Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2024

ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER VII

EC5020 MEASUREMENTS AND INSTRUMENTATION

(Regulation2019)

Time:3hrs **Max. Marks: 100**

CO1	Discuss about the principles of various measurement techniques.
CO2	Analyze the transducers and its impact.
CO3	Explain about the signal conditioning system and signal analyzers.
CO4	Illustrate the digital measurement equipment's.
CO5	Emphasize the need for data acquisition, recording and display systems.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	The expected value of the voltage across a resistor is 40V. however the measurement gives a value of 39v. Calculate the absolute error.	2	CO1	L3
2	What are the different types of Calibration methods.	2	CO1	L2
3	Calculate the gauge factor of a strain gauge, if the value of resistance is 152 Ohms, which changes by 5Ω for 5000 macrostrain.	2	CO2	L3
4	List the applications of the piezoelectric principle in transduction.	2	CO2	L1
5	What is the role of a high-pass filter? Illustrate the characteristic.	2	CO3	L3
6	Differentiate the logic analyzer with the wave analyzer	2	CO3	L2
7	What are different types of Guarding techniques and define it.	2	CO4	L2
8	Draw a schematic diagram of Voltmeter with a simple circuit.	2	CO4	L3
9	How do Analog Printers and Digital Printers differ in terms of data output and accuracy?	2	CO5	L2
10	List the various measurements system applied to Micro and Nanotechnology applications.	2	CO5	L1

PART- B (5x 13=65Marks)

Q.No.	Questions	Marks	CO	BL
11 (a)	(i) Describe the static characteristics of measuring instrument.	7	CO1	L3
	(ii) Illustrate the different components and describe the functions of each part of an instrument system.	6	CO1	L3
	OR			
11 (b)	(i) The following 10 observations were recorded when measuring a voltage 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5 and 41.8 volt. Find the Mean, Standard Deviation, the probable error of mean and rage.	8	CO1	L3
	(ii) Discuss the significance of standards in measurements. Explain any two types of measurement standards.	5	CO1	L3

12 (a)	Explain the construction, principle and working of a Rotary Variable Differential Transformer (RVDT). Discuss the advantage, disadvantage with applications.	**13**	CO2	L1
	OR			
12 (b)	Explain the construction and working Principle of (i) Photo electric transducers (ii) Thermocouple (iii) Capacitor microphone	**13**	CO2	L1
13 (a)	Explain the working principle of Kelvin's double bridge method for the measurement of low resistance. Derive the relation for finding unknown resistance.	**13**	CO3	L3
	OR			
13 (b)	Explain the working principles, components, and applications of Data Acquisition Systems (DAS) with types.	**13**	CO3	L3
14 (a)	Elaborate the IEEE 488/GPIB Bus standard requirement with an example.	**13**	CO4	L1
	OR			
14 (b)	What are the characteristics features of DVMs? Discuss about the working of any 3 types of DVM. Mention the advantages of each type of DVM.	**13**	CO4	L1
15 (a)	Draw the block diagram of a CRO and explain the working principle of dual trace CRO and differentiate between digital storage and analog storage oscilloscope performance.	**13**	CO5	L2
	OR			
15 (b)	Elaborate the architecture and applications of virtual instrumentation in various fields of measurements and instrumentation.	**13**	CO5	L2

PART- C (1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	(i) An AC bridge was made up as follows: arm ab, a capacitor of 0.8 mF in parallel with 1 kW resistance, bc a resistance of 3 kW, arm cd an unknown capacitor C_x and R_x in series, arm da a capacitance of 0.4 mF. The supply at 1 kHz is connected across bd and a detector across ac. Determine the value of unknown capacitance C_x, unknown series resistance Rx and dissipation factor.	**10**	CO3	L5
	(ii) The Four arm of Hay's Bridge are arranged as follows AB coil of unknown impedance. Arm BC non –reactive resistor of 1000Ω. Arm CB Non-reactive resistor of 833 Ω with a standard capacitor of 0.38μF. Arm DA Non-reactive resistor of 16800 Ω. If the supply frequency is 50Hz. Determine inductance and resistance at balanced condition.	**5**	CO3	L5