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Question Paper Code : 11291

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Fourth Semester

Electrical and Electronics Engineering

EE3403 — MEASUREMENTS AND INSTRUMENTATION

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define steady state error.
2. List the main classifications of instruments.
3. List two types of measurements performed by moving coil meters.
4. Give two applications of moving iron meters.
5. What is the main purpose of a Kelvin double bridge?
6. Define an instrumentation amplifier.
7. List the main classifications of transducers.
8. What is a smart sensor.
9. What is an A/D converter?
10. What is meant by Virtual Instrumentation?

PART B — ($5 \times 13 = 65$ marks)

11. (a) Explain the elements of a generalized measurement system with a neat diagram and give examples of each element.

Or

- (b) Distinguish between static and dynamic characteristics of measuring instruments with suitable examples.

12. (a) Explain the principle of operation of a moving coil instrument. Draw a labeled diagram.

Or

- (b) Explain the working of a moving iron instrument with a suitable diagram.

13. (a) Explain the working principle of a Wheatstone bridge and its application in measuring resistance.

Or

- (b) Explain the structure and operation of an instrumentation amplifier. Discuss its advantages over a standard op-amp in measurement systems.

14. (a) Explain the working principles of angular velocity measurement transducers.

Or

- (b) Describe the concept of digital transducers and smart sensors, highlighting their advantages over conventional transducers.

15. (a) (i) Explain the importance of PLC in modern Instrumentation field. (8)
(ii) Write short notes on Virtual Instrumentation. (5)

Or

- (b) Explain the role of instrument standards in ensuring accurate and reliable measurements.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the types and characteristics of A/D converters. Discuss sampling and associated errors.

Or

- (b) Discuss various methods and transducers used for measuring pressure, temperature and displacement with diagrams.