



P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belagavi)
Third Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; March / April - 2022
Electronic Instrumentation

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Ability to apply the basic knowledge of Electrical and Electronic principles in Electronic Instrumentation.

CO2: Ability to analyze the working principle and construction of the electronic measuring instruments.

CO3: Ability to measure various electrical and physical quantities and related parameters using meters and transducers.

CO4: Ability to design a system for the desired specifications in Electronic Instrumentation.

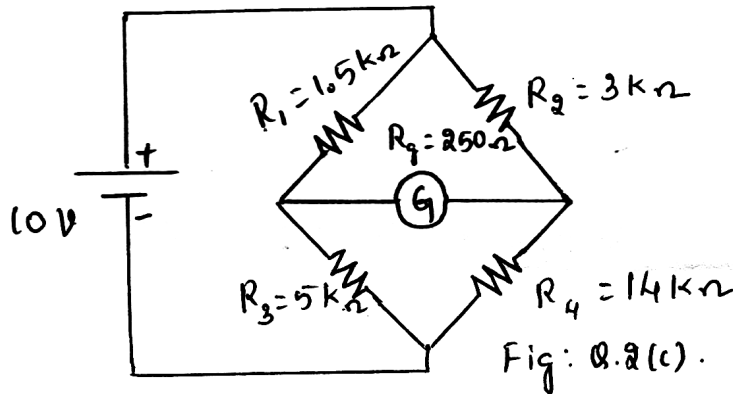
CO5: Ability to understand the working of oscilloscopes, signal generators, wave analysers and harmonic distortion analysers.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any Two sub questions (from a, b, c) for Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
I a.	Define resolution and sensitivity of digital meters.	2	L1	CO1	PO1
b.	List out any one application and limitation of Wheatstone bridge.	2	L1	CO1	PO1
c.	What is Piezo-Electric transducer?	2	L1	CO1	PO1
d.	List any four features of instrumentation amplifier.	2	L1	CO1	PO1
e.	What is the speciality of storage oscilloscope?	2	L1	CO1	PO1
II : PART - B		90			
UNIT - I		18			
1 a.	What are systematic errors? Explain different types of it and also describe how these errors can be minimized?	9	L2	CO1	PO1
b.	With the help of a block diagram, explain the working of a ramp type digital voltmeter.	9	L2	CO1	PO1
c.	Sketch the block diagram of True RMS voltmeter and explain the working principle.	9	L2	CO1	PO1
UNIT - II		18			
2 a.	With the help of neat diagram, derive the balancing condition to determine the unknown frequency in Wein's bridge.	9	L2	CO3	PO2
b.	A capacitance comparison bridge is used to measure capacitance impedance at a frequency of 2 kHz. Bridge constants are $C_3 = 100 \mu\text{F}$, $R_1 = 10 \text{ k}\Omega$, $R_2 = 50 \text{ k}\Omega$, $R_3 = 100 \text{ k}\Omega$. Find the equivalent series circuit of the unknown impedance.	9	L3	CO3	PO2

- c. Calculate the current through the galvanometer for an unbalanced Wheatstone bridge as shown below,



9 L3 CO3 PO2

UNIT - III

18

- 3 a. Show that, $K = 1 + 2\mu$, for gauge factor.
 b. Describe the construction and working principle of LVDT and mention its advantages.
 c. What is Thermistor? With a neat sketch, depict various configurations of Thermistors. Also list out the advantages of Thermistors.

9 L3 CO2 PO3

9 L2 CO2 PO2

9 L2 CO2 PO2

UNIT - IV

18

- 4 a. Explain the working principle of a spectrum analyser with a neat block diagram.
 b. Explain Instrumentation amplifier using Transducer bridge with neat circuit diagram and derive the expression for output voltage of the circuit.
 c. List out any six objectives of a data acquisition system. Also mention important factors that decide DAS.

9 L2 CO4 PO1

9 L2 CO4 PO1

9 L2 CO4 PO1

UNIT - V

18

- 5 a. Sketch the circuit diagram of function generator and explain its working.
 b. With the help of block diagram, explain how the frequency synthesizer operates, by showing the waveforms at various points.
 c. Explain the operation of a Digital storage oscilloscope with a block diagram and sketch the system waveforms.

9 L2 CO5 PO1

9 L2 CO5 PO1

9 L2 CO5 PO1

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