

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014****Subject Code: 141901****Date: 20-06-2014****Subject Name: Mechanical Measurement and Metrology****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) Explain objectives of Metrology. **03**
- (b) What are the various possible sources of errors in measurement? Define static error and explain any two static errors with example. **07**
- (c) Describe with neat sketch “Imperial standard Yard”. **04**
- Q.2**
- (a) Describe working principle and construction of vernier micrometer with neat sketch. **07**
- (b) With the help of neat sketch describe the working principle and construction of an optical comparator with its advantages and limitations. **07**
- OR**
- (b)
- I) Write applications and limitations of angle gauges. **03**
- II) The following observations were obtained while checking angle of tapered piece on one side with the help of two discs (Rollers), slip gauge and dial indicator. **04**
- Diameter of larger disc = 40 mm
- Diameter of smaller disc = 24 mm
- Slip gauge placed between the discs = 30 mm
- The dial indicator shows no variation when traversed along the surface of the piece placed over the discs. Draw the sketch of the set up and find angle of taper.
- Q.3**
- (a) Define the following terms for Screw thread: **03**
- i) Major Diameter ii) Minor Diameter iii) Pitch
- iv) Lead v) Flank angle vi) Helix angle
- (b) Explain the measurement of effective diameter for internal screw threads with neat sketch. **04**
- (c) Explain three wire method to measure the effective diameter of given screw thread with neat sketch. **07**
- OR**
- Q.3**
- (a) With neat sketch explain the construction and working of bourdon tube pressure gauge and also write merits and demerits of its. **07**
- (b) Explain in brief the following with neat sketch **07**
- i) Prony brake dynamometer and ii) Rope brake dynamometer
- Q.4**
- (a) Explain Parkinson gear tester with neat sketch. **04**
- (b) A spur gear of 8 mm module has 50 teeth calculate following proportion: **03**
- Pitch circle diameter, Addendum and Dedendum, Tooth working height and base pitch. Assume clearance to be 0.25 module. Spur gear has pressure angle of 20° .
- (c) With neat sketch describe the construction working of Tomlinson surface roughness tester with its advantages and disadvantages. **07**

OR

- Q.4** (a) Describe the construction and working of resistance temperature Detector (RTD) with its advantages and disadvantages. **07**
(b) Explain the various modes of measurements with two examples. **07**
- Q.5** (a) Define Flatness and describe a method to find out the flatness of a surface plate. **07**
(b) Define squareness. Explain with neat sketch the following methods or measuring the squareness. **07**
i) Indicator method
ii) Auto collimator method
- OR**
- Q.5** (a) Explain surface texture and elements of surface roughness. **07**
(b) Explain with neat sketch the principle, construction and working of Johansson Mikrokator. **07**

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