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Question Paper Code : 91035

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Fourth Semester

Electrical and Electronics Engineering

EE 3403 — MEASUREMENTS AND INSTRUMENTATION

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Write the reasons for the occurrence of instrumental error.
2. Five measurements of voltage was made and found to be 12.1 V, 12.5 V, 12.3 V, 12.0 V and 12.9 V. Find the standard deviation.
3. Write the equation for deflecting torque in a permanent magnet moving coil meter with the meaning of each symbol in it.
4. Write the disadvantages of moving iron meters.
5. Write the expression for the balance conditions of a wheat stone bridge.
6. What is sliding bridge balance? Where does it occur?
7. What is the function of a transducer?
8. How are transducers classified?
9. Write any two merits of DSO.
10. What is the concept of a virtual instrument?

PART B — ($5 \times 13 = 65$ marks)

11. (a) (i) With a block diagram, explain the functions of each elements of a generalised measurement system. (7)
- (ii) A voltage drop of 112.5 V was measured across a resistor passing a current of 1.62 A. Give significant figures of power dissipated in the resistor. (6)

Or

- (b) Six measurements of the resistance gave 101.2Ω , 101.7Ω , 101.3Ω , 101.0Ω , 105.5Ω and 101.3Ω . Calculate the average deviation and probable error.

12. (a) With a neat diagram explain the construction and working of a moving iron meter.

Or

- (b) With the appropriate diagrams, explain the working of an induction type meters.
13. (a) Draw the circuit diagram and explain the working of an instrumentation amplifiers. Write the overall gain equation.

Or

- (b) (i) Derive the equations for unknown components in a Maxwell's bridge. (8)
- (ii) Explain why the above is unsuited for the measurement of low Q or high Q coil inductances? (5)
14. (a) With a neat circuit diagram, explain the principle of working of a displacement transducer.

Or

- (b) (i) Draw the diagram of a Smart sensor and explain the reasons for preferring it for practical applications.
- (ii) Explain the applications of smart sensors.
15. (a) (i) Give two examples of any two PLC programming applications.
- (ii) Give applications of any one IEEE standard.

Or

- (b) Demonstrate the need and working of data loggers. Augment your answer with suitable diagrams.

PART C — (1 × 15 = 15 marks)

16. (a) Analyse and compare the performance of any two types of A/D and D/A converters.

Or

- (b) Compare virtual instrumentation with traditional instruments, highlighting the advantages of VI.