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Question Paper Code : 21391

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/10133 EE 302/080280016 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 — Measurements and Instrumentation for B.E. (Part-Time) Third Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The expected value of the voltage across a resistor is 40V. However the measurement gives a value of 39V. Calculate the absolute error.

2. What are the various important functional elements of a typical measurement system?

3. Draw the circuit of a basic DC voltmeter.

4. Discuss in brief about the hysteresis in B-H curve.

5. How does a Hay's bridge differ from Maxwell's bridge? What is its uniqueness?

6. Which instrument is used for measuring very high resistances found in cable insulations?

7. What are the various components of a recording instrument?

8. Reason out why today's commercial LED monitor have become more popular than their LCD counterparts.

9. What is known as thermocouple effect and how do you use it in a transducer?

10. When do you call an instrument to be intelligent?

PART B — (5 × 16 = 80 marks)

11. (a) Summarise the static and dynamic characteristics of instruments.

Or

(b) (i) How is the statistical analysis of measurement data performed?

(ii) For the given data calculate any three statistically analysed values $x_1 = 49.7$; $x_2 = 50.1$; $x_3 = 50.2$; $x_4 = 49.6$; $x_5 = 49.7$.

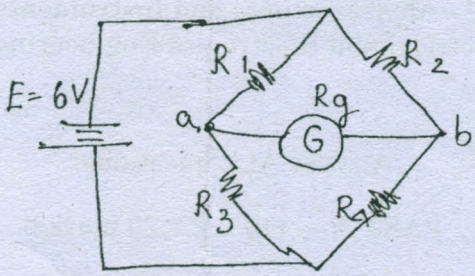
12. (a) (i) What are the main considerations in selecting a voltmeter. (8)

(ii) With a neat block diagram of a digital multimeter explain their working principle. (8)

Or

(b) On what principle a digital frequency meter works? Explain with neat diagrams.

13. (a) An unbalanced wheatstone bridge is given below in Fig. 13 (a). Calculate the current through the galvanometer.



$R_1 = 1\ k\Omega$
$R_2 = 2.5\ k\Omega$
$R_3 = 3.5\ k\Omega$
$R_4 = 10\ k\Omega$
$R_g = 300\ \Omega$
$E = 6\ V$

Or

(b) (i) Give the construction of a Anderson's bridge and derive its balance conditions. (10)

(ii) Write a detailed technical note on grounding techniques. (6)

14. (a) What is the advantage of using a magnetic tape reorder? Explain how the tape reorder works with suitable diagrams. (16)

Or

(b) Bring out how data loggers measure and record data effortlessly, accurately and quickly explaining the working of them. (16)

15. (a) Explain the classification of transducers and discuss about the selection criteria for them.

Or

(b) Explain the following :

(i) Piezoelectric transducers

(ii) Smart sensors.

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