Reg. No. : | | | | | | | | | | | | |

Question Paper Code:R4305

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

Electrical and Electronics Engineering

R21UEE405- ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Compare Resolution and precision.	CO1- U
2.	The expected value of voltage across the resistor is 100V. However the measurement gives the value of 98V. Calculate percentage of error.	CO1- U
3.	Reason why it is necessary to make the potential coil circuit purely resistive in wattmeters.	CO1- U
4.	Recite the hysteresis in B-H Curve.	CO1- U
5.	List the purpose of using Isolation transformer.	CO1- U
6.	Compare various guarding techniques for earth loops.	CO1- U
7.	Mention the advantages of magnetic tape recorder.	CO1- U
8.	Illustrate the operation of digital plotter.	CO1- U
9.	List about gauge factor with its expression.	CO1- U
10.	Illustrate the elements of Data Acquisition System.	CO1- U

PART – B (5 x 16= 80 Marks)

11.	(a)	A professor given a task to the students for observing the ambient condition of their classroom and to display the observed measurements in front of the class. Articulate the steps to be followed by those students to complete the task.	CO2- App	(16)

Or

	(b)	Instrumentation refers to the tools or means by which engineers attempt to measure variables or items of interest in the data-collection process. In addition, during the process of data collection, engineers might fail to recognize that changes in the calibration of the measuring instrument(s) can lead to biased results. Make use of relevant example.	CO2- App	(16)
12.	(a)	Select a suitable circuit to measure the voltage of 11 kV and analyze its function with necessary conditions and equations.	CO4- Ana	(16)
		Or		
	(b)	You have planned to go tour for 6 days along with your family members. Before you left the house, you ensured that you have switched off all the electrical and electronic utilities in the house and also noted the readings of energy meter that it reads 820. After 6 days, while you are seeing the readings of energy meter, it reads 830. Assume that no one used any items within your house for during those 6 days. Analyze why it shows 830 without any load and also explain the function of the energy meter in ideal case.	CO4- Ana	(16)
13.	(a)	A Maxwell bridge is having bridge constants at balance as C1=0.01μF, R1=470 KΩ, R2=5.1KΩ and R3=100 KΩ. Construct the given bridge circuit and derive the necessary equations. Determine the series equivalent of the unknown impedance.	CO4- Ana	(16)
		Or		
	(b)	In a measurement system, the particular device reads over current due to some fault. Identify the source of the fault and analyze its impact.	CO4- Ana	(16)
14.	(a)	A multimedia production company needs to store high-resolution video footage. Whether you select magnetic disk storage or SSDs? Design your choice for the particular application.	CO5- Ana	(16)
		Or		
	(b)	An engineering firm needs to produce highly detailed CAD drawings. Which type of digital plotter would you recommend and why? Develop your choice with good resolution, speed and cost.	CO5- Ana	(16)

15. (a) A high-speed industrial process control system requires fast and accurate data conversion. Select and construct the best type of A/D and D/A converters for this application. CO3- App (16)

Or

(b) Design a virtual instrumentation system for a remote patient monitoring system. Explain how software-based instruments can replace traditional medical measurement systems. CO3- App (16)