

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III EXAMINATION – SUMMER 2025****Subject Code:3132405****Date:29-05-2025****Subject Name: Measurement & Instrumentation****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 gross errors and systematic errors.	03
	(b) Explain the working principle of PMMC instruments with necessary diagrams.	04
	(c) Draw the block diagram of oscilloscope and describe its various blocks.	07
Q.2	(a) Explain working principle of Wheatstone bridge.	03
	(b) Explain damping methods for moving iron instrument.	04
	(c) Give five comparisons of PMMC & MI instruments.	07
	OR	
	(c) An 820Ω resistance with an accuracy of $\pm 10\%$ carries a current of 10mA. The current was measured by an analog ammeter on a 25mA range with an accuracy of $\pm 2\%$ of full scale. Calculate the power dissipated in the resistor and determine the accuracy of the result.	07
Q.3	(a) Define precision and accuracy.	03
	(b) Write short note on LVDT.	04
	(c) Discuss Lissajous pattern and its use for comparison of frequency of two periodic waveform.	07
	OR	
Q.3	(a) Explain the working principle of thermistor.	03
	(b) Derive the percentage error in measurement of P where $P=V \cdot I$.	04
	(c) Explain measurement of 3-phase power with two wattmeter method.	07
Q.4	(a) Describe working principle of flow transducer.	03
	(b) Discuss the working principle of thermocouple.	04
	(c) A PMMC instrument has Full Scale Deflection of 100 μ A and a coil resistance of 1k Ω . Calculate the required shunt resistance value to convert the instrument into an ammeter with FSD=100mA.	07
	OR	
Q.4	(a) Describe 7-segment display in brief.	03
	(b) Write short note on strain gauge.	04
	(c) Explain the working principle and block diagram of Digital multimeter.	07
Q.5	(a) What is sample & hold circuit?	03
	(b) Write short note on RTD.	04
	(c) Explain measurement of inductance by Maxwell bridge.	07
	OR	
Q.5	(a) What are attenuation probes?	03
	(b) Discuss analog to digital conversion with necessary diagrams.	04
	(c) Explain measurement of inductance by Hay's bridge.	07
