



Al-Mustaqbal University College
Department of Medical Instrumentation Techniques Engineering
Class: second
Subject: Measurements & Medical Transducers
Lecturer: Suhair Hussein & Noor Alhuda Hussein & Fatima Thaeer
Lecture: 1

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 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 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 ?

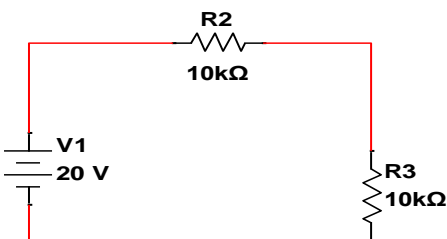


Fig.1

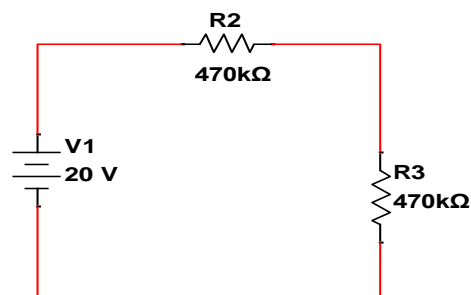


Fig.2