U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 23EE3PCMNI **Max Marks: 100**
Course: Measurements and Instrumentation

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Describe the various types of measurement methods and explain instrument classification	*CO1*	*PO1*	**08**
	b)		Define the sensitivity of Wheatstone's bridge. Hence deduce the expression for sensitivity of the bridge 'S_B'.	*CO2*	*PO1*	**08**
	c)		Explain the terms (i) Static Error (ii) Relative Error	*CO1*	*PO1*	**04**
			OR			
2	a)		Define limiting errors and explain the Gross Errors and systematic errors by giving suitable examples.	*CO2*	*PO1*	**08**
	b)		With a neat bridge circuit derive the balance equation for Kelvin's double bridge.	*CO2*	*PO1*	**08**
	c)		Mention the limitations of Wheatstone's bridge.	*CO1*	*PO1*	**04**
			UNIT - II			
3	a)		With help of circuit diagram, derive the bridge balance equation of Anderson's bridge for measuring self-inductance.	*CO2*	*PO2*	**09**
	b)		Describe the working of Schering bridge. Derive the equation for capacitance and Dissipation factor.	*CO2*	*PO2*	**06**
	c)		An AC bridges has the following constants. Arm AB- capacitor of 2.5μF in parallel with 50K ohm; Arm AD-resistance of 200 K ohm; Arm BC-capacitance of 0.5μF; Arm CD-unknown capacitance C_x and R_x in series and frequency 1KHz. Determine the unknown capacitance Cx and Rx in series.	*CO3*	*PO2*	**05**
			UNIT - III			
4	a)		Derive the torque equation of single phase electrodynamometer type wattmeter.	*CO2*	*PO2*	**08**
	b)		Define the following w.r.t. current transformer a) Transformation ratio b) Ratio correction factor	*CO1*	*PO1*	**04**
	c)		With neat equivalent circuit and phasor diagram, arrive at the expression for ratio error in current transformer.	*CO2*	*PO2*	**08**

			OR			
	5	a)	With neat block diagram, Explain the working principle and Construction of single phase electrodynamometer type power factor meter.	*CO2*	*PO1*	**08**
		b)	With neat block diagram, Explain the working principle and Construction of electronic energy meter	*CO2*	*PO1*	**06**
		c)	A wattmeter connected to read the power consumed by an inductive load reads 28W. The voltmeter connected across the supply and the pressure coil circuit reads 250V. The ammeter connected in series with the current coil and the load reads 5A. The impedance of the pressure coil circuit is (2160 + j6) Ω. The voltage drops across the ammeter and the voltmeter are neglected. Determine the percentage error in the wattmeter reading.	*CO3*	*PO2*	**06**
			UNIT - IV			
	6	a)	What are the Advantages of electronic Instruments?	*CO1*	*PO1*	**05**
		b)	Explain the construction and working of a RAMP type digital voltmeter.	*CO2*	*PO1*	**08**
		c)	Explain the construction and working of servo balancing type digital voltmeter.	*CO2*	*PO1*	**07**
			UNIT - V			
	7	a)	With the neat block diagram explain about the Piezoelectric and Hall-effect transducers.	*CO2*	*PO1*	**10**
		b)	Explain the construction and principle of working of a linear voltage differential transformer (LVDT).	*CO2*	*PO1*	**10**

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