Department of Electrical Engineering
Assignment
Date: 20/04/2020

Course Details

Course Title: Instrumentation and Measurement **Module:** 6th (BE)
Instructor: Sir Waleed Jan **Total Marks:** 30

Student Details

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Q1.	**(a)**	A student mistakenly connects an ammeter in parallel in a circuit. What will happen? Explain briefly.	**Marks 05** **CLO 2**
	(b)	A student mistakenly connects a voltmeter in series in a circuit. What will happen? Explain briefly.	**Marks 05** **CLO 2**
Q2.	**(a)**	Random error cannot be easily reduced in measurements. Justify this statement.	**Marks 05** **CLO 1**
	(b)	What are the different reasons due to which gross error occurs in measurement? Explain briefly.	**Marks 05** **CLO 1**
Q3.	**(a)**	What will happen if a spring in not connected with the coil of a moving coil galvanometer? Explain briefly.	**Marks 05** **CLO 2**
	(b)	A student is performing an experiment in the laboratory during which he finds out that the measuring instrument is giving a Full Scale Deflection for a current of 10 μ A. He wants to measure a voltage of 20V with the help of this measuring instrument. Now, What should be the appropriate value of the resistor to be added with this instrument so that it can measure up to 20V? Moreover, should the resistor be connected in series or parallel with this instrument?	**Marks 05** **CLO 02**

Q1(a) A student mistakenly connects an Ammeter in parallel in a ckt. what will happen? Explain briefly.

Ans Ammeters have alow resistance.
An Ammeter is Design to be connected in Series so that Current passes through it.
Since you don't want to change the Original ckt.
It's best of the Ammeter has a very low resistance.
Adding a very low resistance in Series means the Current won't decrease that much and the low resistance Takes a small share of the voltage.
The problem with Connecting an Ammeter in Parcallel.

if you connect an Ammeter in parcallel then there are Two problems.
The first is that you haven't put the Ammeter in the way of the Current you're Trying to Measure so you Can't be Measuring it properly.
The second is that the Current drawn increases so you're changing the current you're Trying To Measure.
A low resistance in parallel with a High resistance has an effective resistance of a bitble less than the low resistance.

Q2(b) A student mistenly connects a voltmeter in series in a CKt. what will happen? Explain briefly?

Ans voltmeter have a very high resistence. when you say that you connect a voltmeter in series to the supply, I will Assume that the other end of the voltmeter is connected through a ~~high~~ Constant load impedance to ~~sy~~ supply. Celse how are you going to connect in series! The Load Current will be reduced and nothing happens to voltmeter.

~~Connects a voltmeter in series.~~
The problem with Connecting a voltmeter is Series.
if you breack a circuit and insert a voltmeter then you're introducing a big resistance into the CKt and so the current is small everywhere.
This means the Bulb will be out, which means you're not measuring the voltage across a bulb when it's lit.

Q2(a) Random error Cannot be easily reduced in measurements.
Just This statement.

Ans

The main reason For random error are limitations of Instruments.
Environmental factor, and slight variations in procedure.

for example.

when Weighing yourself on a Scale, you position yourself slightly differently each Time.

when Taking a volume reading in a Flask you may read the value From a different Angle each Time.

Measuring your height is Affected by minor posture changes.

Reading must be estimated when they Fall between marks on a scale or when the thickness of a scale a measurement marking is Taken in to Account.

Q1(b) what are the different reason due to which gross occurs in measurement? Explain briefly?

Ans The category basically Takes in Account human oversight and other mistake. while reading recording and the readings.

The most common of error, The human error in the measurement Fall under this category of error in measurement.

For Example:

The person Taking the reading From the meter of Instrument he may read 23 as 28.

Gross error can be Avoided by using Two suitable measures and They are written below.

A proper care should be Taken in reading recording the Data.

Also Calculation of error should be done Accurately.

By increasing the number of experimenters we can reduce the gross error. if each experimenter Take different reading at different points, then they taken average of more readings we can reduce the gross error.

Q3(a) what will happen if a spring in not Connected with the Coil of a moving Coil galvanometer? Explain briefly?

Ans There are normally Two. They provide The Electrical Connection to the Coil on the Armature. The fixed-to-moving Connection.

But that isn't why They are springs. They are Torsional spring providing the restoring force that pushes the pointer back to Zero.

is The hair spring that make the deflection proportional to the force. And Since the force a an Analogue to the Current, It permits us to draw an Analogue Scalevunder the pointer and measure the Current.

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(Q3(b)) A student is Performing an Experiment in the laboratory during which he finds out that the measuring instrument is giving a Full scale Deflection For a current of 10μA. He wants to measure a voltage of 30V with the help of this measureing instrument. Now what should be the Appropriate value of the resistor to be added with this instrument so that it can measure up to 30V? Moreever should be resistor be connected in series or parallel with this instrument?

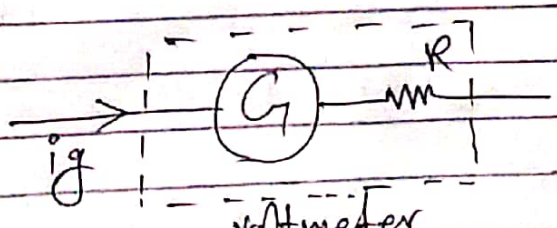
Given Data

$V = 30V$
$I = 10 \times 10^{-6}$
$G = 0\Omega$ because G is neglected.

Required

$R = ?$

Solution.



we know that

$V = ig \times (G + R)$

V = Maximum potential difference

C_G = Resistance of Galvanometer

R = High value of Resistor.

i_g = Current through Galvanometer.

$V = i_g \times (C_G + R)$

$\frac{V}{i_g} = C_G + R$

$\frac{V}{i_g} - C_G = R$

we neglet

$R = \frac{20}{10 \times 10^{-6}} - 0$

$R = \frac{20}{10 \times 0.000001}$

$R = \frac{20}{0.00001}$

$R = 2,000,000$

$R = 2 \times 10^6$

$R = 2 mega \Omega$

Find through ohm law

$R = \frac{20}{10 \times 10^{-6}} - 2 meg\ (10^6)$

$R = 2,000,000 - 2 mega \times 1,000,000$

$R = 2,000,000 Mega - 2,000,000 Mega$

$R = 0$

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