Seat No.: _____                                   Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY
## BE - SEMESTER–IV • EXAMINATION – WINTER 2013

**Subject Code: 141901**                          **Date: 23-12-2013**
**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.**

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|---|---|---|---|
| **Q.1** | **(a)** | Define Metrology. Explain clearly difference between primary, secondary and working standards. | **07** |
| | **(b)** | Define and Explain following terms <br> (i) Sensitivity   (ii) Linearity    (iii) Hysteresis | **07** |
| **Q.2** | **(a)** | Explain with neat sketch Method of measurement of Taper plug  using sine bar | **07** |
| | **(b)** | Explain working principle of micrometer Draw neat sketch of micrometer and  Label each parts  of micrometers | **07** |

**OR**

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|---|---|---|---|
| | **(b)** | Explain working principle of Vernier caliper Draw neat sketch and label each part. Find out Least count of Vernier caliper. | **07** |
| **Q.3** | **(a)** | Explain with neat sketch measurement of effective diameter screw thread using three wire methods. How best size of wire is selected. | **07** |
| | **(b)** | Explain method tooth thickness measurement by Gear tooth Vernier caliper. | **07** |

**OR**

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| **Q.3** | **(a)** | Explain construction and working of Tomlinson surface roughness tester. | **07** |
| | **(b)** | State the  various possible errors on the gear. Explain how circular pitch measuring machine measure  circular pitch error of Gear | **07** |
| **Q.4** | **(a)** | Explain working of dead weight tester .how pressure gauge is calibrated on dead weight tester. | **07** |
| | **(b)** | Explain with neat sketch  working of optical pyrometer | **07** |

**OR**

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|---|---|---|---|
| **Q.4** | **(a)** | Explain the principle of thermo couple. Also explain their calibration method | **07** |
| **Q.4** | **(b)** | Explain working of Mcleod  gauge for pressure measurement | **07** |
| **Q.5** | **(a)** | Explain the alignment Test on the lathe machine is carried out explain various step in brief. | **07** |
| | **(b)** | Explain in brief following <br> (i) Nutating disc flow meter (ii) construction and working of load cell. | **07** |

**OR**

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| **Q.5** | **(a)** | Explain working principle of Linier variable Differential transformer (LVDT) and advantages  disadvantage of LVDT | **07** |
| | **(b)** | Explain  following method for measurement of straightness <br> (i)  The Auto- collimator method <br> (ii)  Precision sprit level method | **07** |

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