

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Seventh Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE117: Measurements and Instrumentation

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Precision is the
 - a) Accuracy
 - b) Sensitivity
 - c) Repeatability
 - d) Error
2. Central value of measurement data is
 - a) Arithmetic mean
 - b) Deviation
 - c) Random value
 - d) Maximum value
3. A current of $2\mu\text{A}$ is passed through the moving coil of an undamped d'Arsonval galvanometer, which has a displacement constant of 2Nm/A and a control constant of $10 \times 10^{-6}\text{Nm/rad}$. The moving coil oscillates with amplitude of
 - a) 0.2 rad
 - b) 0.4 rad
 - c) 0.6 rad
 - d) 0.8 rad
4. The braking torque provided by permanent magnet in single-phase energy meter can be changed by
 - a) providing a magnetic shunt and changing its position
 - b) changing the distance of permanent magnet from the center of revolving disc
 - c) Changing Supply Voltage
 - d) Eddy current

5. _____ is used for the measurement of low resistance
 - a) Wheat stone bridge
 - b) Kelvin's bridge
 - c) Anderson bridge
 - d) Schering Bridge
6. AC bridge balance equation is
 - a) $Z_1Z_4=Z_2Z_3$
 - b) $Z_1Y_4=Z_2Y_3$
 - c) $V_1I_4=V_2I_3$
 - d) $R_1R_4=R_2R_3$
7. It is an active transducer
 - a) Encoder
 - b) LVDT
 - c) Thermocouple
 - d) Strain gauge
8. It is a digital transducer
 - a) Encoder
 - b) Thermocouple
 - c) LVDT
 - d) Strain gauge
9. It works by charging of the portion to be printed
 - a) Dot matrix printer
 - b) Laser printer
 - c) Ink Jet printer
 - d) Line printer
10. Light is not generated in this display
 - a) CRT display
 - b) LED
 - c) LCD
 - d) Dot matrix display

PART B (10 x 2 = 20 Marks)

11. What is Calibration process?
12. Define the standard deviation of measurement data.
13. What are the types of Galvanometers?
14. Mention the errors in Energy meter?
15. What are the advantages of Maxwell Inductance-Capacitance Bridge?
16. What are the applications of Wein Bridge?
17. Distinguish between thermistor and RTD.
18. What is smart sensor?
19. Mention the types of display devices.
20. What is a data logger?

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the functional elements of an instrument system in detail. (7)
(ii) What are the dynamic characteristics of an instrument? Explain. (7)

(OR)

- b) (i) Explain the various types of errors in measurement system. (7)
(ii) Explain the various standards of measurement. (7)

22. a) (i) Describe constructional details and principle of operation of D'Arsonal galvanometer. (7)
(ii) Draw and explain the operation of LPF Wattmeter. (7)

(OR)

- b) (i) Explain the construction and working of single phase induction type energy meter. (7)
(ii) An energy meter is designed to make 100 revolutions of disc for one unit of energy. Calculate the number of revolutions made by it when connected to load carrying 40A at 230V and 0.4 power factor for an hour. If it actually makes 360 revolutions, find the percentage error. (7)

23. a) (i) Draw and explain the bridge for the measurement of self inductance of low Q coil and derive the expression. (7)
(ii) With neat diagram explain the principle of Wheat Stone's Bridge. (7)

(OR)

- b) (i) Explain the principle and operation of Wein bridge with neat diagram. (7)
(ii) Draw and explain the operation of Megger. (7)

24. a) (i) Give the criteria for the selection of transducers. (7)
(ii) Explain the construction and principle of Thermistor in detail. (7)

(OR)

- b) (i) Draw and explain the elements of data acquisition system. (7)

(ii) Explain the features of smart sensors in detail. (7)

25. a) (i) With neat diagrams explain the digital plotter. (7)

(ii) Explain the operation of laser printer. (7)

(OR)

b) (i) Explain the structure and operation of LCD. (7)

(ii) Explain the operation and applications of data loggers. (7)
