Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152402 **Date: 16-05-2013**

Subject Name: Electrical Measurement and Electronic Instruments

Time: 10:30 pm 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 the standards of measurement in detail.	**07**
	(b)	Explain the types of errors in detail.	**07**
Q.2	**(a)**	Explain the principle, construction and working of PMMC instruments.	**07**
	(b)	Explain the construction and working of Electrodynamometer type instruments.	**07**
		OR	
	(b)	Explain series type ohm meter and its design in detail.	**07**
Q.3	**(a)**	With neat diagram explain ramp type analog-to-digital converter.	**07**
	(b)	Write Technical short note on: Digital Frequency Meter System.	**07**
		OR	
Q.3	**(a)**	Give the classification of digital voltmeters. Explain dual-slope integrating type DVM with necessary block diagram.	**07**
	(b)	Define Probe. List the types of probes and explain the construction and features of active probe.	**07**
Q.4	**(a)**	Define burden of an instrument transformer. Explain the errors in CT. How the errors can be reduced?	**07**
	(b)	A ring core current transformer of ratio 1000/5 A is operating at full primary current with a secondary burden of non-inductive resistance of 1.1 Ω. Its exciting current is 1 A at power factor of 0.45. Calculate (i) the ratio error at full load, assuming that there has been no compensation (ii) phase angle.	**07**
		OR	
Q.4	**(a)**	Explain the basic aspects of PT. Give the comparison between CT and PT.	**07**
	(b)	Moving coil millivoltmeter has a resistance of 20 Ω and a full scale deflection of 120° is reached when potential difference of 100 mV is applied across its terminals. The moving coil has the effective dimension of 3.1 cm X 2.6 cm and is wound with 120 turns. The flux density in the gap is 0.15 Wb/m^2. Determine control constant of the spring and suitable diameter copper wire for coil winding if 55 % of total instrument is due to coil winding, ρ for copper is 1.73×10^{-8} Ω-m.	**07**
Q.5	**(a)**	List the methods of measurement of medium resistance. Explain Wheatstone bridge method in detail.	**07**
	(b)	Explain construction and operation of Dynamometer type Wattmeter. List its advantages and disadvantages.	**07**
		OR	
Q.5	**(a)**	Explain circuit and vector diagram of Maxwell's bridge for inductance measurement.	**07**
	(b)	Explain construction and operation of induction type single-phase energy meter.	**07**

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