

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024****Subject Code:3141901****Date:19-11-2024****Subject Name: Mechanical Measurement and Metrology****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.

- Q.1** (a) Define Metrology. Explain clearly difference between primary, secondary and working standards **03**
- (b) Draw a block diagram of a generalized measurement system (GMS) and explain the various elements of it in detail. **04**
- (c) Explain the construction and working of a Vernier height gauge with the help of a neat sketch. **07**
- Q.2** (a) Discuss the elements of screw thread with neat sketch. **03**
- (b) Explain following gear errors : 1. Profile error, 2. Pitch error, 3. Errors in pressure angel, 4. Tooth thickness error **04**
- (c) Write short note on Parkinson Gear tester. **07**
- OR**
- (c) Draw the neat sketch of “Taly surf” and its working principle. **07**
- Q.3** (a) Define unilateral and bilateral tolerances. Give examples for each. **03**
- (b) Explain hole base vs shaft base system. **04**
- (c) Explain types of fit with neat sketch. **07**
- OR**
- Q.3** (a) Describe construction, working principle of Vernier Micrometer with neat sketch. **03**
- (b) Define and Explain following terms (i) Sensitivity (ii) Hysteresis (iii) Range and span (v) Accuracy and precision **04**
- (c) Explain the gear tooth thickness measurement by gear tooth Vernier calliper. **07**
- Q.4** (a) Explain working principle of bimetallic strip. **03**
- (b) What is thermocouple? Explain application of series and parallel connection in thermocouple. **04**
- (c) Describe the construction and working of resistance temperature detector (RTD). **07**
- OR**
- Q.4** (a) What are the difference between systematic error and random error? **03**
- (b) Explain liquid in glass thermometer. **04**
- (c) Describe the construction and working of optical pyrometer. **07**
- Q.5** (a) Explain rope brake dynamometer **03**
- (b) Explain the principle of electrical Strain gauges **04**
- (c) Explain three wire method for measuring effective diameter of a thread. **07**
- OR**
- Q.5** (a) Briefly Explain comparators. **03**
- (b) Write short note on proving ring type load cell. **04**
- (c) Explain working of McLeod gauge for pressure measurement. **07**

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