

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014****Subject Code: 143402****Date: 20-06-2014****Subject Name: Metrology and Computer Aided Inspection****Time: 10:30 am - 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.

- Q.1** (a) i) What are the important points in wringing slip gauges together? **04**
 ii) Define error in measurement. Give a classification of error. **03**
 (b) i) Define the following: 1) accuracy, 2) Precision, 3) Sensitivity and 4) speed of response. **04**
 ii) What are angular measurement instruments? Sketch and label the parts of a Micrometer. **03**
- Q.2** (a) i) Explain the terminology for surface roughness. **04**
 ii) How profilometer is useful for surface measurement. **03**
 (b) Explain with neat sketch Tomlinson Surface Meter. **07**
- OR**
- (b) Describe comparison methods of measuring surface texture giving their relative advantages. **07**
- Q.3** (a) i) Write a principle of Interferometry. **03**
 ii) Describe the use of optical flats and monochromatic light for dimensional comparison and testing flatness of surface. **04**
 (b) Explain the working of Michelson interferometer. How it has undergone modification in stages? **07**
- OR**
- Q.3** (a) Explain the working of AC laser interferometer **07**
 (b) Describe with sketches the working principles and the application of the Toolmaker's Microscope. **07**
- Q.4** (a) i) How Laser Scanning gauge works? Explain with neat sketch **04**
 ii) What are the advantages, disadvantages and application of CMM. **03**
 (b) What are non contact and In- process inspection. **07**
- OR**
- Q.4** (a) i) What do you mean by image analysis in image processing? **03**
 ii) What is the Gray Scale Image processing technique. **04**
 (b) How machine vision system functions. What are their respected fields? **07**
- Q.5** (a) Explain Histogram model with neat sketch. **07**
 (b) Define the terms: quality, quality assurance and quality control **07**
- OR**
- Q.5** (a) What are principles of Zero defects in computer integrated quality assurance? **07**
 (b) What is POKA-YOKE? Explain in detail **07**
