhoffs current law to a parallel circuit.
4. Apply the current divider rule to a series-parallel circuit.

### **APPARATUS:**

1. Analog Multimeter
2. D.C. Power Supply
3. Protoboard
4. Ammeter
5. Voltmeter

### **COMPONENTS:**

1. Resistor : 3.3 k $\Omega$  (1 unit), 4.7 k $\Omega$  (1 unit), 6.8 k $\Omega$  (1 unit), 10 k $\Omega$  (1 unit)
2. Light-Emitting Diodes (LEDs) (3 units)

### **PART A: PARALLEL CIRCUIT**

#### Procedures:

1. Pick any three resistors and measure the resistances using multi meter. Record your measured value in Table 1.
2. Read the value of the resistors using color code. Record your answer in Table 1.
3. Connect all the three resistors in parallel. Draw the parallel circuit in Figure 2.1.
4. Measure the total resistance. Record your answer in the answer sheet
5. Calculate the total resistance using the measured value from Table 2.1. Show your calculation in the answer sheet.
6. Complete the parallel circuit by connecting a 12 V voltage source.
7. Connect the ammeter to the parallel circuit to measure the total current. Draw the complete circuit in Figure 2.1.
8. Turn ON the power supply.
9. Read the ammeter value and record the value in the answer sheet.
10. Measure the voltage across each resistor. Record your value in Table 2.
11. Measure all branch currents by using multimeter. Record your value in Table 2.

12. Referring Table 2, show your calculation to prove the Kirchhoff's current law in the answer sheet.
13. Connect three LEDs, one to each branch. Answer the question in the answer sheet.
14. Disconnect one LED, leaving one branch open. Answer the question in the answer sheet.

### **PART B: SERIES-PARALLEL CIRCUIT**

#### Procedures:

1. Measure the value of all resistors using multi meter. Record the value in Table 3.
2. Connect the circuit as shown in Figure 1 below.

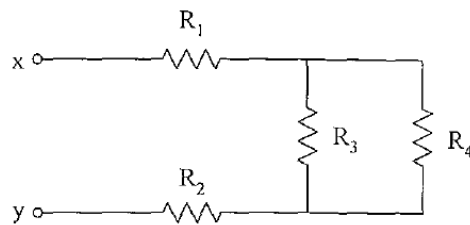


Figure 1

3. Measure the total resistance. Record the value in the answer sheet
4. Calculate the total resistance using the measured value from Table 3. Show your calculation in the answer sheet.
5. Complete the circuit by connecting a 12 V voltage source to the terminal x-y,
6. Connect the ammeter to the circuit to measure the total current. Draw the circuit in Figure 2.2. Label all your resistors value.
7. Turn ON the power supply.
8. Read the ammeter value and record the value in the answer sheet
9. Measure the voltage drop across each resistor. Record the value in Table 4.
10. Measure the current through each resistor. Record the value in Table 4.
11. Using current divider rules, calculate the currents flowing through R<sub>3</sub> and R<sub>4</sub>. Show your calculations in the answer sheet.
12. Connect three LEDs, each in series with R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub>.
13. Measure the total current using multimeter. Record the value in the answer sheet Answer the question in the answer sheet.