

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech II Semester Regular/Supplementary Examinations, November-2025
ELECTRICAL MEASUREMENTS AND INSTRUMENTATION
 (ELECTRICAL& ELECTRONICS ENGINEERING)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

		<u>UNIT-I</u>	
1.	a)	Derive the torque equation of a moving iron instrument.	[7M]
	b)	Why is damping required for an electromechanical measuring instrument? What are the different types of damping provided in electromechanical measuring instruments?	[7M]
		(OR)	
2.	a)	Distinguish between gross error, systematic error and random error with examples. What are the methods for their elimination/reduction?	[7M]
	b)	What are the shunts and multiplier? Derive the expression for both, with reference to meters used in electrical circuits.	[7M]
		<u>UNIT-II</u>	
3.	a)	Why is dynamometer type instrument chiefly used as a wattmeter? How do you extend the range of wattmeter using instrument transformers?	[7M]
	b)	Draw the possible methods of connecting the pressure coil of a wattmeter and compare the errors. Explain the meaning of 'compensating winding' in a wattmeter and show how they help to reduce the error.	[7M]
		(OR)	
4.	a)	Explain the operating principle and constructional details of AC polar type potentiometer?	[7M]
	b)	A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of $0.1\ \Omega$ is balanced at 75 cm. Find the magnitude of the current if the standard cell e.m.f. of 1.45 V is balanced at 50cm.	[7M]
		<u>UNIT-III</u>	
5.	a)	Describe the theory and method of measurement of low resistance using Kelvin's double Bridge. How the effect of thermo – electric emf is taken into account during measurement?	[7M]
	b)	Derive the equation of balance of a Schering Bridge. Draw the phasor diagram under null conditions and explain how loss angle of capacitor can be calculated.	[7M]
		(OR)	
6.	a)	Derive the equation of balance for Anderson bridge and also draw the phasor diagram.	[7M]
	b)	Explain the operation of a Wagner's earthing device.	[7M]
		<u>UNIT-IV</u>	

7.	a)	What is transducer? What are active and passive transducers? Give examples.	[7M]
	b)	Explain the working of Hall effect sensors.	[7M]
		(OR)	
8.	a)	What is the use of LVDT? Discuss its basic principle of operation.	[7M]
	b)	State the laws of thermocouple. Explain the working of thermocouples.	[7M]
		<u>UNIT-V</u>	
9.	a)	With block diagram explain the operation of “Ramp type’ digital voltmeter.	[7M]
	b)	With a block diagram, explain in detail the digital energy meter.	[7M]
		(OR)	
10.	a)	Draw the block diagram of a digital multimeter and explain its operation.	[7M]
	b)	Determine the measurement of phase angle from Lissajous figures.	[7M]
