BUNDELKHAND INSTITUTE OF ENGINEERING & TECHNOLOGY, JHANSI

CLASS TEST-1 (KEE-302)

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

M.M- 15 **M.T- 1 Hr.**

Attempt any five questions, each carry equal marks **5*3**

1. Explain the following characteristics of an instrument
   a) Accuracy b) Precision c) Static error d) Resolution
2. Three resistances haye following ratings
   $R_1 = 15\Omega \pm 5\%$, $R_2 = 33\Omega \pm 2\%$, $R_3 = 75\Omega \pm 5\%$. Determine the magnitude and limiting error in ohms, if all resistances are connected in series. Also calculate percentage relative limiting error.
3. A galvanometer has an internal moving coil resistance of 1000 Ω and gives full scale deflection for 3 mA. Calculate the value of shunt resistance required to convert the PMMC meter into a DC ammeter with a range of 0 – 5 amperes.
4. Define and explain various types of error occurs in measurement.
5. Derive the torque equation for electrodynamometer type wattmeter
6. A 4mA meter with internal resistance of 100Ω is to be converted to 0-200 mA ammeter. Calculate the value of shunt resistance required. Also differentiate between DC ammeter and DC voltmeter.

Bundelkhand Institute of Engineering & Technology
Jhansi, Uttar Pradesh 284128

ODD SEM: CT-1: 2022-23

Class (Yr. & Branch): 2nd (EE) **Semester: 3rd**
Subject: Electrical Measurements & Instrumentation **Paper Code: KEE-302**
Time: 60 Minutes **M.M.: 10**
Student's Name..... **Roll No.....**

Attempt all questions:

1. Explain deflecting, controlling and damping torques. **2 Marks CO-1**

2. Three resistors have the following rating:
$R_1 = 37\Omega \pm 5\%$, $R_2 = 75\Omega \pm 5\%$, $R_3 = 50\Omega \pm 5\%$
Determine the magnitude and limiting error in ohm and in percent of the resistance of these resistance connected in series.
3 Marks CO-1

3. Explain a Wheatstone bridge. What are its limitation; how the errors can be minimized ? **3 Marks CO-2**

4. A (0-1mA) moving coil ammeter has an external resistance of 5Ω calculate the value of shunt resistor required to extend the range of instrument to 100A.
2 Marks CO-2

**********ALL THE BEST**********

3 Marks CO-1

3. Explain a Wheatstone bridge. What are its limitation; how the errors can be minimized ? **3 Marks CO-2**

4. A (0-1mA) moving coil ammeter has an external resistance of 5Ω calculate the value of shunt resistor required to extend the range of instrument to 100A.

2 Marks CO-2

**********ALL THE BEST**********

BUNDELKHAND INSTITUTE OF ENGINEERING & TECHNOLOGY, JHANSI
CLASS TEST-2 (KEE-362)
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

M.M- 15 **M.T- 1 Hr.**

Attempt all questions, each carry equal marks **5*3**

1. The four arms of bridge network is given in figure-1. A 50 Hz voltage supply is applied across a and c.Find R and C when vibration galvanometer connected across b and d is undeflected. **CO2**

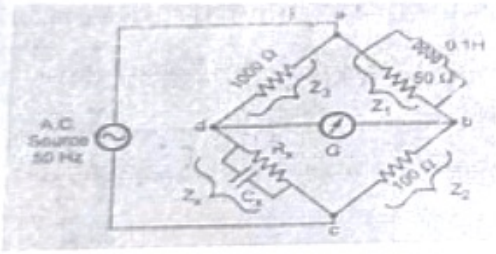

Figure-1

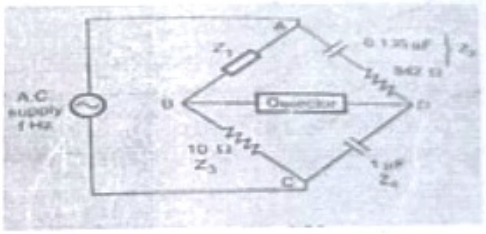

Figure-2

2. Obtain the balance equations of the bridge shown in figure-2and determine the unknown parameters in the arm AB. **CO2**
3. What are the difficulties in measurement of high resistance? Explain the use of guard circuits. **CO2**
4. Derive balance equation of Hay's bridge .when it is prefered over Maxwell Bridge? Also mention its applications.**CO2**
5. A coil with a resistance of 10 Ω is connected in the direct connection in a Q meter. Resonance occurs when the oscillator frequency is 1MHz and the resonating capacitor is set to 65pF. Calculate the % error introduced in the calculated value of Q by 0.02Ω insertion resistance.**CO2**

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ODD SEM: CT-2: 2022-23

Class (Yr. & Branch): 2nd (EE) **Semester: 3rd**
Subject: Electrical Measurements & Instrumentation **Paper Code: KEE-302**
Time: 60 Minutes **M.M.: 10**
Student's Name..... **Roll No.....**

Attempt all questions:

