CBCS SCHEME

ACHARYA INSTITUTE OF TECHNOLOGY Library Date BANGALORE

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15MT46

Fourth Semester B.E. Degree Examination, July/August 2021
Instrumentation and Measurements

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

1 a. With neat block diagram, explain the elements of generalized measurement system. **(08 Marks)**

b. Compare deflection and null type instruments. **(04 Marks)**

c. Explain the functions of instruments and measurements system. **(04 Marks)**

2 a. Explain the methods correction for interfering and modifying inputs. **(08 Marks)**

b. Explain the input-output configuration of measuring instruments and measurement systems. **(04 Marks)**

c. Define transducer and its classification. **(04 Marks)**

3 Explain the following static characteristics systems:
(i) Accuracy and precision (ii) Scale range and span (iii) Reproducibility and drift
(iv) Repreatability (v) SNR and sensitivity (vi) Linearity and hysteresis
(vii) Threshold and resolution (viii) Dead zone and time **(16 Marks)**

4 a. Determine the step response of a second order system. **(08 Marks)**

b. Explain the response of a first order system. **(08 Marks)**

5 a. Explain in detail working of variable capacitor transducer with necessary diagrams. **(08 Marks)**

b. Explain Hall effect devices with neat diagrams. **(08 Marks)**

6 a. Explain the operation of differential pressure level detector with neat diagram. **(08 Marks)**

b. Explain the following level detection methods:
(i) Radiation level sensor (ii) Ultrasonic level detector **(08 Marks)**

7 a. Explain the operation of resistance strain gauge and derive the expression for gauge factor. **(08 Marks)**

b. Explain the different types of electrical strain gauges. **(08 Marks)**

8 a. Explain the operation of Kelvin double bridge and derive the expression for balanced condition. **(08 Marks)**

b. Derive the expression for frequency of oscillations for a Wein's bridge. **(04 Marks)**

c. Write short notes on Wagner's earth connection. **(04 Marks)**

9 a. Explain the factors need to be consider for selecting a transducer. **(04 Marks)**

b. Explain the working of resistive position transducer with neat diagram. **(04 Marks)**

c. Explain the working of LVDT with necessary diagrams and waveforms and graph. **(08 Marks)**

10 a. Explain the working of thermocouple with neat diagram and state the three effects which helps in measurement of temperature. **(08 Marks)**

b. Explain the construction and working of the LED. **(08 Marks)**

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