Question Paper Code : X 20488

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Fourth Semester

Electrical and Electronics Engineering

EE 6404 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2013)

Time : Three Hours　　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Answer ALL questions

PART – A　　　　　　　　　　　　　　　(10×2=20 Marks)

1. A moving coil voltmeter has a uniform scale with 100 divisions, the full scale reading is 200 V and 1/10 of a scale division can be estimated with a fair degree of certainty. Determine the resolution of the instrument in volt.

2. Give the formula to calculate Standard Deviation (SD) and Variance (V) in the analysis of random errors.

3. Ammeters are connected in _____ in the circuit and therefore they should have a _____ electrical resistance.
   a) Series and high
   b) Series and low
   c) Parallel and low
   d) Parallel and high.

4. Define creeping.

5. List down the applications of D.C. potentiometer.

6. Give the condition(s) for balance in a Wheatstone bridge.

7. Classify the printers based on printing methodology.

8. Bring down the few basic components of data logger.

9. Differentiate the sensor and the transducer.

10. List down any four applications of smart sensors.

PART – B   **(5×13=65 Marks)**

11. a) i) A step input of 5A is applied to an ammeter. The pointer swings to a voltage of 5.18A and finally comes to rest at 5.02A.

   a) Determine the overshoot of the reading in ampere and in percentage of final reading.

   b) Determine the percentage error in the instrument.   **(4)**

   ii) Classify the standards of measurement by their function and application and also explain the primary standard and secondary standard.   **(9)**

(OR)

   b) With help of block diagrams, explain the functional elements of an instrumentation system.   **(13)**

12. a) i) With neat diagram, explain the attraction-type Moving-Iron (MI) instruments.   **(7)**

   ii) With help of circuit, explain the step-by-step method to determine the magnetizing curve (B-H).   **(6)**

(OR)

   b) With neat diagrams, explain the construction and theory of operation for Ferrodynamic type frequency meter.   **(13)**

13. a) i) With neat configuration and phasor diagram, explain the Maxwell's Induction bridge and also derive the mathematical expression to find the unknown quantities in the bridge circuit.   **(9)**

   ii) List down the factors that classify the types of phase meter and give it types.   **(4)**

(OR)

   b) i) Discuss the grounding techniques in detail to reduce the ground loop interference signal.   **(8)**

   ii) With neat diagram, explain the measurement of self inductance using A.C. potentiometer.   **(5)**

14. a) With neat diagram, explain the X-Y recorder and also discuss the advantages and applications.   **(13)**

(OR)

   b) With neat diagram, explain the principle and working of Cathode Ray Oscilloscope (CRO).   **(13)**

15. a) With help of block diagram, explain the components of data acquisition system and also discuss the advantages, disadvantages and applications for the same. **(13)**

(OR)

b) i) Explain the working of D/A converter with a neat diagram. **(8)**

ii) List down the factors to be consider while selecting the transducer. **(5)**

PART – C **(1×15=15 Marks)**

16. a) With help of an equivalent circuits and phasor diagrams, derive and explain the transformation ratio and phase angle for current transformer. **(15)**

(OR)

b) With help of working principle diagram, explain the Liquid Crystal Display (LCD) and also give the comparison of Cathode Ray Tube (CRT) display and Liquid Crystal Display (LCD). **(15)**

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