

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: **07**
(i) Slip gages (ii) Telescopic gage (iii) Sine bar and (iv) Sine Center
- (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. **07**
A Chromel-Alumel thermocouple is assumed to have nearly linear operating range up to 1100° C with emf (reference 0° C) 45.14 mV at this temperature. The thermocouple is exposed to a temperature of 840 ° C. The potentiometer is used as cold junction and its temperature is estimated to be 25 ° C. Calculate the emf indicated on the potentiometer.
