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

Autonomous Institute Affiliated to VTU

January / February 2025 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)	With a neat circuit diagram arrive at the balance condition of Wheatstone bridge	CO2	PO2	**08**
	b)	In the wheatstone bridge , the value of resistance of various arms are: P=1000Ω,Q=100 Ω, R=2005 Ω and S=200 Ω. The battery has an emf of 5V & negligible internal resistance. The galvanometer has a current sensitivity of 10mm/μA & an internal resistance of 100 Ω. Calculate the deflection of galvanometer & the sensitivity of the bridge in terms of deflection per unit change in resistance.	CO2	PO2	**08**
	c)	Explain the loss of charge method?	CO1	PO1	**04**
		OR			
2	a)	With a neat circuit diagram arrive at the balance condition of Kelvin double bridge.	CO1	PO1	**10**
	b)	With the circuit diagram explain the working of Crompton's type(Lab. Type) DC potentiometer.	CO2	PO1	**10**
		UNIT - II			
3	a)	Describe the sources and the null detectors that are used for a.c. bridges	CO2	PO1	**06**
	b)	Derive the equations for balance in case of Maxwell's inductance capacitance bridge. Draw the phasor diagram for balance condition.	CO2	PO2	**08**
	c)	A maxwell's capacitance bridge is used to measure an unknown inductance in comparison with capacitance. The various values at balance are R2=400Ω; R3=600Ω; R4=1000Ω; C4=0.5μF, calculate the values of R1 & L1. Calculate also the value of storage (Q) factor of coil if the frequency is 1000 Hz.	CO2	PO2	**06**
		OR			
4	a)	Describe working of Schering bridge. Derive the equation for capacitance & dissipation factor.	CO2	PO2	**08**

		b)	Derive the equation of balance for an Anderson's bridge. Discuss the advantages & disadvantages of the bridge	*CO2*	*PO2*	**08**
		c)	What are the causes for errors in A.C.bridge & their compensations?	*CO2*	*PO1*	**04**
			UNIT - III			
	5	a)	With the help of a block diagram explain the working of Electronic energy meter.	*CO2*	*PO2*	**06**
		b)	Explain the special features incorporated in the dynamometer wattmeter when used to measure power in circuits of low power factor.	*CO2*	*PO1*	**06**
		c)	A wattmeter has a current coil of 0.03 ohm resistance & a pressure coil of 6000 ohm resistance. Calculate the percentage error if the wattmeter is so connected that (i) The current coil is on the load side,ii) the pressure coil is on the load side (a) if the load takes 20A at a voltage of 220V and 0.6 p.f. in each case(b) what load current would give equal errors with the two connections?	*CO2*	*PO2*	**08**
			OR			
	6	a)	Explain single phase electrodynamic type power factor meter?	*CO1*	*PO1*	**06**
		b)	Using relevant phasor diagram, derive an expression for phase angle error in C.T	*CO2*	*PO2*	**08**
		c)	Explain the construction & working of LPF wattmeter?	*CO2*	*PO1*	**06**
			UNIT - IV			
	7	a)	What are the advantages of electronic instruments?	*CO1*	*PO1*	**06**
		b)	Describe various factors which are taken into consideration while selecting an electronic type analog voltmeter.	*CO1*	*PO1*	**08**
		c)	Explain with help of block diagram, the various parts of an electronic multimeter?	*CO2*	*PO1*	**06**
			OR			
	8	a)	Give the comparison between electronic meters & conventional analog meters	*CO1*	*PO1*	**06**
		b)	With block diagram explain working of Ramp type DVM	*CO2*	*PO1*	**08**
		c)	Explain servo balancing potentiometer type DVM	*CO2*	*PO1*	**06**
			UNIT - V			
	9	a)	Explain the construction of wire gauges & derive the expression for the gauge factor.	*CO2*	*PO2*	**10**
		b)	With necessary diagram explain the construction and working of LVDT	*CO2*	*PO1*	**10**
			OR			
	10	a)	What is piezoelectric & Hall effect transducers?	*CO2*	*PO1*	**10**
		b)	Explain temperature sensors devices, RTD's, thermistors, Thermocouples	*CO2*	*PO1*	**10**

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