*Total number of printed pages:* **2** **D/4th /DIE402**

**2025**

**TRANSDUCERS AND SIGNAL CONDITIONING**

*Full Marks : 100*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer **any five** questions.*

| | | | |
|---|---|---|---|
| 1. | a) | What is a transducer? How transducers are classified? Explain. | 8 |
| | b) | What are the different types of strain gauges? Explain using suitable diagrams. | 12 |
| 2. | a) | Describe the working of linear variable differential transformer using a suitable diagram. | 7 |
| | b) | Explain the constructional details and working of synchro pair using a suitable diagram. | 8 |
| | c) | Describe the working of potentiometric accelerometer. | 5 |
| 3. | a) | Explain the basic principle of operation of capacitive transducer. | 6 |
| | b) | Draw the diagram of differential capacitive transducer and determine the expression for output voltage. | 10 |
| | c) | Distinguish between RTD and thermistor. | 4 |
| 4. | a) | Describe the basic principle of working of piezoelectric transducer. Derive the relations for charge sensitivity, voltage sensitivity and output voltage of a piezoelectric transducer. | 10 |
| | b) | Explain the constructional details and working of variable reluctance type inductive transducer using suitable diagrams. | 10 |
| 5. | a) | Describe the working of Hall Effect Transducer using a suitable diagram. | 6. |
| | b) | Describe in brief the basic principle of operation of following optical transducers:<br>i) Photoconductive detectors<br>ii)Photovoltaic detectors | 7*2=14 |
| 6. | a) | Write short notes on any two of the following :<br>i) Photodiode and Phototransistor.<br>ii) Functional block diagram of instrumentation system. | 7*2=14 |

iii) Shaft encoder

b) Explain the working of a carbon microphone using a suitable diagram 6