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

Course Details

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

Student Details

Name: IQBAL HUSSAIN **Student ID:** 13690

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

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Q:1 (a) A student mistakenly connects an ammeter in parallel in a Circuit. what will happen? Explain Briefly?.

Ans: if the ammeter setting is hooked up in parallel with a very low resistance in the ammeter, all of the available current will flow through the ammeter, possibly damaging it. and if it is not damaged, it won't give a typical reading for the circuit being tested, because the circuit has been altered.

if you connect an ammeter in parallel then there are two problems.

the first is that you have not put the ammeter in the way of the current you are trying to measure so you can't be measuring it properly.

The Second is that the current you are trying to measure. A low resistance in parallel with a high resistance has an effective resistance of a little less than the low resistance. the low resistance ammeter makes the effective resistance of the circuit very low and

So the current is very big. the ammeter actually shorts out the Component it's trying to measure the current through.
this can demage the ammeter because a very big current flows in it.

Q: 1 (b) A student mistakenly connects a voltmeter in series in a circuit what will happen? Explain briefly.

Ans:- Voltmeter has a very high resistance if it is connected in series with the Circuit, very small amount of current will flow through the circuit and voltmeter will show the potential drop between its two terminals. it can be considered as an open circuit.
So no voltage drop occour. voltage in same line is zero. its indicate zero.
So, voltmeter is always Connected in paralled.

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Q:2 (a) Random error cannot be easily reduced in measurments? ~~Explain Briefly~~. Justify this Statement.

Ans: A random error makes the measured value both smaller and larger than the true value, they are errors of precision. Random errors occour by chance and cannot be avoided. Random error is due to factors which we do not or cannot control. Random error also called system noise or random variation has no pattern. One minute your readings might be too Small. the next they might be too large. You cannot predict random error and these errors are usually unaviodable.

No matter how careful you are, there is always errors in a measurement. Error is not a "mistake" its part of the measuring Process. In Science measurement error is called experimental error or observational error.

There are two types of error.

Random error & Systematic error.

Causes:

Random error causes one measurement to differ slightly from the next. it comes from unpredictable changes during an experiment. random errors cannot be eliminated from an experiment.

if you take multiple measurements the values cluster around the true value. thus, random error primarily affects precision. Typically, random error affects the last significant digit of a measurement.

Example:

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 measurement marking is taken into account.

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Q 2 (b) What are the different reasons due to which gross error occours in measurement? explain Briefly.

Ans:

Gross errors are caused by mistake in using instruments or meters. calculating measurment and recording data results. the best example of these errors is a person or operator reading pressure gage 1.01N/m2 as 1.10N/m2 it may be due to the person's bad habit of not properly remembering data at the time of taking down reading. writing and calculating and then presenting the wrong data at a later time. this may be the reason for gross errors in the reported data, and such errors may end up in calculation of the final results, thus deviating result.

Q.3 (a) What will happen if a spring is not connected with the coil of a moving coil galvanometer?

Ans:. They provide the electrical connection to the coil on the armature.
the fined to moving Connection But that isn't why they are springs. they are torsional springs providing the restoring force that pushes the pointer back to Zero.
it is the hair springs that make the deflection proportional to the force. And since the force is proportional to the current, it permits us to draw an analogue Scadevander the pointer and measure the current.

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Q:3 (b)

Ans:

Given data:

$I_g = 10\mu A$

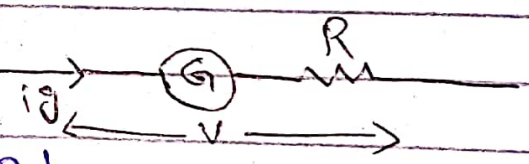
$V = 20\,v$

$G = 0\,\Omega$ because G is neglected

Required:

$R = ?$

Solution:



$$V = i_g (G + R)$$

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

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

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

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$$R = \frac{20}{10 \times 10^{-6}} \quad \text{--- (i)}$$

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

$$R = 2000000$$

$$\{R = 2M\Omega\}$$

And the resistor will be connected in series.