Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-IV Examination June- 2010

Subject code: 141901

Subject Name: Mechanical measurement & Metrology

Date: 18 / 06 / 2010 **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)**	Describe with sketch International Prototype Meter (Material Length Standard) stating material composition and limitations.	**07**
	(b)	Describe with sketch the construction and working of a micrometer. Explain how least count is found and reading is taken. What is zero error?	**07**
Q.2	**(a)**	Describe with sketch following stating application: (i) Slip gages (ii) Telescopic gage (iii) Sine bar and (iv) Sine Center	**07**
	(b)	Describe with sketch the construction and working of Sigma Comparator.	**07**
		OR	
	(b)	Describe with sketch the construction and use of a Combination Set stating limitation.	**07**
Q.3	**(a)**	Describe with sketch the construction and use of Gear Tooth Vernier Caliper. How is the gear tooth thickness at PCD measured?	**07**
	(b)	Describe with sketch principle, construction and use of Autocollimator.	**07**
		OR	
Q.3	**(a)**	What is an effective diameter of threads? State its significance. Explain with sketch Measurement of Effective Diameter by Two Wire method stating limitation..	**07**
	(b)	Explain Surface Texture and Elements of Surface Roughness.	**07**
Q.4	**(a)**	Explain with a block diagram Generalized Measuring System and its four functional elements. Show a block diagram of measurement scheme for Weighing Machine.	**07**
	(b)	Explain the construction and working of LVDT stating applications.	**07**
		OR	
Q.4	**(a)**	List and explain characteristics of measuring devices stating illustrations.	**07**
	(b)	Explain the principle, working and method of speed measurement using Stroboscope stating an illustration.	**07**
Q.5	**(a)**	Explain with sketch construction and working of Piezometer & U-Tube Manometer stating application.	**07**
	(b)	List and explain with sketch types of expansion thermometer stating application.	**07**
		OR	
Q.5	**(a)**	Describe with sketch construction and working of Dead Weight Pressure Gauge Tester. State sources of error and their remedies.	**07**
	(b)	Explain in brief the principles of thermocouple stating an illustration. A Chromel-Alumel thrmocouple is assumed to have nearly linear operating range up to 1100º C with emf (reference 0º C) 45.14 mV at this temperature. The thermocouple is exposed to a temperature of 840 º C. The potentiometer is used as cold junction and its temperature is estimated to be 25 º C. Calculate the emf indicated on the potentiometer.	**07**

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