

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV EXAMINATION – SUMMER 2025

Subject Code: 3141901

Date:08-05-2025

Subject Name: Mechanical Measurement and Metrology

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: (i) Calibration (ii) Hysteresis (iii) Threshold | 03 |
| | (b) Differentiate following terms: -
1) Accuracy and Precision,
2) Systematic and random errors | 04 |
| | (c) What are the various methods of measurement? Explain them with examples. | 07 |
| Q.2 | (a) Define terms: (i) Tolerances (ii) Fits (iii) Shaft basis system | 03 |
| | (b) Why sine bar is not preferred for angles greater than 45°? Explain. | 04 |
| | (c) Write a short note on Auto collimator. | 07 |
| | OR | |
| | (c) Explain with neat diagram, working principle and application of Sigma comparator. | 07 |
| Q.3 | (a) Give the classifications of threads. | 03 |
| | (b) Explain the common errors in threads. | 04 |
| | (c) Explain three wire method for measuring effective diameter of a thread. | 07 |
| | OR | |
| Q.3 | (a) Define following terms related to gear measurement:
(i) Pressure angle (ii) Circular pitch (iii) Module | 03 |
| | (b) Give comparison between involute and cycloidal gears. | 04 |
| | (c) Explain constant chord method for gear tooth measurement. | 07 |
| Q.4 | (a) Explain different types of transducers. | 03 |
| | (b) Describe LVDT giving its advantages, limitations & field of applications. | 04 |
| | (c) Explain generalized measurement system using suitable example. | 07 |
| | OR | |
| Q.4 | (a) Write the advantages of lasers. | 03 |
| | (b) Write a short note on 'Coordinate Measuring Machine'. | 04 |
| | (c) Write a short note on Cathode ray Oscillographs. | 07 |
| Q.5 | (a) What is gauge factor? Explain its importance. | 03 |
| | (b) Explain the principle of electrical Strain gauges | 04 |
| | (c) Discuss the construction and working of thermocouple with neat sketch. | 07 |
| | OR | |
| Q.5 | (a) Give the classification of instruments for pressure measurement. | 03 |
| | (b) Explain any one method used for force measurement. | 04 |
| | (c) Write a short note on rope brake dynamometer | 07 |
