Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE / ME / MBA / MCA - SEMESTER– • EXAMINATION – WINTER 2014

Subject Code:2710808 **Date:12/01/ 2015**

Subject Name:ADVANCED METROLOGY & EXPERIMENTAL TECHNIQUES

Time: **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)	Explain dimensional wear of cutting tools and itôs influence on accuracy of machining.	**07**
Q.2	**(a)**	Enlist the types of errors. Discuss their causes.	**07**
	(b)	Discuss general considerations in data analysis.	**07**
		OR	
	(b)	The following results are taken of a pressure using a pressure gauge: 2.97, 2.98, 2.99, 3.00, 3.01, 3.02, 3.03, 3.04, 3.05, Pascal Calculate Arithmetic mean, Average deviation, Standard deviation and variance.	**07**
Q.3	**(a)**	Explain experiment design protocols with suitable example.	**07**
	(b)	The two resistors R_1 and R_2 are connected in series and then in parallel. The value of resistances are : $R_1 = 100.0 \pm 0.1q$ and $R_2 = 50 \pm 0.03q$. Calculate the uncertainty in the combined resistance for both series and parallel connection.	**07**
		OR	
Q.3	**(a)**	Explain different types of experiments.	**07**
	(b)	Explain the use of probability distributions with suitable example.	**07**
Q.4	**(a)**	Explain how LASER interferometer can be used for distance measurement.	**07**
	(b)	Explain holographic interferometry principle. Explain double exposure holographic interferometry.	**07**
		OR	
Q.4	**(a)**	Explain different configurations of Coordinate Measuring Machine.	**07**
	(b)	Explain the different probe sensors used in CMM.	**07**
Q.5	**(a)**	Discuss significance of image enhancement in machine vision systems with suitable example.	**07**
	(b)	Explain the methods of image processing.	**07**
		OR	
Q.5	**(a)**	Discuss Histogram models used for machine vision systems.	**07**

(b) Discuss technical difficulties encountered during image processing for machine vision systems. **07**

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