

Code: 20EE3401

**II B.Tech - II Semester – Regular / Supplementary Examinations
MAY - 2024**

**MEASUREMENTS AND INSTRUMENTATION
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

			BL	CO	Max. Marks
UNIT-I					
1	a)	Explain the various methods of providing damping torque in an indicating instruments.	L3	CO2	8 M
	b)	State the advantages, disadvantages and errors in PMMC instruments.	L3	CO2	6 M
OR					
2	a)	Discuss the construction and working of attraction type moving iron instrument with a neat sketch.	L4	CO4	7 M
	b)	Explain various errors and their compensation used in ammeters and voltmeters.	L3	CO3	7 M
UNIT-II					
3	a)	Describe the construction details of a single-phase induction-type energy meter	L3	CO3	8 M

		with a schematic diagram and label its different parts. Comment on the different materials used for the different internal components.			
	b)	Explain the different sources of errors in induction type energy meter and discuss how they can be adjusted / compensated?	L4	CO4	6 M
OR					
4	a)	Explain the operation of moving iron type single phase power factor meter with a neat diagram.	L4	CO4	8 M
	b)	State the advantages and disadvantages of moving iron power factor meter.	L3	CO2	6 M
UNIT-III					
5	a)	Compare Maxwell's bridge and Hay's bridge with respective diagrams.	L3	CO2	7 M
	b)	Deduce the expression for balancing the Maxwell's inductance bridge. Also draw the phasor diagram under balanced condition.	L4	CO4	7 M
OR					
6	a)	Explain the operation of a meggar used for high resistance measurement with a neat diagram.	L3	CO2	8 M
	b)	In an Anderson's bridge for measurement of inductance, the arm AB consists of an unknown impedance with L and R, the arm BC contains a variable resistor, fixed resistances of 500 Ω each in arms CD and	L4	CO4	6 M

		DA, a known variable resistance in the arm DE, and a capacitor of fixed capacitance $2 \mu\text{F}$ in the arm CE. The AC supply of 200 Hz is connected across A and C, and the detector is connected between B and E. If balance is obtained with a resistance of 300Ω in the arm DE and a resistance of 600Ω in the arm BC, calculate values of unknown impedance L and R.			
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UNIT-IV

7	a)	Describe the basic requirements of an electrical transducer.	L3	CO3	6 M
	b)	Discuss the working principle of strain gauges with suitable diagrams. Describe the terms Poisson's ratio and gauge factor.	L3	CO3	8 M

OR

8	a)	Describe the construction and working principle of a thermocouple. Compare different thermocouple materials.	L3	CO5	8 M
	b)	Explain how thermistor can be used for temperature measurement.	L4	CO4	6 M

UNIT-V

9	a)	Describe the performance characteristics of a digital measurement.	L3	CO3	6 M
	b)	List the types of digital voltmeters and describe the operation of any one of them briefly with a suitable block diagram.	L4	CO5	8 M

OR

10	a)	Discuss the principle of operation of a digital multimeter with the help of a functional block diagram.	L4	CO5	7 M
	b)	Demonstrate briefly about power analyzers.	L4	CO5	7 M