

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2021****Subject Code:3141901****Date:05/01/2022****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.

		<b>Marks</b>
<b>Q.1</b>	<b>(a)</b> Define the terms: (i) Threshold (ii) Linearity (iii) Sensitivity	<b>03</b>
	<b>(b)</b> Differentiate following terms: - 1) Systematic and random errors, 2) Reproducibility and Repeatability	<b>04</b>
	<b>(c)</b> What is coordinate measuring machine? Discuss various configuration of CMM.	<b>07</b>
<b>Q.2</b>	<b>(a)</b> Explain the working principle of a laser transducer system.	<b>03</b>
	<b>(b)</b> What is the basic difference between sine bars, sine plates, and sine tables?	<b>04</b>
	<b>(c)</b> Explain vernier micrometer Screw with neat sketch. How least count of vernier micrometer can be calculated?	<b>07</b>
<b>OR</b>		
	<b>(c)</b> Explain with neat sketch how conical work pieces are inspected on a sine centre.	<b>07</b>
<b>Q.3</b>	<b>(a)</b> Give comparison between involute and cycloidal gears.	<b>03</b>
	<b>(b)</b> Explain Parkinson gear tester with neat sketch.	<b>04</b>
	<b>(c)</b> Derive the depth of gear using constant chord method	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	<b>(a)</b> How is Taylor's principle applicable to thread gauging?	<b>03</b>
	<b>(b)</b> Derive the expression for the best-size wire in a two-wire method.	<b>04</b>
	<b>(c)</b> Derive the diameter over wire(Maximum) H for thread measurement using three wire method	<b>07</b>
<b>Q.4</b>	<b>(a)</b> Explain the characteristics of good comparator.	<b>03</b>
	<b>(b)</b> What are the primary reasons for surface irregularities?	<b>04</b>
	<b>(c)</b> Explain with neat sketch construction and working of sigma comparator.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	<b>(a)</b> Give a detailed classification of fits.	<b>03</b>

- (b) Differentiate between hole basis and shaft basis systems. **04**
- (c) Describe with neat sketch “Linear Variable Differential Transformer”.  
Comment on its application. **07**
- Q.5** (a) Explain the principle and types of thermocouple. **03**
- (b) Explain briefly the methods of force measurement. **04**
- (c) Write a short note on rope brake dynamometer, **07**
- OR**
- Q.5** (a) Classification of instruments for pressure measurement. **03**
- (b) What is gauge factor? Explain its importance. **04**
- (c) Sketch and explain McLeod Gauge used for low pressure measurement. **07**

\*\*\*\*\*