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Question Paper Code : 33448

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fourth Semester

Electronics and Instrumentation Engineering

EI 1251/EE 1257 — ELECTRICAL MEASUREMENTS AND INSTRUMENTS

(Common to Instrumentation and Control Engineering)

(Regulation 2004/2007)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the types of instruments.
2. What is the need for calibration?
3. Define phantom loading.
4. Write the disadvantages of electro-dynamometer type wattmeter.
5. Classify AC potentiometers.
6. State the errors caused in current transformer.
7. Name some methods used for measuring low resistance.
8. What are the advantages of Kelvin's double bridge?
9. Name the bridge circuits used for measuring capacitance.
10. Define Q factor of the coil.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the working and constructional details of PMMC instrument with a neat diagram and also derive the torque equation if the instrument is spring controlled. (16)

Or

- (b) Explain the working principle of Rectifier Instrument with a neat sketch. (16)

12. (a) Explain the working principle of Dynamometer type MI Instrument with neat sketches. (16)

Or

- (b) Describe the construction and principle of operation of single phase energy meter. (16)

13. (a) Describe the principle of working of CT and PT with neat sketches. (8 + 8)

Or

- (b) Explain the construction and principle of working of Crompton's potentiometer with suitable sketches and write its limitations. (16)

14. (a) Obtain the bridge balance equation of Kelvin's double bridge. (16)

Or

- (b) Illustrate the Construction and working principle of Megger with a neat sketch. (16)

15. (a) (i) Obtain the relation for estimating Q factor for Maxwell Bridge. (10)
(ii) A Maxwell bridge is used to measure inductive impedance. The bridge constants at balance are $C_1=0.01 \mu\text{F}$, $R_1=470\text{k}\Omega$, $R_2=5.1\text{k}\Omega$ and $R_3=100\text{k}\Omega$. Find the series equivalent of unknown impedance. (6)

Or

- (b) (i) Explain the various sources of error in AC bridges. (8)
(ii) Describe the operation of vibration galvanometer. (8)