[19] SEAT No._____ No. of Printed Pages: 2

Sardar Patel University

B.Sc. (semester-III) CBCS Examination .-2021 (NC)

Subject Code: US03EELE02

Subject: Instrumentation

Date: 02/01/2021; Saturday

Time: 10:00 am to 12:00 pm

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. A device for determining the voltage or magnitude of a quantity or variable is called as _____.
   a) error b) Resolution
   c) Accuracy d) Instrument
3. The _____ errors are due to unknown causes and occur even when all systematic errors have been accounted for.
   a) Random error b) Dynamic error
   c) Gross error d) None
4. Element that senses and converts the desired input to more convenient and practical form to be handled the measurement system is called as _____.
   a) data presentation b) signal conditioning
   c) calibration element d) Transducer
5. Current gain of the amplifier is given by _____.
   a) output power / input power b) output voltage / input voltage
   c) output current / input current d) none
6. 1 Tera is equivalent to _____.
   a) 10^{3} b) 10^{6}
   c) 10^{9} d) 10^{12}
7. 1 Pico is equivalent to _____.
   a) 10^{-12} b) 10^{-09}
   c) 10^{-06} d) 10^{-03}
8. In an Ayrton galvanometer the resistor are connected in a _____.
   a) Series b) parallel
   c) series and parallel d) none
9. The other name of Ayroton galvanometer is _____.
   a) universal b) Suspension
   c) PMMC d) Arsenol
10. _____ is the voltmeter sensitivity.
    a) S=1 / Ifsd b) S=Ifsd
    c) S=V/ Ifsd d) S=1 / Vfsd

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

1. _____ is used for manipulating/processing the output of the transducer in a suitable form. (transducer element / Signal condition element)
2. _____ for giving the information about the measured variable in quantitative form. (data presentation element / intermediate modifying element)
3. _____ are mainly covers human error.(Gross error / Random error)
4. Probable error is gives as _____. ($\pm 0.6745\ \sigma$ / $\pm 0.006745\ \sigma$)

5. 1 Hecto is equal to 10^2. (True or False)
6. 1 atto is equal to 10^{18}. (True or False)
7. The equation for the develop torque ,derived from the basic law for electromagnetic torque is given as T=B*A*I*N. (True or False)
8. The unit of electric charge is coulomb. (True or False)

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

1. Explain self-generating types of instruments.
2. Draw the functional block diagram of Bourdon tube pressure gauge.
3. Explain Analog and Digital types of instruments.
4. Define: Sensitivity and Resolution
5. Define: Instrument and Accuracy.
6. Explain Arithmetic mean.
7. What are the primary and auxiliary fundamental units?
8. Explain fundamental and derived units?
9. Explain international system units.
10. Draw the basic DC ammeter circuit diagram.
11. Draw the circuit diagram of series type ohmmeter.
12. Draw the curve of dynamic behaviour of galvanometer.

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

1. Explain Typical application of instrument systems.
2. Explain Deflection and Null types of instruments in detail with necessary diagram.
3. Explain types of errors in detail.
4. Ten measurement of resistance of a resistor gave 101.2 Ω ,101.7Ω,101.3 Ω,101.0 Ω,101.5 Ω,101.3Ω,101.2 Ω,101.4 Ω,101.3 Ω,101.1 Ω. Calculate
   (1) Arithmetic mean (2) Standard deviation (3) Probable error
5. Derive electric and magnetic units.
6. 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) A flux density in CGS system expressed as 20 $Maxwell/cm^2$. Calculate the flux density in lines / in^2. (1 Maxwell= 1 line)
7. Explain permanent magnet moving coil mechanism in detail.
8. Explain in detail DC voltmeter.