Reg. No.															

Question Paper Code	14494

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Fourth Semester

Electrical and Electronics Engineering

24EEPC403 - MEASUREMENTS AND INSTRUMENTATION

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	_____is mainly due to human mistakes in reading or in using instruments or errors in recording observations. a) Gross errors b) Systematic errors c) Instrumental errors d) Environmental errors	1	K2	CO1
2.	Resolution of an instrument is a) The minimum of quantity it can measure b) The maximum of quantity it can measure c) The maximum non-linearity d) ability to distinguish polarity	1	K1	CO1
3.	A meter reads 115.50 V and the true value of the voltage is 115.44 V. Determine the static error for the instrument. a) 0.02V b) 0.03V c) 0.04V d) 0.06V	1	K3	CO1
4.	Current transformers and potential transformers are used for measuring a) low current and voltages b) very low current and voltages c) high currentsand voltages d) intermediate currents and voltages	1	K1	CO2
5.	A dynamometer type wattmeter can measure a) DC power only b) AC power only c) DC as well as AC power d) None of the mentioned	1	K2	CO2
6.	A DC ammeter has a resistance of 0.1 Ω and its current range is 0 - 100A. If the range is to be extended to 0 - 500A, the meter requires the following shunt resistance a) 0.010 Ω b) 0.011 Ω c) 0.025 Ω d) 1.010 Ω	1	K3	CO2
7.	Which bridge automatically adjusts itself to maintain balance? a) Wheatstone bridge b) Self-balancing bridge c) Hay's bridge d) Kelvin bridge	1	K1	CO3
8.	Why is the Kelvin double bridge preferred for low-resistance measurement? a) It increases supply voltage b) It eliminates lead and contact resistance errors c) It measures capacitance d) It works only with AC	1	K2	CO3
9.	A high-Q choke coil is to be tested in a laboratory. Which bridge should be used? a) Hay's bridge b) Wheatstone bridge c) Kelvin bridge d) Schering bridge	1	K3	CO3
10.	Which transducer is used to measure magnetic field? a) Capacitive transducer b) Piezoelectric transducer c) Hall effect transducer d) Resistive transducer	1	K1	CO4
11.	Why are piezoelectric transducers suitable for vibration measurement? a) They generate voltage when subjected to mechanical stress b) They work only for DC signals c) They have moving contacts d) They measure resistance directly	1	K2	CO4

12.	A technician wants to observe waveform shape and amplitude of an AC signal. Which instrument should be used? a) DMM b) CRO c) Wattmeter d) Megger	*1*	*K3*	*CO4*
13.	Which instrument is used to measure voltage and display the reading in numerical form? a) CRO b) Digital voltmeter (DVM) c) Wattmeter d) Galvanometer	*1*	*K1*	*CO5*
14.	A non-sinusoidal waveform from an inverter circuit must be measured accurately. Which meter should be used? a) PMMC meter b) Average responding meter c) True RMS meter d) MI meter	*1*	*K3*	*CO5*
15.	Data loggers are typically used in: a) Real-time video gaming b) Environmental monitoring c) Circuit debugging d) Browsing the internet	*1*	*K2*	*CO6*
16.	A factory needs to record temperature values automatically for 24 hours without human supervision. Which instrument should be used? a) Wattmeter b) Data logger c) DSO d) Frequency meter	*1*	*K3*	*CO6*

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)

Answer ALL Questions

17.	Apply the concepts of accuracy and precision to evaluate the performance of a measuring instrument with a suitable example.	*3*	*K3*	*CO1*
18.	A PMMC instrument has a coil of dimensions 10 mm × 8 mm. The flux density in the air gap is 0.15 Wb/m². If the coil is wound for 100 turns, carrying a current of 5 mA, then calculate the deflecting torque.	*3*	*K3*	*CO2*
19.	Analyze the limitations of the Wheatstone bridge.	*3*	*K4*	*CO3*
20.	Analyze the factors to be considered for selection of transducers.	*3*	*K4*	*CO4*
21.	Apply the principle of True RMS meters to measure the RMS value of an AC voltage waveform.	*3*	*K3*	*CO5*
22.	Analyze the role of wireless instrumentation in improving measurement.	*3*	*K4*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Apply the concept of any five static characteristics to evaluate the performance of a measuring instrument.	*11*	*K3*	*CO1*
		OR			
	b)	A set of ten readings were recorded while measuring the stator temperature of an electric machine. The readings were 52.4, 55.1, 56, 55.4, 57, 54, 53.7, 51.7, 54.9, 53.7degree Celsius. Find: Arithmetic Mean, Deviation, Average Deviation, Standard Deviation and Variance.	*11*	*K3*	*CO1*
24.	a)	Obtain the equation for deflection of PMMC instrument. Show that its scale is linear if spring control is employed and list out the advantages.	*11*	*K3*	*CO2*
		OR			
	b)	Make use of single-phase electrodynamometer type wattmeter to measure power and explain its construction and working principle. Also derive its torque equation.	*11*	*K3*	*CO2*

25.	a)	Analyze the Schering bridge used for capacitance measurement. Derive the balance equations and draw the phasor diagram.	*11*	*K4*	*CO3*
		OR			
	b)	Analyze the Maxwell's Inductance Capacitance Bridge and derive the balance equation for Inductance measurement. Draw a neat circuit diagram.	*11*	*K4*	*CO3*
26.	a)	Analyze the working principle of a capacitive transducer and justify its use for pressure measurement.	*11*	*K4*	*CO4*
		OR			
	b)	Analyze the working principle of piezoelectric transducer and explain its use for force / pressure measurement.	*11*	*K4*	*CO4*
27.	a)	Explain how digital energy meter is used to measure the electrical energy consumed by a residential load.	*11*	*K3*	*CO5*
		OR			
	b)	Use the principle of ramp type digital voltmeter operation to demonstrate the working of digital voltmeter with a neat block diagram and waveform.	*11*	*K3*	*CO5*
28.	a)	Make use of PC-based measurement systems for real-time industrial monitoring and control applications.	*11*	*K3*	*CO6*
		OR			
	b)	Apply the concept, functional blocks and features of Smart Sensor in measurement systems.	*11*	*K3*	*CO6*