

CBCS Scheme

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15MT46

Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Instrumentation and Measurements

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Explain the elements of a generalized measurement system with a neat block diagram. (08 Marks)
b. Explain the different methods of correction for interfering and modifying inputs. (08 Marks)

OR

- 2 a. Explain deflection type and null type instruments operation with an example. (08 Marks)
b. Explain the different functions of instrumentation and measurement systems. (04 Marks)
c. Classify and explain different types of transducers. (04 Marks)

Module-2

- 3 a. Explain the following: (i) Accuracy and Precision (ii) Scale range and scale span
(iii) Reproducibility and Drift (iv) Signal to Noise ratio (v) Dead zone and Dead time.
(vi) Hysteris (10 Marks)
b. Derive the expression for the time domain response of a first order system to step input. (06 Marks)

OR

- 4 a. Derive the expression for the Time domain response of a second order system to a step input and draw the magnitude response under different damping conditions. (08 Marks)
b. Derive the expression for the frequency response of a first order system. (08 Marks)

Module-3

- 5 a. With a neat diagram, explain operation of variable inductance and variable capacitance transducers. (08 Marks)
b. Explain about Hall Effect devices. (08 Marks)

OR

- 6 a. With a neat diagram, explain differential pressure level detector and float level devices. (08 Marks)
b. Explain how optical level switches are used for measurement of level. (08 Marks)

Module-4

- 7 a. Explain different types of electrical strain gauges. (08 Marks)
b. Explain the strain gauge circuit with the help of wheat-stone bridge circuit. (08 Marks)

OR

- 8 a. Explain the operation of wheat stone's bridge with neat circuit diagram and its applications. Derive the condition for bridge balance. (08 Marks)
b. Derive the expression for measuring the frequency in the audio range using Wein's bridge. (08 Marks)

Module-5

- 9 a. With a neat diagram, explain the construction and working principle of Resistive position transduce and resistance thermometer. (08 Marks)
b. Explain the construction and working principle of LVDT. (08 Marks)

OR

- 10 a. Explain piezoelectric pressure transducer and its advantages and disadvantages. (08 Marks)
b. Explain the construction and working principle of LED displays. (08 Marks)

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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.