

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

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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 is 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 $10 \mu\text{A}$. 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

Question No 1 :- (a)

Answer : A student connect an ammeter parallel in a circuit it will short out the load or damage the ammeter

Explanation :- An ammeter has a very low resistance if put in parallel in a circuit. It may draw a heavy current which can result in burning of moving coil, unless we have put a extremely low resistance as a shunt to the ammeter. Due to high current following through the ammeter it will short out the load.

Question No 1 : (b)

A voltmeter connected in series, a very small current will flow or no current will flow in a circuit. Due to high resistance of voltmeter.

Explanation :- voltmeter has very high resistance to

ensure's that its connection do not alter flow of current in circuit. Now if it is connected in series then no current will be there in the circuit due to its high resistance.

Question No 2 :- (a)

Random error cannot be easily reduced in measurement because it may be too expensive to control them in each time measurement are made.

Random errors in experimental measurements caused by unknow and unpredictable changes in the experiment measurements.

Question No 2 :- (b)

Gross error are caused by experimenter carelessness or equipment failure. Some other reasons are calculating measurements, instruments or meters, and recording data results.

The best example of these error is a person or operator reading.

pressure gage 1.01 N/m^2 as 1.10 N/m^2
 It may be due to the person's
 bad habit of not properly
 remembering data at a time of
 taking down reading, writing and
 calculating and presenting the wrong
 data at a later time. This may
 be the reason of gross error
 in the reporting data.

Question No 3 :- (a)

If a spring is not connected with
 the coil of a moving coil
 galvanometer then the pointer connect
 back to zero.

Explanation: The spring provide that
 restoring force pushed the pointer
 back to zero. It is the hair springs
 that make the deflection proportional
 to the force. And the force is
 proportional to the current. It permit
 us to draw an analoge scaled-
 under the pointer and measure
 the current.

Question NO 3: (b)

Given Data :

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

$$V = 20 \text{ V}$$

required :

$$R = ?$$

Solution :

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

$$V / I_g = G + R$$

$$R = V / I_g - G$$

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

$$R = 2,000,000$$

$$R = 2 \times 10^6 = 2 \text{ Mega } \Omega$$

So resistance $2 \text{ Mega } \Omega$ meaning
 20 V and connected in
Series