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**Question Paper Code : 60497**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/10133 EE 302/080280016 — 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. 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. How are basic instruments converted into higher range ammeter?
4. Define creeping in energy meter.
5. What is the use of earth loop?
6. What is meant by self balancing bridges? Give two examples.
7. Distinguish between LED and LCD.
8. What are the functions of data logger?
9. What is the difference between sensor and transducer?
10. Name some of the active transducers which are used in the measurement of temperature.

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) Describe the construction and working of permanent magnet moving coil instrument. Also derive the expression for deflection. (16)

Or

- (b) Write short notes on :

- (i) Current transformer. (8)  
(ii) Weston frequency meter. (8)

13. (a) (i) In a balanced network, AB is a resistance of  $500\Omega$  in series with an inductor of  $0.18\text{ H}$ , BC and DA are non-inductive resistances of  $1\text{ k}\Omega$  each and CD consists of a resistance  $R$  in series with a capacitor  $C$ . A potential difference of  $5\text{ V}$  at a frequency of  $5000/2\pi$  is applied between points A and C. Determine the values of  $R$  and  $C$ . (8)  
(ii) Draw and explain the balance conditions of a Wheatstone bridge. (8)

Or

- (b) (i) Explain the construction of Anderson's bridge. Derive the unknown quantities at balance condition. Also write its advantages and disadvantages. (10)  
(ii) Determine the insulation resistance of a short length of cable in which voltage falls from  $125$  to  $100\text{ V}$  in  $25$  seconds. The capacity of the condenser is  $600 \times 10^{-12}\text{ F}$ . (6)

14. (a) Explain the principle of working of a X-Y recorder with neat functional diagram. Also mention some applications. (12 + 4)

Or

- (b) With neat figure explain the working principle of a digital storage oscilloscope. What are the advantages over analog CRO? (12 + 4)

15. (a) (i) Describe the construction and working of potentiometer type resistance transducer for measuring linear displacement. (8)
- (ii) Explain the working of D/A converter with a neat diagram. (8)

Or

- (b) (i) What is called Piezo electric transducer? Explain its working with a diagram. (8)
- (ii) Explain how to measure pressure using capacitive type transducer. (8)