PVP 23

Code: 23EE3601

III B.Tech - II Semester - Regular Examinations – APRIL 2026

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	State the reason for fixed coils connected in series and the moving coil connected in parallel.	L2	CO1
1.b)	Recall the difference between a Current Transformer (CT) and a Potential Transformer (PT).	L2	CO2
1.c)	List the applications of capacitive transducers.	L2	CO3
1.d)	Define the Hall effect.	L2	CO4
1.e)	Tell the basic working principle of a successive approximation DVM.	L2	CO1
1.f)	Quote the basic functions of a digital multimeter.	L2	CO1
1.g)	Interpret the remote calibration in intelligent transducers.	L2	CO3
1.h)	Name the main components of a smart energy meter.	L2	CO1

1.i)	Cite the function of the RTU in a SCADA system.	L2	CO1
1.j)	Label the key parameters measured in solar instrumentation?	L2	CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Illustrate the operation of the wattmeter at Low Power Factor (LPF).	L3	CO1	5 M
	b)	With a diagram, explain how a single-phase power factor meter is connected in a circuit for power factor measurement.	L3	CO2	5 M
OR					
3		Construct the expression for the ratio error in a Potential Transformer. Explain the causes of ratio error in detail.	L3	CO4	10 M
UNIT-II					
4	a)	Explain the working principle and construction of a capacitive transducer. Discuss how it measures displacement, pressure, or thickness.	L3	CO1	7 M
	b)	Summarize the applications of strain gauges in various industries.	L3	CO2	3 M
OR					
5	a)	Describe the principle of piezoelectric	L3	CO1	5 M

		transducers and the mechanism by which mechanical stress produces an electrical charge.			
	b)	Interpret how thermocouples are used in temperature measurement.	L4	CO2	5 M
		UNIT-III			
6	a)	Summarize the working principle of an integrating-type digital voltmeter and the integration of the input voltage leading to a digital reading.	L3	CO1	6 M
	b)	Recall the advantages and disadvantages of a ramp-type DVM.	L3	CO2	4 M
		OR			
7	a)	With the help of a diagram, explain the working principle of a digital tachometer.	L3	CO2	5 M
	b)	Illustrate the principle and applications of a Q meter.	L4	CO4	5 M
		UNIT-IV			
8	a)	Analyze the concept of smart instruments and discuss their features in detail.	L4	CO1	5 M
	b)	Interpret HART communication in detail, covering its principles and working mechanism.	L3	CO3	5 M
		OR			
9	a)	Develop the concept of Automatic	L3	CO3	6 M

		Meter Reading (AMR) and its key applications in modern utility systems.			
	b)	Correlate the components of a smart energy meter in detail.	L4	CO5	4 M
UNIT-V					
10		Describe the working principle of Phasor Measurement Units (PMUs) and their applications in power grid monitoring.	L3	CO5	10 M
OR					
11	a)	Outline the working principle and significance of sunshine duration measurement in solar energy systems.	L4	CO5	6 M
	b)	Compare the applications of Pyranometers and Pyrheliometers in solar energy systems.	L4	CO5	4 M