

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER– V EXAMINATION – SUMMER 2026****Subject Code:3151708****Date:09-06-2026****Subject Name: Measurement in industry****Time: 02:30 PM TO 05:00 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: Dew Point, Relative humidity (RH) and Absolute Humidity. | 03 |
| | (b) Explain Nozzle-Flapper system for displacement measurement. | 04 |
| | (c) With mathematical modelling, derive the equations for a Spring-Mass Accelerometer, also comment on the damping ratio (ζ). | 07 |
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| Q.2 | (a) Describe the terms Analyzer, Detector, and Gauge in the context of measurement. | 03 |
| | (b) For strain measurement, what is the difference between EFPI and IFPI sensor. | 04 |
| | (c) Explain how Magnetostrictive effect can be used to measure the various industrial parameters. | 07 |
| OR | | |
| | (c) Enlist various techniques used to solve the linearization problem in displacement measurement using a capacitive transducer. | 07 |
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| Q.3 | (a) Derive the stress – strain relationship. | 03 |
| | (b) Explain in brief about Wire wound strain gauge. | 04 |
| | (c) Discuss the need of calibration and compensation in strain gauge. | 07 |
| OR | | |
| Q.3 | (a) Derive the equations for resistive strain gauge. | 03 |
| | (b) With diagram, explain about semiconductor strain gauge. | 04 |
| | (c) Explain how interferometry used to measure the strain in fiber optics strain gauge. | 07 |
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| Q.4 | (a) Explain construction of resistive accelerometer. | 03 |
| | (b) Explain the use of PIGA to measure the acceleration. | 04 |
| | (c) Design an industrial weighing system for continuous process plant. | 07 |
| OR | | |
| Q.4 | (a) Explain working of Inductive accelerometer. | 03 |
| | (b) With neat diagram, explain working of Proving Ring transducer. | 04 |
| | (c) Explain how various Dynamometer can be used to measure the torque. | 07 |
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| Q.5 | (a) Explain Hair Hygrometer with neat diagram. | 03 |
| | (b) Define the term pH. Enlist various electrodes used for pH measurement and explain the standard hydrogen electrodes in detail. | 04 |
| | (c) Discuss chromatography and its classification. Explain any one in detail. | 07 |
| OR | | |
| Q.5 | (a) Explain need to measure the turbidity in industry. | 03 |
| | (b) Explain Toroidal conductivity measurement with its advantage and disadvantage. | 04 |
| | (c) With neat diagram explain FID and ECD detectors. | 07 |
