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

Course Details

Course Title: Instrumentation and Measurement **Module:** 6th (BE)
Instructor: Engr 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**

Q 1 (a):. A Student mistakenly Connect an ammeter in Parallel in a Circuit. What Will happen.

Ans: Ammeter always Connected in Series Because Ammeter used to measure maximum Current. It has very low resistance. If it is Connected in Parallel then Ammeter Will burn out Because Ammeter is designed to measure Current

b) A Student mistakenly Connect a Voltmeter in Series in a circuit What Will happen.

Ans:. Voltmeter always Connected in Parallel Because Voltmeter used to measure maximum Voltage. It has very high resistance. If it is connected in Series then Voltmeter show zero deflection Because Voltmeter is designed to measure Voltage.

Q 2(a):

Random error Cannot be easily reduced in measurement Justify this Statment

Ans: A random error makes the measured value both Smaller and larger than the true value. they are error of Precision. Random error is due to factor which we Cannot Control. It may be too expensive. or we may be to ignorant of these factors to control them each time we measure. It may even be that Whatever we are trying to measure is changing in time or is fundamentally Probabilistic. Random error often occurs when instrument are Pushed to their limits. These error Cannot be reduced in measurement Because we Cannot measure the exact Value

Example: If a Quantity has Value 0.7071 then we Cannot use this exact Value in calculation So this error increases as calculation increases

b) What are the different reason due to which gross error occurs in measurement:.

Ans: Manual errors in reading instruments and calculating measurement results are known as gross error.

This category basically takes into account human oversight and other mistake while reading, recording and the readings. The most common of errors. the human error in the measurement fall under this category of errors in measurement

Example:. The person taking the reading from the meter of the instrument he may read 23 as 28.

Q No 3 (a):

What will happen if a spring is not connected with the coil of moving coil galvanometer.

Ans: They are torsional springs providing the restoring force that pushes the pointer back to zero. It is the hair spring that make the deflection proportional to the force. And since the force is proportional to the current, it permits use to draw an analogue scale under the pointer and measure the current.

If a spring is not connected to the coil then the pointer not goes back to zero.

Example: If the meter read 8A current by connected the meter in series. if the meter disconnect then meter show 0A instead of zero Ampere.

b)

Given data:

Current = I_g = 10μA

Voltage = V = 20V

Required:

R = ?

Formula:

$V = IR$

$V = I_g(G+R)$

Solution:

$V = I_g(G+R)$ ∴ G is neglicted

$\frac{V}{I_g} = 0+R$

$\frac{V}{I_g} = R$

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

$R = 2 \times 10^6 \Omega$

$R = 2M\Omega$

Resistor Connected with Series