Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160915 Date:14-12-2022

Subject Name:Electrical Measurement and Measuring Instruments

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Which methods are used for producing deflecting, controlling and damping torques in a Moving Iron instruments?	**03**
	(b)	List types of systematic error. Explain the measures taken to minimize these errors.	**04**
	(c)	Describe with neat sketches the construction and working of L.V.D.T. Also draw its output characteristics.	**07**
Q.2	**(a)**	Discuss different methods of measurement.	**03**
	(b)	Differentiate between the following citing suitable examples: (i) Active and Passive transducers (ii) Transducers and Inverse transducers	**04**
	(c)	Draw the circuit of a Kelvin's Double Bridge used for measurement of low resistance. Derive the condition for balance.	**07**
		OR	
	(c)	Define the terms: (i) Speed of response, (ii) Accuracy, (iii) Precision, (iv) Reproducibility, (v) Drift, (vi) Threshold, (vii) Fidelity	**07**
Q.3	**(a)**	Explain the different principles of working of capacitive transducers for measurement of displacement.	**03**
	(b)	How is the instrument range extended by Instrument Transformers?	**04**
	(c)	Discuss construction and working principle of induction type single phase energy meter.	**07**
		OR	
Q.3	**(a)**	Explain why electrodynamometer type of instruments can be used both on ac and dc?	**03**
	(b)	Explain working principle of Weston frequency meter.	**04**
	(c)	Describe the working and construction of resistance thermometers. Describe the materials used for RTDs. Also draw the resistance versus temperature characteristic.	**07**
Q.4	**(a)**	Draw circuit diagram of Maxwell's bridge.	**03**
	(b)	Explain the working principle of LCR meter.	**04**
	(c)	Describe the construction and working of a PMMC instrument. Derive the equation for deflection for PMMC instrument if the instrument is spring controlled.	**07**
		OR	
Q.4	**(a)**	Why is Hay's Bridge suitable for measurement of inductors having a Q greater than 10?	**03**
	(b)	Describe the principle of working of a digital storage oscilloscope.	**04**
	(c)	Explain measurement of unknown capacitance with the help of Schering bridge. Also draw phasor diagram.	**07**

Q.5	**(a)**	Explain any one transducer used for measurement of speed.	**03**
	(b)	Give an overview of different digital display devices.	**04**
	(c)	Define electrical transducer and discuss general characteristics of transducer.	**07**

OR

Q.5	**(a)**	Write a short note on digital recorders.	**03**
	(b)	What are the difficulties encountered in the measurement of high resistance? Explain how these difficulties are overcome.	**04**
	(c)	List the different types of digital voltmeters. Explain any one in detail.	**07**

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