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

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary 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.

UNIT - I

1	a)	Derive the balance equation of Kelvin double bridge and hence obtain an expression for the unknown low resistance under measurement.	**08**
	b)	Obtain the balance equation for Schering Bridge used for the measurement of capacitance. Draw the phasor diagram under balanced condition.	**08**
	c)	What are the limitations of Wheatstone bridge?	**04**

OR

2	a)	Derive the equation for balance for an Anderson's bridge. Draw the phasor diagram for condition under balance.	**08**
	b)	The arms of an AC Maxwell bridge are arranged as follows: AB is a non-inductive resistance of 1000 Ω in parallel with a capacitor of capacitance 0.5 μF, BC is a non-inductive resistance of 600 Ω, CD is an unknown inductive impedance and DA is a non-inductive resistance of 400 Ω. If balance is obtained under these conditions, find the value of the resistance and the inductance of the branch CD.	**08**
	c)	Explain sources and detectors that are used in A.C bridges.	**04**

UNIT - II

3	a)	With neat sketch, explain construction and working principle of dynamometer type wattmeter.	**07**
	b)	A wattmeter has a current coil resistance of 0.2 Ω & potential coil resistance of 5000 Ω. It is connected to measure the power consumed by a load. Calculate the percentage error in the reading of wattmeter, when it takes a load of 20A at 250V with 0.8pf & when (a) pressure coil is connected on supply side (b) current coil is connected on supply side (c) what load current would give equal errors with the connections.	**07**
	c)	With block diagram, explain the working of electronic energy meter.	**06**

UNIT - III

4	a)	A current Transformer has a turn ratio of 1:99 and is rated as 500/5 A, 15V. The magnetizing and core loss components of exciting current are 8A and 4A respectively. Determine the ratio error and phase angle for the rated burden and rated secondary current at 0.8 pf leading, neglect the resistance and leakage reactance of secondary winding.	**08**
	b)	With a circuit diagram explain the working of a Crompton DC potentiometer.	**08**
	c)	Mention the applications of DC potentiometer.	**04**

OR

5	a)	Derive the expression for ratio and phase angle error of a CT with equivalent circuit and phasor diagram.	**08**
	b)	With circuit diagram, explain a method to determine unknown resistance by a DC potentiometer.	**08**
	c)	What is the necessity of turn compensation in an instrument transformer.	**04**

UNIT - IV

6	a)	With neat block diagram explain working of a ramp type digital voltmeter.	**10**
	b)	Explain with circuit the electronic multimeter.	**10**

UNIT - V

7	a)	What is a Transducer? How are they classified?	**05**
	b)	Explain briefly the procedure for selecting a transducer.	**05**
	c)	Explain the construction and principle of working of a linear voltage differential transformer (LVDT).	**10**

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