[10/A-11]

Sardar Patel University
B.Sc. (semester-III) CBCS Examination Sept.-2022 (NC)
Subject Code: US03EELE02   Subject: Instrumentation
Date: 29/09/2022   Time: 12-30 Am. to 2-3.0 P.m.
                                               Maximum Marks: 70

Q-1   **Multiple Choice Questions.**   **(10)**

1.   _____ is a deviation from the true value of the measured variable.
      a) error   b) Resolution
      c) Accuracy   d) Instrument

2.   _____ 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

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

4.   Voltage gain of the amplifier is given by _____.
      a) Vi/ Vo   b) Vo
      c) Io/ Ii   d) Vo/ Vi

5.   1 micro is equivalent to _____.
      a) 10^{-06} b) 10^{-09}
      c) 10^{15} d) 10^{12}

6.   Coding has been developed for _____ signal only.
      a) analog   b) digital
      c) AC   d) all of these

7.   The smallest change in the measured value to which the instrument is respond is called as _____
      a) error   b) Resolution
      c) Accuracy   d) Sensitivity

8.   1 Foot = _____ cm (/ 3.48)
      a) 30.48   b) 2.54
      c) 3.48   d) 25.4

9.   The other name of universal galvanometer is _____.
      a) Arsenol   b) Suspension
      c) PMMC   d) Ayrton

10.   The equation for the developed torque, derived from the basic law for the electromagnetic torque is _____.
      a) T=B*J*I*N   b) T=I*N
      c) T=A*I*N   d) T=B*A*I*N

Q-2   **Do as Directed. (Fill in the blanks and True/False)**   **(08)**

1.   Unit of the resistor is Hertz. (True / False)

2.   The unit of electric charge is coulomb. (True or False)

3.   1 atto is equal to 10^{18}. (True or False)

4.   Gross errors are mainly covers human error. (True / False)

[P.T.O.]

5. Probable error is gives as _____. ($\pm0.6745 \sigma$ / $\pm0.006745 \sigma$)

6. 1 nano farad is equal to _____ farad. (10^{-9} or 10^{-12})

7. Reciprocal of the full scale deflection current of the basic movement is called as _____. (Sensitivity / Resolution)

8. Resistance of the shunt is given as _____. (Rs / Rh)

Q-3   **Answer in short. (Any Ten)**   **(20)**

1. Explain self-generating types of instruments.

2. Explain basic functional element of a measuring system.

3. What are Active and Passive instrument?

4. Define: Error and Accuracy.

5. Explain Average Deviation.

6. Define: Instrument and Accuracy.

7. Explain Probable error.

8. Give the unit of length, Area, Mass and volume.

9. Differentiate fundamental and derived units?

10. Draw the basic circuit diagram of Multiple resistors.

11. Draw the circuit diagram of universal Galvanometer.

12. What does stand for PMMC and LVDT?

Q-4   **Answer the following question (Any Four)**   **(32)**

1. Draw the functional block diagram of Bourdon tube pressure gauge and explain in detail.

2. Explain Deflection and Null types of instruments in detail with necessary diagram.

3. Explain types of errors in detail.

4. A set of independent current measurement was taken by six observers and recorded 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.

5. Calculate the following example.
   a) Express the density of water 62.5 lb/ft^3 in to (a) lb/in^3 (b) g/cm^3
   b) The velocity light in free space is given as $2.997925*10^8$ m/s. Express the velocity of light in Km/hr.

6. Derive electric and magnetic units.

7. Explain permanent magnet moving coil mechanism in detail.

8. Explain in detail DC voltmeter.

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