U.S.N.										

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

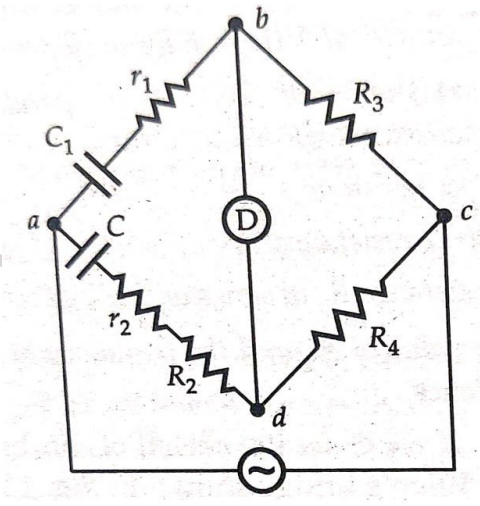
Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE3PCEEM **Max Marks: 100**
Course: Electrical and Electronic Measurements

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)	Arrive at the expression for bridge sensitivity of a Wheatstone bridge.	*CO1*	*PO1*	**08**
	b)	The four arms of an ac bridge are as shown in Fig.1b. A supply of 450Hz is given to the bridge. At balance R_2=4.8Ω, R_3= 2000Ω, R_4=2850Ω and C_2=0.5μF and r_2 =0.4Ω. Determine the value of imperfect capacitor C_1 and its equivalent resistance r_1 and also the dissipating factor for this capacitor. 	*CO1*	*PO2*	**06**
	c)	Describe the various factors that causes errors in AC bridges measurements and suggest the method of minimization for the same.	*CO1*	*PO1*	**06**
		OR			
2	a)	Derive the equations for balance in case of Anderson's bridge. Draw the phasor diagram for balance condition.	*CO1*	*PO2*	**07**
	b)	A Wheatstone's bridge circuit arrangement is as follows : ratio arms: P=1000Ω and Q=100Ω, standard resistance S=200Ω and the test resistance R=2005Ω. The battery has an emf of 5V and	*CO1*	*PO2*	**07**

			negligible internal resistance. The galvanometer has a current sensitivity of 10 mm/μA and an internal resistance of 100Ω. Determine the deflection of the galvanometer and the sensitivity of the bridge in terms of deflection per unit change in resistance.			
		c)	Discuss the sources and the null detectors that are used for a.c. bridges.	*CO1*	*PO1*	**06**
			UNIT - II			
	3	a)	Explain the Construction and operation of single-phase dynamometer type power factor meter.	*CO1*	*PO1*	**07**
		b)	A wattmeter has a current coil of resistance 0.03 ohm and a pressure coil of resistance 6000 ohms is connected to measure the power consumed by a load. Determine the percentage error if the wattmeter is so connected that: 1) the current coil is on the load side 2) the pressure coil is on the load side If the load takes 20A at a voltage of 220V and 0.6 powerfactor.	*CO2*	*PO2*	**06**
		c)	Enumerate the special features incorporated in the dynamometer wattmeter when used to measure power in circuits of low power factor	*CO2*	*PO2*	**07**
			UNIT - III			
	4	a)	With necessary circuit diagram and phasor explain Silsbee's method for CT testing	*CO2*	*PO2*	**08**
		b)	A 1000/5A ,50Hz current transformer has a secondary burden comprising a non-inductive impedance of 1.6Ω. The primary winding has one turn. Determine the flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5W at full load. The magnetizing mmF is 100A.	*CO2*	*PO2*	**08**
		c)	Describe how a DC potentiometer can be used for a Calibration of dc voltmeter.	*CO2*	*PO2*	**04**
			OR			
	5	a)	Enumerate the use of instrument transformer for range extension.	*CO2*	*PO1*	**04**
		b)	A current transformer has a bar primary and 200 secondary winding turns. The secondary winding burden is an ammeter of resistance 1.2Ω and reactance 0.5Ω, the secondary winding has a resistance of 0.2Ω and reactance of 0.3Ω. The core requires the equivalent of an mmf of 100A for magnetization and 50A for core losses. Determine the primary winding current when the ammeter in the secondary winding indicates 5A.	*CO2*	*PO2*	**08**
		c)	With the circuit diagram explain the steps used for measurement using Crompton's type dc potentiometer	*CO2*	*PO2*	**08**
			UNIT - IV			
	6	a)	List any four advantages of digital voltmeters over conventional analog voltmeters.	*CO2*	*PO1*	**04**

		b)	With a neat block diagram explain the working of integrating type DVM.	*CO2*	*PO1*	**08**
		c)	With a neat block diagram explain the working of digital oscilloscope.	*CO2*	*PO1*	**08**
			UNIT - V			
	7	a)	With necessary diagram explain the construction and working of LVDT.	*CO3*	*PO1*	**07**
		b)	Prove that gauge factor of strain gauge is given by $G_f = 1+2u$, where u is poisson's ratio.	*CO3*	*PO2*	**08**
		c)	Explain the working principle of piezoelectric transducers	*CO3*	*PO1*	**05**

****