



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 gives correct reading when measuring voltage in low voltmeter when connected across two point 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. the effect called loading effect of an instrument it is caused principally by low sensitivity instrument. the internal resistance of the voltmeter is:

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

Where S = sensitivity of the voltmeter = $(I/I_m) \Omega/v$

Procedure:

1. Connect the circuit shown in fig. (1).
2. Measure the voltage of R_2 using voltmeter of $20 \text{ K } \Omega/V$ 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?

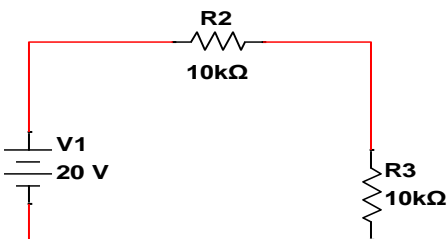


Fig.1

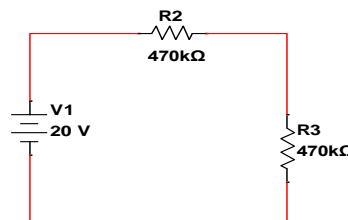


Fig.2