

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2024****Subject Code:3134103****Date:26-11-2024****Subject Name:Sensor and Instrumentation****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|---|-----------|
| Q.1 | (a) Explain generalized block diagram of an instrument. | 03 |
| | (b) Differentiate between accuracy and precision. | 04 |
| | (c) Enlist and describe desirable characteristics of transducer. | 07 |
| Q.2 | (a) What is calibration and why it is required in industry? | 03 |
| | (b) Explain in brief about inductive displacement sensor. | 04 |
| | (c) What is Pizzo effect, explain various configuration of Pizzo-elements in sensor with its advantage and disadvantages. | 07 |
| | OR | |
| | (c) Explain the working of tachometer to measure speed with neat diagram. | 07 |
| Q.3 | (a) Describe the working principles of PTC and NTC sensors for temperature measurement. | 03 |
| | (b) Explain the construction and working of strain gauge. | 04 |
| | (c) Explain the servomechanism application of Synchros. | 07 |
| | OR | |
| Q.3 | (a) Explain the working principle of Gyroscope. | 03 |
| | (b) Explain how charge amplifier circuit can solve non linearity problems in capacitive type displacement measurement sensors. | 04 |
| | (c) Explain the principle of operation and construction of thermocouple. Also enlist the types of thermocouples. | 07 |
| Q.4 | (a) Explain the working principle of inclinometers. | 03 |
| | (b) Give an example of a nano sensor and explain its significance in measurement application. | 04 |
| | (c) Explain the working principle of a pyrometer, including its different types and their specific applications. | 07 |
| | OR | |
| Q.4 | (a) Explain in brief about MEMS. | 03 |
| | (b) Explain the working principle of Acoustic sensor. | 04 |
| | (c) Enlist various types of proximity sensors and explain any one in detail. | 07 |
| Q.5 | (a) Discuss about S/N ratio in smart sensors. | 03 |
| | (b) Explain single channel and multichannel data acquisition system. | 04 |
| | (c) Draw an interfacing diagram of LM35 with any Microcontroller for temperature measurement. | 07 |
| | OR | |
| Q.5 | (a) Compare normal sensors with smart sensors. | 03 |
| | (b) Explain in brief about DAQ systems. | 04 |
| | (c) Explain Sample and hold circuit with schematic diagram. | 07 |
