Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2141704 **Date:01/06/2016**

Subject Name:Measurement & 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.**

Q.1		**Short Questions**	**14**
	1	Define Energy.	
	2	What is the ohms/volt rating of a voltmeter with a 50 µA movement?	
	3	Calculate resolution of an 8-bit DAC for a full scale output voltage of 10.2 V?	
	4	Can a 2 and 1/2 digit voltmeter measure 1mV if the basic range is 0 to 100V?	
	5	What is graticule in Cathode ray oscilloscope?	
	6	What is use of delay line in Cathode ray oscilloscope?	
	7	Given a resistor with bands: A = blue, B = gray, C = orange and D = silver. Find the resistance value and tolerance.	
	8	Define stray capacitance.	
	9	How quality factor Q can be calculated for any inductor?	
	10	Give Examples for integrating and recording type of instruments.	
	11	If the vertical sensitivity of a scope is set to 50 mV/Div, how much and in what direction will the 0.2 voltage applied to the vertical inputs of the scope, deflect the spot?	
	12	A 250:5, current transformer is used along with an ammeter. If ammeter reading is 2.7 A, estimate the line current.	
	13	What is application of magnetometer?	
	14	Why Input guarding is used?	
Q.2	**(a)**	Explain in brief: Wien Bridge to find out unknown frequency.	**03**
	(b)	Explain 'Ohmmeters'.	**04**
	(c)	What is use of Universal Time-Counters? Explain with proper Block diagram.	**07**
		OR	
	(c)	Explain Hay's bridge method to measure unknown Inductance.	**07**
Q.3	**(a)**	How Voltmeter- Ammeter method can be used to measure unknown resistance? Explain in detail.	**03**
	(b)	Write short note on Lissajous patterns.	**04**
	(c)	Draw and explain block diagram of Successive approximation type of ADC.	**07**
		OR	
Q.3	**(a)**	The Schering bridge has the following conditions: (1) Arm AB – capacitance of 1 uF in parallel with 1.2 K ohm, (2) Arm AD – resistance of 4.7 K ohm, (3) Arm BC – capacitor of 1 uF and (4) arm CD – unknown capacitor C_x and R_x. Calculate the unknown capacitance and Resistance.	**03**
	(b)	Explain in brief – Time base circuitry for CRO.	**04**
	(c)	What is current transformer? Explain its working with construction diagram.	**07**
Q.4	**(a)**	Draw only circuit diagram of weighted Binary Resistive summing networks type of DAC. List its advantages and limitations.	**03**
	(b)	A moving coil instrument gives a full scale deflection for a current of 20 mA with a potential difference of 200 mV across it. Calculate: i) Shunt required to use it as an ammeter to get a range of 0-200 A, ii) Multiplier required to use it as a voltmeter of	**04**

range 0 -500 V.

	(c)	Write short note on Vertical deflection subsystem of CRO.	**07**

OR

Q.4	**(a)**	Draw and explain basic block diagram of CRO probe.	**03**
	(b)	For single phase power measurement using dynamometer wattcmeters, how wattmeter is connected to measure power with least error? How compensated wattmeter is working? Explain with proper circuit diagrams.	**04**
	(c)	Describe the constructional detail and working of a Single Phase Electrodynamometer type of power factor meter. Prove that the special displacement of moving system is equal to the phase angle of the system.	**07**
Q.5	**(a)**	How electronics timers are working? Explain in detail.	**03**
	(b)	Write short note on watt-hour meter.	**04**
	(c)	With block diagram explain working of Digital Multi-meters.	**07**

OR

Q.5	**(a)**	Compare Current and Potential transformers.	**03**
	(b)	What is inductive interference? Explain how it can be reduced.	**04**
	(c)	What is a main functionally of a sweep frequency generator? Explain major components of a sweep frequency generator with a block diagram	**07**

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