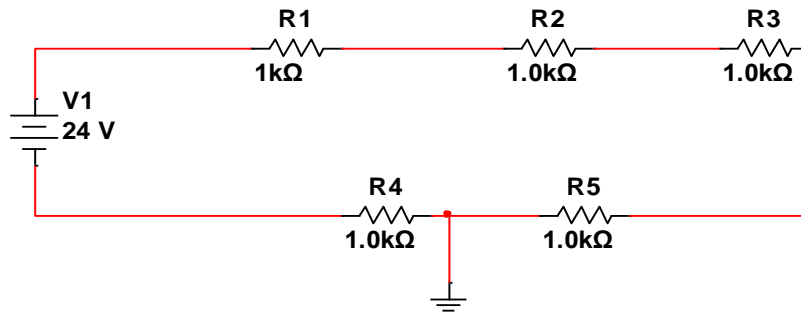


Experiment1

Connecting an electrical circuit and checking voltage, current and resistance

ربط دائره كهربائيه وفحص الجهد والتيار والمقاومه



Procedure:

1. Connect the circuit shown in fig.
2. Measure total voltage.
3. Measure value of resistance R1, R2, R3, R4, R5
4. Measure the value of total current
5. Draw signal source voltage
6. Measure of the value equivalent resistance and the first three resistor
7. Calculate value of power for the cct.

Vs		
IT		
R1		
R2		
R3		
R4		
R5		
R1,2,3		
Req		

Experiment 2

Loading effect on voltmeter

Object: To study the loading effect of voltmeter

Theory:

The sensitivity of a d.c voltmeter is an important factor when selecting a meter for a certain voltage measurement. A low sensitivity meter give correct readings when measuring voltage in low resistance circuits, but it is certain to produce very unreliable readings in low resistance circuits. A voltmeter when connected across two points in a high resistive circuit , acts as a shunt for that portion of the circuit and thus reduces the equivalent resistance in that portion of the circuit .

The meter will then give a lower indication of the voltage drop than actually existed before the meter was connected. This effect is called the loading effect of an instrument; it is caused principally by low sensitivity instruments.

The internal resistance of the voltmeter is

$$R_{in} = S \times V_{range}$$

Where S = sensitivity of the voltmeter = (1 / Im) Ω/v

Procedure:

1. Connect the circuit shown in fig. (1).
2. Measure the voltage of R2 using voltmeter of 20 K Ω / V sensitivity on scale 10 V.
3. Repeat step 2 using scale greater than 10 V.
4. Connect the circuit shown in fig. (2) Repeat step 2.

Discussion:

1. What are the reasons of the difference between the reading of step 2 and step 3?
2. Derive the unit of the sensitivity.
3. How we can minimize the loading effect on voltmeter?

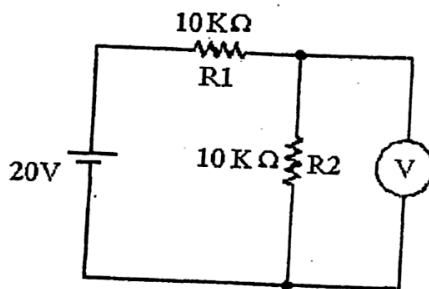


Fig. (1)

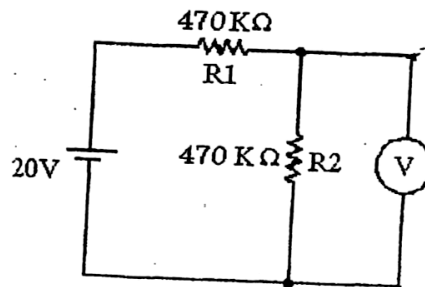


Fig. (2)