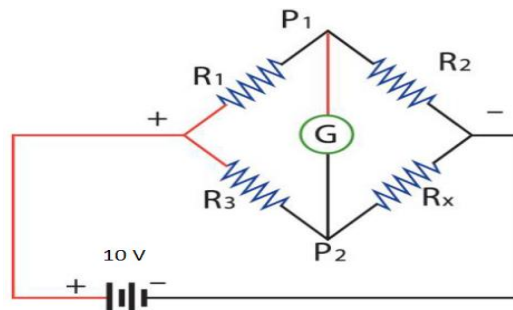


THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Third Semester**Biomedical Engineering***UBMTL24302 - Sensors and Measurements***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BTL	CO	Marks
1.	Specify the need for measurement systems.	L2	1	2
2.	Define propagation of errors.	L1	1	2
3.	Consider a strain gauge with a strain of 2.5×10^{-6} and a gauge factor of 6.0. The resistance of the material is 300Ω . Determine ΔR .	L2	2	2
4.	Compare and contrast the differences between RTD and Thermistor.	L1	2	2
5.	What is photo diode?	L1	3	2
6.	Define optical encoder.	L2	3	2
7.	Write the function of signal conditioning circuits.	L1	4	2
8.	Determine the value of R_x , if $R_1=5K\Omega$, $R_2=800\Omega$ and $R_3=620\Omega$.	L2	4	2



9.	Why is a delay line used in the vertical section of an oscilloscope?	L2	5	2
10.	Which sensor is used for the detection of anions and cations in the human body? Point out the necessity of it.	L1	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a Illustrate with an example the elements of a generalized measurement system. Explain the function of each element. Or b Discuss in detail about the static characteristics and Dynamic characteristics of a Transducer.	L2	1	16
12.	a Explain in detail about the types of strain gauges, working principle and applications with a neat diagram. Or b Enumerate the working principle of the Linear Variable Differential Transducer and explain its applications in Industry.	L2	2	16

13.	a	Describe the principle of operation of the Photomultiplier tube and scintillation counter with a neat diagram.	L2	3	16
		Or			
	b	Explain in detail about the construction and working principle of the Piezoelectric transducer used for the measurement of force with an equivalent circuit.	L2	3	16
14.	a	Identify and describe the bridge that is used for the measurement of resistance in the range 1Ω to $0.1M\Omega$. Write the Bridge balance equation and derive the expression for the sensitivity.	L3	4	16
		Or			
	b	Explain how inductance is measured in terms of known capacitance using Maxwell's Bridge. Derive the conditions for balance. Explain how it is used to measure Q-Factor.	L3	4	16
15.	a	With the help of a functional block diagram, explain the operation of a CRO, and compare and contrast the advantages with DSO.	L2	5	16
		Or			
	b	Explain the construction and working of the magnetic tape recorder and thermal recorder. Write the merits and demerits of the recorder.	L2	5	16