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: ABDUL BASIT   **Student ID:** 13684

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 circuit. What will happen? Explain briefly.

Answer: Two things may happen if an ammeter is connected across in a parallel in a circuit.

1   The ammeter may cause a short circuit due to its very low ohmic shunt resistance.

2   The ammeter moving coil may burn, destroying the meter completely.

Q1 (B) A student mistakenly connects a voltmeter in series in a circuit. What will happen? Explain briefly.

Answer: As **voltmeter** is a device of having high resistance. If student connect it in series that would make circuit transformed totally, draws very less current than normal and load cannot be supplied with required power.

Q2 (A) Random error cannot be easily reduced in measurements. Justify this statement.

Answer: Random errors in experimental measurements are caused by unknown and unpredictable changes in the experiment. These changes may occur in the measuring instruments. **Random errors** occur by chance and **cannot** be avoided. **Random error** is due to factors which we do not, or **cannot**, control.

Examples of causes of random errors are:

- electronic noise in the circuit of an electrical instrument,
- Irregular changes in the heat loss rate from a solar collector due to changes in the wind.

Q2(B)What are the different reasons due to which gross error occurs in measurement? Explain briefly?

Answer: Gross errors can be defined as physical errors in analysis apparatus or calculating and recording measurement outcomes. The gross error occurs because of the human mistakes. For examples consider the person using the instruments takes the

wrong reading, or they can record the incorrect data. Such type of error comes under the gross error. The gross error can only be avoided by taking the reading carefully.

Q3(A) What will happen if a spring in not connected with the coil of a moving coil galvanometer? Explain briefly.

Answer.: If spring is not connected then there will be no controlling torque which resultantly won't be possible to bring the pointer back to its original position when the flow of current stops as force is proportional to current.

Formula : $\tau = NIAB\sin\theta$

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 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?

ANSWER ON NEXT PAGE

Abdul-Basit 13684.

Question No 3(b)

Given data:-

$$I_g = 10 \mu A = 10 \times 10^{-6}$$

$$V = 20 v$$

measuring instrument is galvanometer
which value will be neglect $= G = 0$.

Required.

$$R = ?$$

b

Sol

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

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

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

So putting value

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

$$R = 2 M\Omega \ Ans.$$

So resistance will be $2M\Omega$ for measuring a 20V and connected in series in order Convert galvanometer in to ~~Ammeter~~ Voltmeter. in which we need high resistance.