Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91434

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/080280016/10133 EE 302 — 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 — ($10 \times 2 = 20$ marks)

1. Define limiting errors. Derive the expression for relative limiting error.

2. Define linear time invariant and line time variant systems. Give examples.

3. Why PMMC ammeters are the most widely used instrument?

4. An absolute electrometer has a movable circular plate 10 cm in diameter. Determine the potential difference across the plates if the plates during measurement are 6 mm apart and the force of attraction is 4×10^{-3} N.

5. Draw the equivalent circuit and phasor diagram of a potential transformer.

6. Write the working principle of a digital plotter.

7. What is meant by grounding?

8. What are the various detectors that are used in a bridge network?

9. What is transducer? What is the difference between sensor and transducer?

10. What are the advantages of successive approximation type ADC?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the block diagram and functional elements of measurement system with neat diagram. (8)

(ii) Classify and explain the different types of standards and errors of measurements. (8)

Or

(b) (i) With a suitable illustration elaborate the significance of calibrations. (8)

(ii) Write a technical note on static and dynamic characteristics of instrumentation systems. (8)

12. (a) (i) With a neat sketch explain the working principle of PMMC instrument. (8)

(ii) Explain the construction and its working principle of electrodynamometer type wattmeter. (8)

Or

(b) (i) Discuss in detail, about the working principle and characteristics of CT with its phasor diagram. (10)

(ii) Write a technical note on the magnetic measurements. (6)

13. (a) (i) Explain the theory and working principle of Wheatstone's bridge. Derive the relation for finding unknown resistance. (8)

(ii) Describe any one method for the measurement of high resistance. (8)

Or

(b) (i) Explain the comparison method of measurement of inductance by Maxwell's LC bridge with its balance equations. (8)

(ii) Explain the measurement of frequency by Wien's bridge. (8)

14. (a) (i) Discuss the working principle of a Magnetic tape recorder. (8)

(ii) Explain the construction and functionalities of various components of a CRT display. (8)

Or

(b) (i) Compare and contrast the construction, working principle and applications of LED and LCDS. (8)

(ii) Write a detailed technical note on Data loggers. Explain how they differ from Data Acquisition systems. (8)

15. (a) (i) Explain in detail, the working principle of piezoelectric transducers. (8)

(ii) Discuss any one method of D/A converter. (8)

Or

(b) (i) Describe in detail, the working principle of capacitive microphone. (8)

(ii) Write a detailed technical note on smart sensors. Explain also the various built-in features of them compared to conventional sensors. (8)