Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2710808 **Date: 04/01/2016**

Subject Name: ADVANCED METROLOGY & EXPERIMENTAL TECHNIQUES

Time:2:30 pm to 5:00 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)** Discuss thermal aspects affecting accuracy. **07**

(b) Enlist methods of improving accuracy and surface finish. Explain any one in detail. **07**

Q.2 **(a)** Discuss causes and types of errors in detail. **07**

(b) Discuss general considerations in Data analysis. **07**

OR

(b) In a test, temperature is measured 100 times with variations as follows: **07**

Temp	201	202	203	204	205	206	207	208	209	210	211
Frequency of occurrence	2	3	5	12	18	28	15	10	4	2	1

Calculate Arithmetic mean, Average deviation, Standard deviation and variance.

Q.3 **(a)** Discuss experiment design factors. **07**

(b) The resistance of a copper wire is governed by $R = R_0[1+\alpha(T-25)]$, where $R_0=8\Omega\pm0.25$ % is the resistance at 25^0 C, $\alpha = 0.004^0\ C^{-1} \pm 1$ % is temperature co-efficient of resistance and the temperature of wire is $T=35\pm1^0$ C. Calculate the resistance of wire and its uncertainty. **07**

OR

Q.3 **(a)** Explain different types of experiments. **07**

(b) Explain the Chi-Square Test of Goodness of fit in detail. **07**

Q.4 **(a)** Explain how LASER can be used for surface topography. **07**

(b) Explain holographic interferometry principle. Explain real time interferometry. **07**

OR

Q.4 **(a)** Explain different configurations of Coordinate Measuring Machine. **07**

(b) Explain the displacement devices used in CMM. **07**

Q.5 **(a)** What is image enhancement? Discuss its importance in machine vision systems with suitable example. **07**

(b) Explain computer imaging systems. **07**

OR

Q.5	**(a)**	Discuss Histogram Concavity technique used for machine vision systems.	**07**
	(b)	Explain depth measurement using vision system.	**07**

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