Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 71775

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

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. Define the terms accuracy and precision.

2. What is calibration?

3. State the reason for the two types of errors in a potential transformer.

4. List out various causes which incur errors in a dynamometer wattmeter.

5. What are the main causes of ground loop currents?

6. State the features of Ratio Transformers which make them popular for bridge applications.

7. A 3-1/2 digit voltmeter is used for measurement. What is its resolution? How it would display a reading of 12.57 V in 100 V scale?

8. Why is a delay line used in the vertical section of an oscilloscope?

9. What are the basic requirements of a transducer?

10. Arrange the following ADCs in the descending order of speed?
    (a) Integrating Type
    (b) Counter Type
    (c) Successive Approximation Type and
    (d) Flash Type.

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail the types of errors and sources of errors in measurement techniques. (13)

Or

(b) (i) Discuss in detail various dynamic characteristics of a measurement system. (8)

(ii) A set of ten readings were recorded while measuring the stator temperature of an electric machine. The readings were 52.4, 55.1, 56, 55.4, 57, 54, 53.7, 51.7, 54.9, 53.7 degree Celsius. Calculate :

(1) The standard deviation,

(2) The probable error of one reading and

(3) The probable error of mean. (5)

12. (a) Describe the construction and working of an induction type wattmeter. Also derive an expression for the average torque which is proportional to power. (13)

Or

(b) (i) Discuss the step by step method of determination of B-H curve of a magnetic specimen with necessary circuit arrangement. (7)

(ii) Explain briefly any one method of measurement of iron losses each from Wattmeter method with neat schematic arrangements. (6)

13. (a) With the help of Schering bridge explain how loss angle of a dielectric can be determined. (13)

Or

(b) Explain the different types of interferences and their screening methods to reduce them. (13)

14. (a) (i) Describe various types of sweep used in CRO. (5)

(ii) Explain the theory of LCD displays. Compare LCD displays with LED displays. (8)

Or

(b) (i) Describe any one recording method in magnetic tape recorder. (5)

(ii) Write a short note on Plotter. Compare it with a printer and state its uses. (8)

15. (a) Explain with neat illustrations the working principle of LVDT. (13)

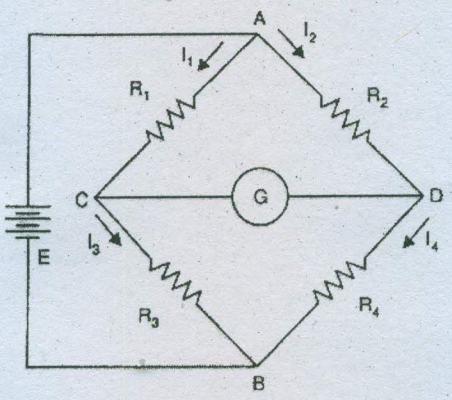
Or

(b) With a functional block diagram explain the concept of Data Acquisition System. (13)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain briefly different classifications of standards. (7)

(ii) In the Wheatstone bridge shown below the value of $R_1 = 200\,\Omega$, $R_2 = 800\,\Omega$ and $R_3 = 300\,\Omega$. The bridge is excited by a 200 V DC source. Determine the power dissipated by the resistor R_4 when the bridge is balanced. (8)



Q.No. 16(a) (ii)

Or

(b) (i) Draw the block diagram of a CRO and explain briefly its vertical deflection system. (8)

(ii) Discuss briefly the three types of operating torque needed for the satisfactory operation of an indicating instrument. (7)

———————