Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2710808 **Date:19/05/2016**

Subject Name: Advanced Metrology and Experimental Techniques

Time:02:30 pm to 05:00 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 the need for high precision measurement.	**07**
	(b)	Enlist methods of improving accuracy and surface finish. Explain any one in detail.	**07**
Q.2	**(a)**	Classify errors. Discuss their causes.	**07**
	(b)	The following readings were obtained during temperature measurement: 39.6, 39.9, 39.7, 39.9, 40.0, 39.8, 39.9, 39.8, 40.4 and 39.7 ^{0}C Calculate: The mean, standard deviation and range.	**07**
		OR	
	(b)	Discuss general considerations in Data analysis.	**07**
Q.3	**(a)**	Discuss experiment design factors.	**07**
	(b)	Explain experiment design protocols with suitable example.	**07**
		OR	
Q.3	**(a)**	Explain the Chi-Square Test of Goodness of fit in detail.	**07**
	(b)	The two resistors *R* and *Rs* are connected in series. The voltage drops across each resistor are measured as E = 10V ± 0.1V (1%) and E_s = 1.2V ± 0.005V(0.467%) along with a value of R_s = 0.0066Ω ± 1/4% . From these measurements determine the power dissipated in resistor R and its uncertainty.	**07**
Q.4	**(a)**	Explain holographic interferometry principle. Explain double exposure holographic interferometry.	**07**
	(b)	Explain how LASER can be used for surface study.	**07**
		OR	
Q.4	**(a)**	Explain the different probe sensors used in CMM.	**07**
	(b)	Explain the displacement devices used in CMM.	**07**
Q.5	**(a)**	Explain briefly methods of image processing.	**07**
	(b)	Discuss Histogram Concavity technique used for machine vision systems.	**07**
		OR	
Q.5	**(a)**	Explain computer imaging systems.	**07**
	(b)	Discuss technical difficulties encountered for machine vision systems as far as image processing is concern.	**07**

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