Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021

Subject Code:3160915 Date:26/11/2021

Subject Name:Electrical Measurement and Measuring 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Describe the working principle of Hall effect transducer.	**03**
	(b)	What is standard of measurement? Describe various standards of measurement.	**04**
	(c)	Define transducer and classify transducers on different basis.	**07**
Q.2	**(a)**	Why PMMC instrument cannot be used for ac measurement?	**03**
	(b)	Explain how strain gauges are used for the torque measurement.	**04**
	(c)	Define following term. (i)Accuracy (ii)Drift (iii)Sensitivity (iv)Reproducibility (v)Precision (vi)Threshold (vii)Fidelity.	**07**
		OR	
	(c)	Explain principle and construction of RTD.	**07**
Q.3	**(a)**	State different methods used to measure low, medium and high resistance.	**03**
	(b)	Draw the circuit diagram of Anderson's bridge.	**04**
	(c)	Explain the working of electrodynamometer type wattmeter.	**07**
		OR	
Q.3	**(a)**	Why secondary of current transformer should not be open, when primary is energized?	**03**
	(b)	Explain any one method for measurement of high resistance.	**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.4	**(a)**	Write a short note on Systematic errors.	**03**
	(b)	How the current range of PMMC instrument extended with the help of shunts?	**04**
	(c)	Explain working of Kelvin's double bridge for measurement of low resistance with neat diagram.	**07**
		OR	
Q.4	**(a)**	Draw circuit diagram of Schering bridge.	**03**
	(b)	Explain construction of single phase induction type energy meter.	**04**
	(c)	Explain measurement of unknown inductance with the help of Hay's bridge. Also draw phasor diagram.	**07**
Q.5	**(a)**	What do you mean by piezoresistive effect? State types of strain gauges.	**03**
	(b)	State the advantages and applications of D.S.O.	**04**
	(c)	Explain construction and working principle of Megger.	**07**

OR

Q.5	**(a)**	Explain Clamp on meter.	**03**
	(b)	Describe the different criteria for selection of transducers for a particular application.	**04**
	(c)	Explain the construction and working principle of LVDT with neat sketch. Explain how the magnitude and direction of the displacement of core of LVDT can be detected.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160915 Date:03/06/2022

Subject Name:Electrical Measurement and Measuring 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.**
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)	Define the following terms : (1) True value (2) Threshold (3) Sensitivity (4) Zero drift	**04**
	(c)	Explain in detail working principle and construction of LVDT.	**07**
Q.2	**(a)**	Differentiate between statistical and random errors.	**03**
	(b)	A capacitive transducer with its plate separation of 0.05mm under static conditions has a capacitance of 5 X 10^{-12} F. Determine axial displacement, which causes change of capacitance of 0.75 X 10^{-12} F.	**04**
	(c)	Explain seebeck effect. Describe construction of thermocouple in detail with different materials used for the same.	**07**
		OR	
	(c)	Define Gauge factor. Derive its expression.	**07**
Q.3	**(a)**	Define sensor, transducer & actuator.	**03**
	(b)	Describe use of instrument transformers in the extension of range of measuring instruments.	**04**
	(c)	Explain working principle and construction of Piezoelectric transducer.	**07**
		OR	
Q.3	**(a)**	A 250 : 5, CT is used along with an ammeter. If ammeter reading is 3.6 Amp, find out the line current.	**03**
	(b)	Explain why CT secondary should not be open ?	**04**
	(c)	Explain construction and working principle of I-phase induction type energy meter.	**07**
Q.4	**(a)**	Draw & explain construction of PMMC instrument.	**03**
	(b)	Explain working principle of Hall effect transducer.	**04**
	(c)	Draw circuit of Kelvin's double bridge method used for measurement of low resistance. Derive the condition for balance.	**07**
		OR	
Q.4	**(a)**	Explain various controls of power scope.	**03**
	(b)	Draw circuit of Owen's bridge. Write its applications	**04**
	(c)	Draw & explain block diagram of Digital storage oscilloscope.	**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)**	What is clamp on meter ? Write its applications.	**03**
	(b)	Discuss the loss of charge method for high resistance measurement.	**04**
	(c)	Explain Maxwell's inductance capacitance bridge with connection diagram and phasor diagram also state balance condition for the same.	**07**

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