1. What do you mean by instrument transformer? What are major sources of errors in current transformer? **2 Marks CO-3**
2. A potential transformer, ratio 1000/100 volt, has the following constants: primary resistance = 94.5Ω, secondary resistance = 0.86Ω, primary reactance = 66.2Ω, total equivalent reactance = 110Ω, no-load current = 0.02A at 0.4 power factor. Calculate i) phase angle error at no load. ii) burden in VA at unity power factor at which the phase angle will be zero. **3 Marks CO-3**
3. Why the secondary of a CT should not be opened when the primary winding is energized? **3 Marks CO-3**
4. Explain the meaning of the term "Burden" in the instrument transformer. **2 Marks CO-3**

**********ALL THE BEST**********

(Roll No. to be filled by candidate)									
2	0	0	4	3	2	0	0	4	9

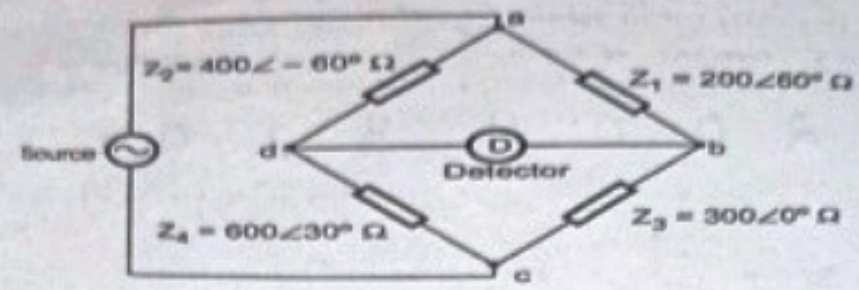
B. TECH.
THIRD SEMESTER THEORY EXAMINATION, 2021-22
KEE-302
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Time: 03 Hours **Max. Marks: 100**

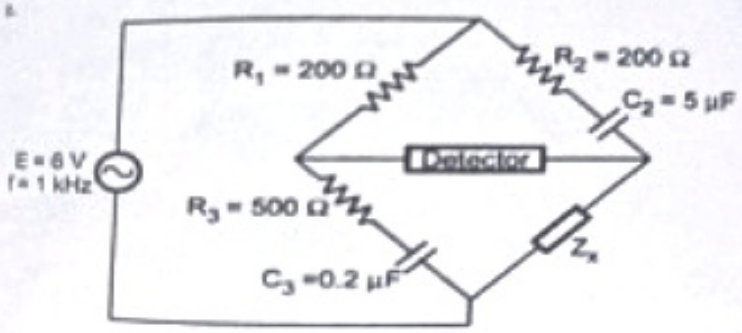
Note:

- Attempt all questions. All questions carry equal marks.
- Assume missing data suitably.

1.	Attempt any ***FOUR*** parts of the following:	4×5	CO
a.	A 0-10 A ammeter has an accuracy of 1.5% of full scale reading. The current indicated by the ammeter is 2.5 A. calculate the limiting values of current and percentage limiting error.		CO1
b.	Explain the static characteristics of an instrument.		CO1
c.	Give the example of indicating and integrating instruments and also explain them.		CO1
d.	Define and explain the types of errors possible in an instrument.		CO2
e.	Distinguish between accuracy and precision with example.		CO1
f.	An ammeter reads 8.3A and the true value of current is 8.5A. Determine the absolute error and relative percentage error. Also define limiting error with suitable formulae.		CO1
2.	Attempt any ***TWO*** parts of the following:	2×10	CO
a.	Explain the working of Wheatstone bridge and derive its balance condition along with its limitations. Also find out whether the bridge is balanced are not for the given figure		CO2



b. Find the unknown parameters of Z_x in the given figure, considering as series circuit. CO2



c. With the help of diagram, derive the balance condition of Schering bridge and also explain the use of (a) guard circuit (b) Q meter CO2

3. Attempt any ***TWO*** parts of the following: 2×10 CO

a. A current transformer of turns ratio 1:199 is rated as 1000/5 A, 25 VA. The core loss is 0.1 W and magnetizing current is 7.2 A, under rated conditions. Determine the phase angle and ratio errors for the rated burden and rated secondary current at CO3
(a.) 0.8 lagging power factor (b.) 0.8 leading pf.
Neglect winding resistance and reactance.

b. With the help of phasor diagram derive the expression for actual ratio in current transformer. CO3

c. Explain the working principle and characteristics of potential transformer and discuss the advantages and disadvantages of instrument transformers CO3

4.	Attempt any ***TWO*** parts of the following:	2×10	CO
a.	With the help of block diagram explain the working of CRO and also explain the measurement of voltage and frequency using suitable formulae.		CO4
b.	Explain the working of digital voltmeter and also define the resolution and sensitivity of DVM.		CO4
c.	Draw the figure of frequency meter and explain its operation.		CO4
5.	Attempt any ***TWO*** parts of the following:	2×10	CO
a.	Classify various transducers on basis of transduction and also explain the operation of LVDT With neat sketch.		CO5
b.	Draw and explain the block diagram of Data Acquisition System and discuss the role of signal conditioning in it.		CO5
c.	Write short notes on (a)Piezoelectric sensor (b) Smart sensor (c) Virtual instrumentation (d) Thermocouple		CO5