Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 162005 **Date: 24/10/2016**

Subject Name: Electromechanical Measurements & Instruments.

Time: 10:30 AM to 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)**	Explain (i) Resolution (ii) Sensitivity and (iii) Repeatability with suitable examples.	**07**
	(b)	What are the limitations of Wheatstone bridge and describe the operation of Kelvin's Double bridge for measurement of low resistance in detail.	**07**
Q.2	**(a)**	Explain the construction and operation of PMMC type instruments and derive its deflecting torque equation with advantages and disadvantages.	**07**
	(b)	What are "Systematic errors"? Explain briefly the following systematic errors: (i) Instrumental errors (ii) Observational errors	**07**
		OR	
	(b)	Briefly discuss primary, secondary and tertiary measurements giving suitable examples and block diagrams.	**07**
Q.3	**(a)**	Derive an expression for the time response of first order system with a step input with neat sketches.	**07**
	(b)	Explain in detail the operation of Modern laboratory type potentiometer with necessary steps and diagram.	**07**
		OR	
Q.3	**(a)**	What is load cell? Explain any one load cell in detail with neat sketch.	**07**
	(b)	Explain the basic construction details of thermocouple with its operation.	**07**
Q.4	**(a)**	The following readings are taken of a certain physical length with the help of micrometer screw gauge: 1.41,1.45,1.63,1.55,1.49,1.51,1.60,1.55,1.47 and 1.66 mm Assuming that only random errors are present, calculate the arithmetic mean, the average deviation, standard deviation, variance and the probable error of the reading.	**07**
	(b)	Explain a functional block diagram of Generalized Instrumentation System with its all functional elements and describe one suitable example to explain it.	**07**
		OR	
Q.4	**(a)**	List the various speed measurement instruments and explain any one speed measurement instrument in detail with neat sketch.	**07**
	(b)	Differentiate between giving suitable example in each case: (i)Reproducibility and Repeatability (ii)Accuracy and Precision.	**07**
Q.5	**(a)**	Explain the construction, operation and output characteristics of RVDT with its advantages and disadvantages.	**07**

	(b)	Explain that how capacitive transducer can be used for measurement of liquid level in detail.	**07**

OR

Q.5	**(a)**	Describe the construction and operation of moving iron type instruments in detail.	**07**
	(b)	Prove that output voltage of Piezo electric transducer is given as E_o = gtp and draw its equivalent circuits.	**07**

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