

# CBCS SCHEME

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18EI651

## Sixth Semester B.E. Degree Examination, July/August 2022 Transducer and Process Instrumentation

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Write the block diagram and describe the functional elements of an instrumentation system. (10 Marks)
- b. With a neat block diagram, describe the generalized input-output configuration of measurement system. (10 Marks)

OR

- 2 a. Explain the method of high gain feedback and the method of signal filtering for the correction of spurious input. (10 Marks)
- b. With a neat diagram/circuit, distinguish the functioning of NULL type and deflection type instruments. (10 Marks)

### Module-2

- 3 a. Explain the following characteristics of instruments:
  - (i) Accuracy
  - (ii) Sensitivity
  - (iii) Threshold
  - (iv) Repeatability
  - (v) Dead zone(10 Marks)
- b. Classify the different types of transducers based on primary and secondary transducers and also explain the factors influencing the choice of transducers/instruments. (10 Marks)

OR

- 4 a. Define drift. Classify different types of drifts in static instrument and explain. (10 Marks)
- b. What is the difference between precision and accuracy of an instrument? (10 Marks)

### Module-3

- 5 a. Explain the construction and working principle of LVDT for the measurement of displacement and state its advantages. (10 Marks)
- b. Explain capacitance transducer in the measurement of displacement and state its advantages. (10 Marks)

OR

- 6 a. Explain the working of thermal level sensors with a neat diagram. (10 Marks)
- b. Describe the working of ultrasonic level detector for a continuous variations of level. (10 Marks)

### Module-4

- 7 a. Obtain equation for voltage sensitivity considering full bridge wheat stone bridge circuit configurations resistance strain gauges. (10 Marks)
- b. With diagram and necessary equations, explain piezoresistive effect in the measurement of strain. (10 Marks)

OR

- 8 a. Explain with neat diagrams of:  
(i) Electronic weighing system  
(ii) Hydraulic load cell (10 Marks)
- b. Explain with neat diagram of:  
(i) Mechanical torque measurement  
(ii) Electric torque measurement (10 Marks)

**Module-5**

- 9 a. Explain how the combination of diaphragms and potentiometer can be to measure pressure. (10 Marks)
- b. Explain how reluctance transducer can be used to measure pressure with a schematic diagram. (10 Marks)

OR

- 10 a. Explain with diagram working of LVDT electrical pressure transducer. (10 Marks)
- b. With a diagram, explain force balance transducer. Obtain its block diagram representation. (10 Marks)

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