Sardar Patel University

[53/A-12] **B.Sc. (semester-III) CBCS Examination Nov.-2019 (NC)**

Subject Code: US03EELE02

Subject: Instrumentation

Date: 30/11/2019; Saturday

Time: 2:00 to 4:00 pm

Maximum Marks: 70

Q-1   Multiple Choice Questions.   (10)

1. _____ element is used for converting one form of energy in to other form of energy
   a) transducer   b) data presentation
   c) signal conditioning   d) transformer

2. Current gain of the amplifier is given by _____.
   a) output voltage / input voltage   b) output power / input power
   c) output current / input current   d) none

3. Which class of error mainly covers human mistake?
   a) Gross error   b) Dynamic error
   c) Random error   d) None

4. Deviation from the true value of the measured value is known as _____.
   a) Resolution   b) error
   c) Accuracy   d) Sensitivity

5. 1 Giga is equivalent to _____.
   a) 10^{09} b) 10^{12}
   c) 10^{15} d) 10^{18}

6. 1 foot = _____ cm.
   a) 3.48   b) 30.48
   c) 100   d) 300.48

7. 1 inch = _____ mm.
   a) 25.4   b) 2.54
   c) 0.254   d) 0.0254

8. In an Ayrton galvanometer the resistor are connected in a _____.
   a) parallel   b) Series
   c) series and parallel   d) none

9. When the large current is to be measured, it necessary to bypass the major part of the current through the resistor is called as _____.
   a) shunt   b) parallel
   c) both a and b   d) series

10. _____ is the voltmeter sensitivity.
    a) S=1 / Vfsd   b) S=I / Ifsd
    c) S=V/ Ifsd   d) S=1 / Ifsd

Q-2   Answer in short. (Any Ten)   (20)

1. Draw the block diagram of Bourdon tube pressure gauge.

2. Give the difference between self generating and power operated instruments.

3. Explain basic functional element of a measuring system.

4. Define: Error and Resolution

5. Define: Instrument and Accuracy.

6. Explain Standard deviation.

7. Explain international system units.

8. Explain fundamental and derived units?

9. What are the primary and auxiliary fundamental units?

10. Draw the circuit diagram of Ayrton shunt.

11. Draw the basic DC voltmeter circuit diagram.

12. Explain multirange voltmeter.

Q-3   Explain Typical application of instrument systems.   **(10)**

OR

Q-3   Explain Manually operated and Automatic types of instruments in detail with   **(10)**
necessary diagram.

Q-4 **A**   Explain types of errors in detail.   **(07)**

     B   A set of independent voltage measurement taken by four observers was recorded as   **(03)**
117.02 V, 117.08 V, 117.11 V and 117.03 V.
Calculate (A) average voltage   (B) the range of error.

OR

Q-4 **C**   A set of independent current measurement was taken by six observers and recorded   **(07)**
as 12.8mA, 12.2mA, 12.5mA, 13.1mA, 12.9mA, 12.4mA.
Calculate (a)   the arithmetic mean
           (b)   the standard deviation of the readings
           (c)   the probable error.

     D   Explain Arithmetic mean.   **(03)**

Q-5 **A**   Derive electric and magnetic units.   **(07)**

     B   The floor area of an office building is 5000 m^2. Calculate the floor area in ft^2.   **(03)**

OR

Q-5 **C**   Express the density of water 62.5 lb/ft^3 in to (a) lb/in^3 (b) g/cm^3 **(07)**

     D   A flux density in CGS system expressed as 20 $Maxwell/cm^2$. Calculate the flux   **(03)**
density in lines / in^2. (1 Maxwell= 1 line)

Q-6   Explain permanent magnet moving coil mechanism in detail.   **(10)**

OR

Q-6   Explain Torque and Deflection of galvanometer.   **(10)**

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