Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code:3160915 Date:17-11-2025

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)**	List types of systematic error. Explain the measures taken to minimize these errors.	**03**
	(b)	Describe use of instrument transformers in the extension of range of measuring instruments.	**04**
	(c)	Explain in detail working principle and construction of LVDT. Explain how the magnitude and direction of the displacement of core of LVDT can be detected.	**07**
Q.2	**(a)**	Why PMMC instrument cannot be used for ac measurement ?	**03**
	(b)	Explain any one method for measurement of high resistance.	**04**
	(c)	Explain seebeck effect. Describe construction of thermocouple in detail with different materials used for the same.	**07**
		OR	
	(c)	Explain construction and working principle of electrodynamometer type wattmeter.	**07**
Q.3	**(a)**	Define sensor, transducer & actuator.	**03**
	(b)	A 250 : 5, CT is used along with an ammeter. If ammeter reading is 3.6 Amp, find out the line current.	**04**
	(c)	Explain working principle and construction of Piezoelectric transducer.	**07**
		OR	
Q.3	**(a)**	Describe the working and construction of resistance thermometers with different materials used for the same. Draw the resistance versus temperature characteristic.	**03**
	(b)	Explain why CT secondary should not be kept open ?	**04**
	(c)	Define the following terms : (1) True value (2) Threshold (3) Sensitivity (4) Zero drift (5) Reproducibility (6) Accuracy (7) Fidelity	**07**
Q.4	**(a)**	Draw & explain construction of PMMC instrument.	**03**
	(b)	Explain working principle of Hall effect transducer.	**04**
	(c)	Explain Maxwell's bridge with necessary diagram. Write its advantages, disadvantages. Draw phasor diagram.	**07**

OR

Q.4	**(a)**	Describe various controls of power scope.	**03**
	(b)	Draw circuit of Owen's bridge. Write its applications	**04**
	(c)	Draw circuit of Kelvin's double bridge method used for measurement of low resistance. Derive the condition for balance.	**07**
Q.5	**(a)**	Write a brief note on Megger.	**03**
	(b)	Compare Analog & digital multimeter.	**04**
	(c)	Explain construction and working of Q - meter.	**07**

OR

Q.5	**(a)**	Explain the working principle of LCR meter.	**03**
	(b)	Discuss the loss of charge method for high resistance measurement.	**04**
	(c)	Draw & explain block diagram of Digital storage oscilloscope.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3160915 Date:25-11-2024

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)**	What do you understand by static and dynamic characteristics of a measuring instrument?	**03**
	(b)	Explain in detail working principle and construction of LVDT.	**04**
	(c)	Describe the constructional detail of a moving iron instrument with the help of diagram. Derive the equation for defection if spring control is used.	**07**
Q.2	**(a)**	Explain working principle of strain gauge.	**03**
	(b)	Define the following terms : (1) True value (2) Threshold (3) Sensitivity (4) Zero drift	**04**
	(c)	Describe the working principle, construction and operation of R.T.D. Draw it's characteristics.	**07**
		OR	
	(c)	Explain construction and working principle of I-phase induction type energy meter.	**07**
Q.3	**(a)**	Explain the different principles of working of capacitive transducers.	**03**
	(b)	Draw & explain the construction of PMMC instrument.	**04**
	(c)	Explain working of Kelvin's double bridge for measurement of low resistance with neat diagram	**07**
		OR	
Q.3	**(a)**	Explain how strain gauges are used for the torque measurement.	**03**
	(b)	Explain working principle of Weston frequency meter.	**04**
	(c)	Describe construction of thermocouple in detail with different materials used for the Same.	**07**
Q.4	**(a)**	Explain why CT secondary should not be open ?	**03**
	(b)	Discuss the loss of charge method for high resistance measurement.	**04**
	(c)	Draw & explain block diagram of Digital storage oscilloscope.	**07**
		OR	
Q.4	**(a)**	How is the instrument range extended by Instrument Transformers?	**03**
	(b)	Draw the circuit diagram of Anderson's bridge.	**04**
	(c)	Explain working principle and construction of Piezoelectric transducer.	**07**
Q.5	**(a)**	Write a brief note on Megger.	**03**
	(b)	Explain working principle of Hall effect transducer.	**04**
	(c)	Explain Maxwell's inductance capacitance bridge with connection diagram and phasor diagram also state balance condition for the same.	**07**
		OR	
Q.5	**(a)**	What is clamp on meter ? Write its applications.	**03**
	(b)	Draw circuit of Owen's bridge. Write its applications	**04**
	(c)	Explain measurement of unknown capacitance with the help of Schering bridge. Also draw phasor diagram.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3160915 Date:05-12-2023

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)**	Define the following terms : (1) True value (2) Threshold (3) Sensitivity	**03**
	(b)	Discuss different methods of measurement.	**04**
	(c)	Explain in detail working principle and construction of LVDT.	**07**
Q.2	**(a)**	Explain how strain gauges are used for the torque measurement.	**03**
	(b)	Differentiate between statistical and random errors.	**04**
	(c)	Define transducer and classify it.	**07**
		OR	
	(c)	Describe construction of thermocouple in detail with different materials used for the same.	**07**
Q.3	**(a)**	How is the instrument range extended by Instrument Transformers?	**03**
	(b)	Draw the circuit diagram of Anderson's bridge	**04**
	(c)	Explain working principle and construction of Piezoelectric transducer.	**07**
		OR	
Q.3	**(a)**	Explain working principle of Weston frequency meter.	**03**
	(b)	State different methods used to measure low, medium and high resistance	**04**
	(c)	Explain construction and working principle of 1-phase induction type energy meter.	**07**
Q.4	**(a)**	Explain why CT secondary should not be open ?	**03**
	(b)	Explain any one method for measurement of high resistance.	**04**
	(c)	Explain working of Kelvin's double bridge for measurement of low resistance with neat diagram	**07**
		OR	
Q.4	**(a)**	Explain the different principles of working of capacitive transducers.	**03**
	(b)	Draw & explain the construction of PMMC instrument.	**04**
	(c)	Describe the constructional detail of a moving iron instrument with the help of diagram. Derive the equation for defection if spring control is used	**07**
Q.5	**(a)**	Discuss the loss of charge method for high resistance measurement.	**03**
	(b)	Explain working principle of Hall effect transducer.	**04**
	(c)	Draw & explain block diagram of Digital storage oscilloscope.	**07**
		OR	
Q.5	**(a)**	Write a brief note on Megger.	**03**
	(b)	Explain the working principle of LCR meter.	**04**
	(c)	Explain measurement of unknown capacitance with the help of Schering bridge. Also draw phasor diagram.	**07**

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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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