

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2024****Subject Code:3134103****Date:19-07-2024****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) Define terms: 1. Calibration 2. Hysteresis 3. Resolution. | 03 |
| | (b) Give classification of errors. | 04 |
| | (c) Explain dynamic characteristics of transducers in detail. | 07 |
| Q.2 | (a) Explain Hall effect and enlist instruments that utilize this phenomenon in their operation. | 03 |
| | (b) Explain capacitive displacement sensor. | 04 |
| | (c) Explain the operational principles and applications of Linear Variable Differential Transformers and Rotary Variable Differential Transformers. | 07 |
| | OR | |
| | (c) Explain how an encoder serves as a feedback sensor to achieve precise control of rotational movement. | 07 |
| Q.3 | (a) What is the boiling point of water in °C, °F, °K and °R. | 03 |
| | (b) Explain construction and working of Bimetallic Thermometer. | 04 |
| | (c) Explain construction and working of strain gauge. | 07 |
| | OR | |
| Q.3 | (a) Explain working of GPS. | 03 |
| | (b) Explain Pizzo Resistive effects. | 04 |
| | (c) With neat diagram explain importance of Seebeck, Peltier and Thomson effect for temperature measurement. | 07 |
| Q.4 | (a) Enlist applications of Nano sensor. | 03 |
| | (b) Write short note on Film Sensor. | 04 |
| | (c) Differentiate Smart Sensor with normal sensor, also enlist advantages and disadvantages of smart sensor. | 07 |
| | OR | |
| Q.4 | (a) Explain MEMS. | 03 |
| | (b) Explain working of Distance LASER sensor. | 04 |
| | (c) Explain structure working and application of Acoustic sensor. | 07 |
| Q.5 | (a) Enlist the types of filters used in measurement. | 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) With suitable example explain need of amplifier in the measurement. | 03 |
| | (b) Differentiate Instrumentation amplifier with Differential amplifier. | 04 |
| | (c) Design an Active Low pass Filter with cut-off frequency of 1 kHz. | 07 |
