Mid Semester 2015 (G1 & G2)

11/15

1. Accuracy and Precision are similar and yet they are different. How?
   a) Accuracy of an instrument is relative to a standard instrument while precision of an instrument is relative to measured variable. They both have same unit
   b) Precision is the difference between the accuracies exhibited by the same instrument at different measurement conditions
   c) Precision is a measure of the degree to which successive measurements differ from one another
   d) Precision is a measure of reproducibility of measurements. Each measurement is obtained with a degree of error. The difference(s) amongst these is a measure of precision.
   e) All of the above

2. What is sensitivity?
   a) It is a dimensionless unit quantity that gives an indication of speed of response of an instrument
   b) It is a reciprocal of quantity being measured.
   c) It is a quantity that gives an indication of speed of response of an instrument
   d) It is the ratio of output signal change to a change of input or measured variable.
   e) c and d

3. Explain the term, resolution of an instrument
   a) Discrimination factor between instrument readings
   b) The smallest change in measured value to which the instrument will respond without an impulse
   c) The smallest division on the instrument scale of reading
   d) a & c
   (e) It is the noise component of a measured quantity.

4. Error is an inevitable quantity in measurement. Why
   a) Because no instrument, be it human, scientific or otherwise, can measure the absolute value of any quantity
   b) Because error is a measure of accuracy
   c) Because measured variables are always disturbed from their state of rest when being measured
   d) Because error is a natural phenomenon
   e) All the above

5. There are three main types of error. These are
   a) Gross, Net, Random; b) Gross, Systematic, Random; c) Human-made, System, Random; d) Human-made, Gross, Random; e) All of the above

6. A voltmeter having a sensitivity of 1,000 ohms per volt reads 100V on its 0-150V scale when connected across an unknown resistor in series with a milliammeter. When the milliammeter reads 5mA, calculate apparent and the actual resistance of the unknown resistor.
   a) 20kΩ, 23.08kΩ, b) 20Ω, 23.08Ω, c) 23kΩ, 20kΩ d) 23Ω, 20Ω, e) 23.08Ω, 20kΩ

7. The relationship between instrument accuracy and meter reading accuracy is
   a) Instrument Accuracy = (Meter Reading/ Full Scale Deflection)*Meter reading Accuracy
   b) Meter Reading Accuracy = (Meter Reading/ Full Scale Deflection)*Instrument Accuracy
   c) Instrument Accuracy = (Full Scale Deflection/Meter Reading)*Meter Reading Accuracy
   d) Meter Reading Accuracy = (Full Scale Deflection/Meter Reading)*Instrument Accuracy
   e) Meter Reading Accuracy = (Full Scale Deflection*Meter Reading)/Instrument Accuracy

8. Name two significant features that are required to accurately define precision or that characterized precision
   a) Number of measurements, conformity b) Number of significant figures to which a measurement is expressed, and discrepancies among the measured quantities c) Number of decimal places the measurement is expressed, conformity d) Repeated measured quantities are very close and the average figure is expressed as a whole number e) Number of decimal places the measured quantity is expressed, little or no error among the measured quantities

9. Add 825 ± 1% to 625 ± 2%
   a) 1,450 ± 3%, b) 1,450 ± 20.75, c) 1,450 ± 14.50, d) 1,450 ± 1.43%, e) 1,450 ± 1%,

10. Subtract 625 ± 1% from 825 ± 2% (give your answer to the nearest whole number)
    a) 200 ± 3%, b) 200 ± 2, c) 200 ± 10, d) 200 ± 5%, e) c & d

11. The common methods/ways of eliminating instrument (Systematic) errors is
    a) By selecting a suitable instrument for the particular measurement application, By applying correction factor after determining the amount of instrument error and by inappropriate adjustment

b) By selecting a suitable instrument for the particular measurement application, By applying correction factor after determining the amount of instrument error and by calibrating the instrument against standard instrument

c) By changing the aging part of the instrument, By applying correction factor after determining the amount of instrument error and by calibrating the instrument against a non-standard instrument

d) All of the above

e) None of the above

12. Name four standards of measurement that are available world over and their levels of accuracy

a) International Standard (5:10^5), National Standard (1:10^6), Local Standard (1: 10^8), Factory Standard (1:10^{15})

b) International Standard (1:10^{15}), Basic Standard (1:10^6), Secondary Standard (1: 10^8), Factory Standard (5:10^6)

c) International Standard (1:10^8), National Standard (1:10^{12}), Reference Standard (1: 10^6), Working Standard (5:10^6

d) International Standard (1:10^{15}) , Primary Standard (1:10^8), Secondary Standard (1: 10^6), Working Standard (5:10^6

e) All of the above

13. Standard of measurement is kept somewhere in Germany. This place is called

a) Physikalish Technische Rheichsanstalt b) Chemikalish Technische Reichsanstalt c) National Bureaux of Standards d) Physikalish Technische Reichsanstalt e) Bureau International des Poids

14. In a multi-range ammeter, there are two types of design. Name these designs

a) Combination of Resistors in **Parallel** is in **Series** with the meter: **Parallel/Series** and Combination of **Series** resistors is in **Series** with the meter: **Series/Series**

b) Combination of Resistors in **Series** is in **Parallel** with the meter: **Series/Parallel** and Combination of **Parallel** resistors is in **Parallel** with the meter: **Parallel/Parallel**

c) Parallel/Parallel and Series/Series

d) Series/Series and Parallel/Parallel

e) Series/Series and Parallel/Series

15. In a multi-range voltmeter, there are two types of design. Name these designs

a) Combination of Resistors in **Series** is in **Series** with the meter: **Series/Series** and Combination of **Parallel** resistors is in **Parallel** with the meter: **Parallel/Parallel**

b) Combination of Resistors in **Parallel** is in **Series** with the meter: **Parallel/Series** and Combination of **Series** resistors is in **Series** with the meter: **Series/Series**

c) Parallel/Parallel and Series/Series

d) Parallel/Series and Series/Series

e) Series/Parallel and Parallel/Parallel