C 3289

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Sixth Semester

(Regulation 2004)

Electrical and Electronics Engineering

EI 1361 — MEASUREMENTS AND INSTRUMENTATION

(Common to B.E. (Part-Time) Fifth Semester Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the importance of dynamic characteristic of systems?

2. Why must instruments be calibrated?

3. What are the advantages of digital instruments over analog instruments?

4. How are resistors and diodes checked using digital multimeters?

5. Derive the condition for sustained oscillation in feedback oscillators.

6. What is electromagnetic interference in instruments?

7. Write briefly in pink plotter.

8. Explain briefly on magnetic tapes.

9. How are strain gauge used for pressure measurement?

10. What is meant by quantization error?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain on the static and dynamic characteristics of a measurement system.

    (ii) If a set of six observations are as follows :

    1.5V, 3V, 1V, 5V, 2V, 4V.

    Calculate the arithmetic mean, average deviation and standard deviation.   (10 + 6)

Or

    (b) With a neat figure explain briefly on each of the building blocks of a digital display instrument. Write briefly seven segment LED display decoder.   (10 + 6)

12. (a) (i) Write briefly on the various torque in analog indicating instruments.

    (ii) With neat figures explain how frequency of a signal is measured using a CRO.   (6 + 10)

Or

    (b) Write briefly with neat figures on

    (i) Principle of operation of a current transformer.

    (ii) B.H. curve analysis of a magnetic circuit.   (10 + 6)

13. (a) (i) Derive the bridge balance condition for the Maxwell bridge and Schering bridge.

    (ii) Find the equivalent parallel resistance and capacitance that causes a Wein bridge to null if the following components are given :

    $R_1 = 8\,k\Omega$, $C_1 = 6\,\mu F$

    $R_2 = 30\,k\Omega$, $f = 2.5\,kHz$

    $R_3 = 1\,k\Omega$ (10 + 6)

Or

    (b) Discuss briefly on types of instrument errors and instrument faults. With neat figure explain the need of WAGNER'S EARTH (ground) connection in bridge circuit.   (10 + 6)

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14. (a) With neat figures explain the construction and working principle of a digital storage Oscilloscope. Compare its advantages over an analog CRO. (10 + 6)

Or

(b) Write briefly on any TWO : (8 + 8)

(i) Dot matrix display

(ii) Advantage and principle of LCD displays

(iii) Digital data logger.

15. (a) How are A/D converters classified? With neat diagram explain the construction and principle of successive approximation type ADC.

(2 + 14)

Or

(b) (i) Write briefly on thermocouples and thermistors as temperature transducers. (8)

(ii) With neat figure explain LVDT for velocity measurement. (8)