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Question Paper Code : 21497

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Third Semester

Electrical and Electronics Engineering

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

(Regulations 2008/2010)

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

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Null methods are highly accurate, but it will not used for industrial process application for the measurement. The above statement is true or false and justify your answer.
2. A voltmeter reads 30 V in its 50 V scale. The resistance of the voltmeter coil is 2000 ohm/volt. If the milli ammeter reads 2.5 mA, calculate the gross error.
3. What is creeping in energy meter and how to avoid it?
4. Why the errors occurred in current transformer and how to avoid it?
5. Compare A.C. and D.C. Potentiometer.
6. Write short notes on Grounding Techniques.
7. Compare merits and demerits of LED and LCD.
8. Draw the block diagram of digital CRO.
9. State criteria for the transducer selection for different application.
10. What are all the different elements of DAS?

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PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the following Static and dynamic characteristics (1) Static sensitivity (2) Linearity (3) Input impedance and loading effect (4) Fidelity. (8)
- (ii) A temperature sensitive transducer is subjected to a sudden temperature change. It takes 10 s for the transducer to reach equilibrium condition (5 time constants). How long will it take for the transducer to read half of the temperature difference? (8)

Or

- (b) (i) Find out uncertainty in a measurement to find out the value of K related by the formula $\theta_1 = \theta_2 * \exp(-K * T)$. The value of $\theta_1 = 28.1 \pm 0.2^\circ\text{C}$, $\theta_2 = 18.3 \pm 0.2^\circ\text{C}$, and $T = 6.8 \pm 0.1\text{s}$. (8)
- (ii) Explain different types of errors occurring in a measurement system. (8)
12. (a) (i) Explain ballistic method of measurement of Flux density, Magnetizing force and determination of B-H curve. (10)
- (ii) Explain any one methods of Iron loss measurement. (6)

Or

- (b) The primary exciting current of a current transformer with a bar primary, nominal ration 100/1, operating on an external burden of 1.6 ohm non inductive, the secondary winding resistance bring 0.2 ohm is 1.9 A, lagging 40.6 deg. to the secondary voltage reversed there being 100 secondary turns. With 1 A flowing in the secondary winding, calculate (i) the actual ratio of primary winding current to secondary winding current, (ii) the phase angle between them in minutes. (16)
13. (a) (i) Explain the principle and operation of Wheat stone bridge. (8)
- (ii) Write short notes on Electrostatic and Electromagnetic interference in measurement system and explain how it will affect measurement system. (8)

Or

- (b) (i) With a neat diagram derive the balancing condition for Schering bridge and explain the working operation.
- (ii) State the merits and demerits of Schering bridge. (12 + 4)
14. (a) (i) With a neat diagram explain the working principle and operation of Magnetic tape recording.
- (ii) Explain the different type of magnetic tape recording. (10 + 6)

Or

- (b) (i) With a neat diagram explain the working principle and operation of Data loggers.
- (ii) Write short notes on different data logger configuration. (10 + 6)
15. (a) (i) Explain the principle and different modes of operation of Piezo electric Transducer. (10)
- (ii) A piezo electric crystal has a thickness of 2 mm and voltage sensitivity of .056 v- m/N. It is subjected to pressure of 500K N/m². Calculate the voltage output. If the permittivity of quartz is 40.6 pf/m, what is the charge sensitivity? (6)

Or

- (b) With a neat circuit explain the working principle of (i) Dual Slope ADC (ii) Flash Type ADC (iii) R-2R DAC.
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