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

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: Electrical & Electronics Engineering **Duration: 3 hrs.**
Course Code: 22EE3PCEEM **Max Marks: 100**
Course: Electrical & 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) With a neat circuit diagram arrive at the balance condition of kelvin's double bridge. **07**

b) A Maxwell's bridge is used to measure an inductive impedance Fig 1a. The bridge constants at balance are R_1=470kΩ, C1 =0.01μF, R_2 = 5.1kΩ, R_3 =100kΩ. Write the balance equation and Determine the series equivalent of unknown impedance. **07**

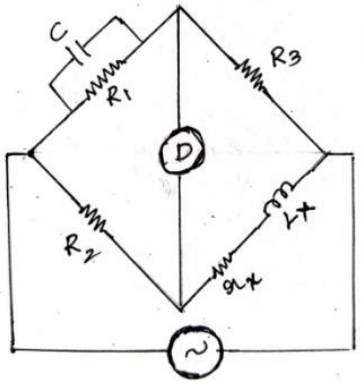

Fig 1a

c) Describe the sources and the null detectors that are used for a.c. bridges. **06**

OR

2 a) With a circuit diagram, Explain the operation of Maxwell's inductance capacitance bridge. Derive the expressions for unknown inductor and its resistor. Draw the vector diagram at balance. **07**

b) A Wheatstone bridge circuit arrangement is as shown in fig 2b. Calculate the unbalanced current in the galvanometer of internal resistance 20Ω, when the supply is 10V. Also determine the value of unknown resistance corresponding to the null reading of the galvanometer. **08**

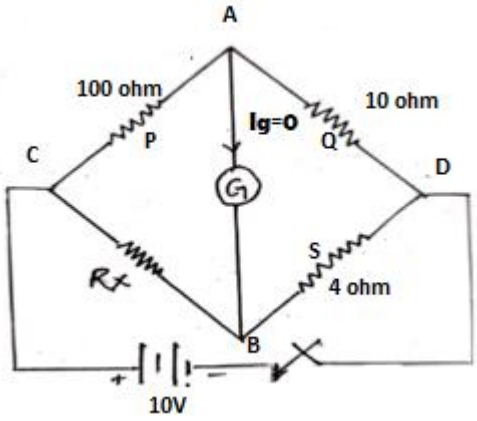

Fig.2b

c) Mention the limitations of Wheatstone bridge. **05**

UNIT - II

3 a) With the help of a block diagram explain the working of Electronic energy meter. **07**

b) A wattmeter has a current coil of resistance 0.045Ω and potential coil of resistance 4000Ω. Calculate the % error (i) When the current coil is on the load side. (ii) When the voltage coil is on the load side, if the load takes 8A, at a load voltage of 240V and 0.8 p.f. **07**

c) Explain the special features incorporated in the dynamometer wattmeter when used to measure power in circuits of low power factor. **06**

UNIT - III

4 a) With the circuit diagram explain the working of Crompton's type dc potentiometer. **07**

b) Describe how a DC potentiometer can be used for a) Calibration of voltmeter & b) Calibration of Ammeter. **06**

c) A ring core CT of ratio 1000/5A is operating at full primary current with a secondary burden non inductive resistance of 1.1Ω. Its exciting current is 1A at a power factor of 0.45. Determine
(i) the ratio error at full load, assuming that there has been no compensation
(ii) Phase angle. **07**

OR

5 a) Draw the equivalent circuit and phasor diagram of a current transformer and derive the expression for ratio error. **07**

b) Describe how a DC potentiometer can be used for calibration of Wattmeter. **06**

c) A current transformer with a bar primary has 300 turns in its secondary winding. The resistance and reactance of the secondary circuit are 1.5Ω and 1.0 Ω respectively including the transformer winding. With 5A flowing in the secondary winding, the magnetizing mmf is 100 A and the iron loss is 1.2 W. Determine the percentage ratio error. **07**

UNIT - IV

6 a) With a neat block diagram explain the working of digital storage oscilloscope. **08**

	b)	Give the comparison of Electronic meters and conventional analog meters.	**04**
	c)	With relevant diagram explain the working of Ramp type DVM.	**08**

UNIT - V

7	a)	Explain the operation of Hall effect Transducer.	**07**
	b)	With necessary diagram explain the construction and working of LVDT.	**08**
	c)	Explain the working of Piezoelectric Transducers.	**05**

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