Reg. No.															

Question Paper Code	14416

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

Fourth Semester

Electrical and Electronics Engineering

20EEPC403 - MEASUREMENTS AND INSTRUMENTATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

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

		Marks	*K – Level*	*CO*
1.	In an experiment, it is found that the experimental value is very close to actual value, hence the experimental value can be called a) Accurate b) Precise c) Suitable d) Mean	*1*	*K2*	*CO1*
2.	Sudden fluctuation in measured values due to external noise is an example of: a) Calibration error b) Random error c) Instrumental error d) Zero error	*1*	*K3*	*CO1*
3.	The purpose of a display unit is to: a) Sense data b) Process data c) Present measured value d) Calibrate instrument	*1*	*K1*	*CO1*
4.	Which instrument transformer is used for measuring high current? a) Potential Transformer (PT) b) Current Transformer (CT) c) Wattmeter d) Energy meter	*1*	*K1*	*CO2*
5.	In the two-wattmeter method for measuring three-phase power, two wattmeters are sufficient because: a) Neutral is always required b) Total power can be obtained from the sum of two wattmeter readings c) Only one phase is measured d) Voltage is constant	*1*	*K2*	*CO2*
6.	Iron loss in magnetic materials is determined to evaluate: a) Mechanical strength b) Energy wasted due to hysteresis and eddy currents c) Voltage regulation d) Temperature rise only	*1*	*K2*	*CO2*
7.	A D.C potentiometer is preferred over a voltmeter for measuring unknown emf because it: a) Draws more current from the source b) Measures by comparison without drawing current c) Works only for AC circuits d) Measures resistance directly	*1*	*K3*	*CO3*
8.	A self-balancing bridge is advantageous in automated systems because it: a) Requires manual balancing each time b) Automatically adjusts to balance condition c) Works only for DC d) Eliminates standard components	*1*	*K3*	*CO3*
9.	Anderson bridge includes an additional arm compared to Maxwell bridge mainly to: a) Reduce circuit cost b) Improve precision in self-inductance measurement c) Measure low resistance d) Eliminate capacitance	*1*	*K3*	*CO3*
10.	An earth loop is formed when: a) A circuit has no grounding b) Multiple ground paths exist in a system c) Voltage becomes zero d) Resistance is very high	*1*	*K1*	*CO4*

11.	Electrostatic shielding is effective when the shield is: a) Left floating b) Properly grounded c) Heated d) Connected in series	*1*	*K2*	*CO4*
12.	Electrostatic interference is mainly caused by: a) Magnetic fields b) Electric fields c) Mechanical vibration d) Temperature rise	*1*	*K1*	*CO4*
13.	PQ analyzers help industries by detecting: a) Paper quality b) Voltage sags, harmonics, and disturbances c) Mechanical vibration only d) Printer speed	*1*	*K2*	*CO5*
14.	A data logger is mainly used for: a) Real-time display only b) Recording data over time c) Increasing voltage d) Frequency conversion	*1*	*K1*	*CO5*
15.	Identify which component converts analog sensor output into digital form for computer processing. a) Multiplexer b) ADC c) DAC d) Amplifier	*1*	*K3*	*CO6*
16.	A smart sensor differs from a conventional sensor because it includes: a) Only sensing element b) Built-in signal processing capability c) Mechanical gears d) Manual calibration only	*1*	*K3*	*CO6*

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

17.	Apply the concepts of accuracy and precision in measurement.	*3*	*K3*	*CO1*
18.	Analyze PMMC meter and justify why it has a uniform scale	*3*	*K4*	*CO2*
19.	Analyze Wheatstone bridge and Kelvin Double bridge for resistance measurement and justify the preferred application of each.	*3*	*K4*	*CO3*
20.	Analyze the screening methods to reduce Interference.	*3*	*K3*	*CO4*
21.	Examine the operating principles of digital plotters and printers and compare their roles for measurement data recording.	*3*	*K3*	*CO5*
22.	Analyze the function of a transducer in a measurement system and justify its operation with a suitable practical example.	*3*	*K4*	*CO6*

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

23.	a)	Make use of Bourdon tube to explain the functional elements of an instrument with a neat block diagram.	*11*	*K3*	*CO1*
		OR			
	b)	Make use of the five static characteristics -accuracy, precision, resolution, linearity and sensitivity of an instrument and explain how they influence instrument performance.	*11*	*K3*	*CO1*
24.	a)	Apply the operating principles of an analog multimeter to measure voltage, current, and resistance.	*11*	*K3*	*CO2*
		OR			
	b)	Apply the principles of construction and operation of a PMMC instrument to derive the expression for deflection in a spring-controlled system.	*11*	*K3*	*CO2*
25.	a)	Analyze the Schering's bridge and derive the balance equation to measure the unknown capacitance.	*11*	*K4*	*CO3*
		OR			
	b)	Analyze the maxwell's bridge and derive the balance equation to determine the inductance in terms of known capacitance . Derive the condition for balance.	*11*	*K4*	*CO3*

26.	a)	Explain the different types of interferences and apply suitable screening methods to reduce them.	*11*	*K3*	*CO4*
		OR			
	b)	Apply the concept of multiple earths and earth loops to explain their effects on measurement systems.	*11*	*K3*	*CO4*
27.	a)	Use the functional blocks of a CRO to illustrate its block diagram and explain how each block contributes to waveform observation.	*11*	*K3*	*CO5*
		OR			
	b)	Construct the block diagram of a Power Quality Analyzer and explain how it is used to monitor power quality parameters.	*11*	*K3*	*CO5*
28.	a)	Analyze the functional blocks of a smart sensor and explain their use in modern measurement and automation systems.	*11*	*K4*	*CO6*
		OR			
	b)	Analyze the working principle of a piezoelectric transducer and explain its suitability for dynamic measurements.	*11*	*K4*	*CO6*