Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Semester-IV- Examination June- 2011

Subject code: 141901

Subject Name: Mechanical Measurement & Metrology

Date:08/06/2011 **Time : 10:30 am to 1:00 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)** Briefly explain following terms giving example **07**

1. Resolution.
2. Accuracy.
3. Threshold.
4. Precision.

(b) What are the Elements of Generalised measurement systems? Identify various elements of pressure actuated thermometer. **07**

Q.2 **(a)** State advantages and limitations of manometers & state the ideal characteristics of manomatric liquid. **07**

(b) In a pipeline water is flowing. A manometer is used to measure the pressure drop for flow through the pipe. The difference in level was found to be 20cm. If the manometric fluid in CCl_4 find the pressure drop in S.I. units (density of CCl_4 = 1.596 g/cm^3). If the manometric fluid is changed to mercury (ρ = 13.6 gm/ cm^3) what will be the difference in level ? **07**

OR

(b) Enlist different types of micrometers. What precaution should be observed while using the micrometer? Draw the sketch indicating reading of **07**

1. 23.78 mm and
2. 73.78 mm on micrometer

Q.3 **(a)** Explain with neat sketch the arrangement for power measurement of a given I.C.Engine by rope brake dynamometer. Also derive the equation for power. **07**

(b) Compare bimetallic thermocouple and thermister as temperature measuring devices. **07**

OR

Q.3 **(a)** What is a sine bar? Briefly describe its use and limitations. **07**

(b) What is calibration? Describe method of calibrating Bourdon tube pressure gauge and also describe the sources of errors in the method of calibration. **07**

Q.4 **(a)** Briefly explain with sketch the two wire and three wire method of measuring effective diameter of thread. **07**

(b) Explain briefly **07**

1. Slip gauges
2. Dial indicator

OR

Q.4	**(a)**	Enlist various methods for measuring gear tooth thickness. Explain in detail about gear measurement using gear tooth vernier caliper. Derive equation for measurement.	**07**
	(b)	What are the salient features of a comparator? Explain SIGMA mechanical comparator with neat sketch.	**07**
Q.5	**(a)**	Explain in brief: 1. Straightness. 2. Flatness. 3. Parallelism.	**06**
	(b)	Describe with neat sketch working of piezoelectric accelerometer.	**04**
	(c)	Explain Radiation Pyrometer.	**04**

OR

Q.5	**(a)**	Explain in brief working of Mcleod gauge for pressure measurement.	**04**
	(b)	Explain working principle of Parkison gear tester.	**04**
	(c)	Alignment test for lathe machine explain various steps in brief.	**06**

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