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15MT46

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Instrumentation and Measurement

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Explain how the effect of modifying and interfering inputs is minimized or eliminated in measurement systems with examples. **(08 Marks)**
    b. Describe the differences between deflection and null type instruments giving suitable example. Discuss about their accuracy. **(08 Marks)**

OR

2   a. Explain primary and secondary transducers with example. List the factors to be considered while selecting a transducer. **(08 Marks)**
    b. Explain analog and digital modes of operation of instruments. Also explain how the resolution of digital instruments can be increased. **(08 Marks)**

Module-2

3   a. Define the following terms:
       i) Static error   ii) Scale range   iii) Scale span   iv) Signal to noise ratio
       v) Reproducibility and drift. **(08 Marks)**
    b. Define the following terms:
       i) Accuracy   ii) Precision   iii) Resolution   iv) Sensitivity   v) Static error. **(08 Marks)**

OR

4   a. Explain the phenomenon of hysteresis in measurement systems and also explain the terms threshold, dead zone and dead time. **(08 Marks)**
    b. Derive an expression for time response of a 2nd order damped system when subjected to a unit ramp and sketch the response. **(08 Marks)**

Module-3

5   a. What is Hall effect? Explain briefly hall effect device operation. **(08 Marks)**
    b. Describe the principle of transduction and explain variable capacitance transducer. **(08 Marks)**

OR

6   a. Explain thermal level sensor and optical level sensor. **(08 Marks)**
    b. Explain differential pressure level measurement with diagram. **(08 Marks)**

Module-4

7   a. Briefly explain the factors affecting strain measurements. **(08 Marks)**
    b. Explain with a diagram the operation of a semiconductor strain gauge and also state its advantages and disadvantages. **(08 Marks)**

OR

8 a. Describe the operation of Kelvin's bridge.   (08 Marks)
   b. Explain with a diagram the working of a Wagner's ground connection.   (08 Marks)

Module-5

9 a. Write note on thermocouple.   (08 Marks)
   b. Explain resistive position transducer.   (08 Marks)

OR

10 a. Explain the construction and working of LVDT. Write its advantages and disadvantages.
                                                                                    (08 Marks)
   b. Briefly explain the photoelectric transducer.   (08 Marks)

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