Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) • EXAMINATION – WINTER 2016

Subject Code:2141003 Date:21/11/2016

Subject Name:Electronics Measurement and 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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What is Electronic Instrument?	
	2	Define Accuracy and Sensitivity of instrument.	
	3	Define the term null as it applies to bridge measurement.	
	4	Which bridge circuit is used for measurement of low resistance?	
	5	The measure value of inductor is 25.3 mh and true value is 21.4 mh . Find the relative error.	
	6	How do the X-shift and Y-shift function of CRO?	
	7	What is the criteria for balance of a Wheatstone bridge?	
	8	Define Transducer.	
	9	What is range of counting for 4 and 1/2 digit display?	
	10	What is operating principle of temperature transducer?	
	11	Define term Isolation.	
	12	What is Hall effect principle?	
	13	List out disadvantages of Digital Instrument.	
	14	Which Bridge circuit is used for measurement of capacitor?	
Q.2	**(a)**	Define and explain Systematic error and Random error with examples.	**03**
	(b)	The output voltage of an amplifier was measured at eight different intervals using the same digital voltmeter with the following results: 20.00, 19.80, 19.85, 20.05, 20.10, 19.90, 20.25, 19.95 V Calculate 1) Deviation of each value and 2) Standard deviation	**04**
	(c)	A bridge is balanced at a frequency of 1 kHz and has the following constants Arm AB - 0.2μF pure capacitor Arm BC – 500 Ω pure resistance Arm CD – Unknown Arm DA- R=600 Ω in parallel with C = 0.1 μF. Derive the balance condition and find the constants of arm CD , considered as a series circuit.	**07**
		OR	
	(c)	Explain internal circuit diagram of Digital Frequency Meter.	**07**
Q.3	**(a)**	Give working principle , characteristics of following transducers: 1) Thermocouple 2) Piezoelectric	**03**
	(b)	Which parameter we need to consider for selecting Transducers?	**04**
	(c)	Explain principle of operation of LVDT in detail.	**07**
		OR	
Q.3	**(a)**	Explain function of Delay line in CRO.	**03**

	(b)	Explain Ratio and Multiple Ratio measurement circuit in detail.	**04**
	(c)	Explain Lissajous method for frequency measurement in CRO.	**07**
Q.4	**(a)**	List out different types of attenuators used in signal Generators and explain any one in detail.	**03**
	(b)	List out Digital Techniques used for Optical Isolation and explain any one in detail	**04**
	(c)	Explain how Instrumentation Amplifier is used to amplify low level signal.	**07**
		OR	
Q.4	**(a)**	Explain operation of I to P convertor in detail.	**03**
	(b)	Write a short note on variable Oscillator.	**04**
	(c)	Explain in detail how Phase difference is measure using X-OR and SR flip-flop method.	**07**
Q.5	**(a)**	Draw S/H circuit using OP-AMP and explain its working in brief.	**03**
	(b)	Draw and explain Sweep Frequency Generator.	**04**
	(c)	Write a short note on Data Acquisition in PLC.	**07**
		OR	
Q.5	**(a)**	Draw block diagram of 1) Wave Analyzer and 2) Spectrum Analyzer.	**03**
	(b)	Give difference between Single Channel DAS and Multichannel DAS .	**04**
	(c)	Draw and explain working of Pulse and Square wave generator.	**07**

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