SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF MEDICAL ELECTRONICS

QUESTION BANK

III SEMESTER

1907303 – ELECTRICAL AND ELECTRONIC MEASUREMENTS

Regulation – 2019

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SUBJECT : 1907303 ELECTRICAL AND ELECTRONIC MEASUREMENTS

SEM / YEAR: III / II

UNIT I – INTRODUCTION			
Functional elements of an instrument – Static and dynamic characteristics – Errors in measurement Statistical evaluation of measurement data – Standards and calibration.			
PART – A			
Q. No	**Questions**	**BTL**	**Competence**
1.	Define measurement. What are the two basic requirements of any measurement?	BTL 1	Remembering
2.	Analyze the functional elements of an instrument with block diagram.	BTL 4	Analyzing
3.	Compare and contrast between Range and Span of an instrument.	BTL 3	Applying
4.	Outline the advantages of an electronic measurement.	BTL 1	Remembering
5.	Express the Data presentation element.	BTL 2	Understanding
6.	Illustrate the Accuracy as 'Percentage of full-scale reading'.	BTL 3	Applying
7.	Identify the number of significant figures in precision.	BTL 1	Remembering
8.	Give the mathematical expression for error.	BTL 3	Applying
9.	Distinguish between the absolute error and relative error.	BTL 4	Analyzing
10.	A particular ammeter requires a change of 2A in its coil to produce a change in deflection of the pointer by 5mm. Calculate its sensitivity and deflection factor.	BTL 3	Applying
11.	State the term Threshold in static characteristics.	BTL 1	Remembering
12.	Interpret the dynamic response of the system.	BTL 2	Understanding
13.	Quote the Laplace transform for the Ramp input.	BTL 1	Remembering
14.	Mention the dynamic characteristics of the dynamic error.	BTL 2	Understanding
15.	Define Random error.	BTL 1	Remembering
16.	Compose the two characteristics of Precision.	BTL 4	Analyzing
17.	Classify the types of systematic errors.	BTL 3	Applying
18.	What is the significance of Standard deviation?	BTL 2	Understanding
19.	Differentiate between the Direct calibration method and Indirect calibration method.	BTL 4	Analyzing

20.	Infer the term standard related to measurement.	BTL 4	Analyzing
21.	Express the methods which are used to reduce the environmental errors.	BTL 2	Understanding
22.	What is static calibration?	BTL 2	Understanding
23.	Why calibration of instrument is important?	BTL 3	Applying
24.	Point out the difference between gross errors and systematic errors.	BTL 4	Analyzing

PART – B			
1.	Explain the functional elements of an instrument. (13)	BTL 4	Analyzing
2.	Summarize the following in detail: (i) Variable conversion element, (4) (ii) Variable manipulation element, (4) (iii) Data Presentation element. (5)	BTL 2	Understanding
3.	Illustrate the following Static characteristics: (i) Error, (6) (ii) Sensitivity. (7)	BTL 3	Applying
4.	Analyze the following static characteristics (i) Accuracy, (7) (ii) Precision. (6)	BTL 4	Analyzing
5.	(i) Describe in detail about the dynamic behavior of the measuring system. (10) (ii) Define the term measuring lag. (3)	BTL 1	Remembering
6.	Explain in detail about the dynamic characteristics of the Instrument. (13)	BTL 2	Understanding
7.	Write short notes on: (i) Instrumental Errors (7) (ii) Environmental Errors (6)	BTL 1	Remembering
8.	Examine the Statistical analysis of the measurement data. (13)	BTL 3	Applying
9.	Describe the following in detail: (i) Gross error, (5) (ii) Observational error, (4) (iii) Random error. (4)	BTL 2	Understanding
10.	The expected value of the voltage to be measured is 150V. However, the measurement gives a value of 149V. Calculate (i) absolute error, (2) (ii) percentage error, (3) (iii) relative accuracy, (3) (iv) percentage accuracy, (2) (v) Error expressed as percentage of full-scale reading if the scale range is 0-200V. (3)	BTL 3	Applying

11.	State the calibration methodology and explain the two fundamental methodologies for obtaining the comparison between test instrument and standard instrument. (13)	BTL 1	Remembering
12.	(i) Define standard. (3) (ii) List the different types of standards of measurement and discuss in brief. (10)	BTL 1	Remembering
13.	Explain the two characteristics of the Precision in static characteristics. (13)	BTL 4	Analyzing
14.	Illustrate on the following statistical analysis of measurement data: (i) Arithmetic mean, (5) (ii) Average deviation, (4) (iii) Standard deviation. (4)	BTL 3	Applying
15.	What are the classifications of instrument errors? Explain about the causes and remedies for each error in detail. (13)	BTL 4	Analyzing
16.	The following values were obtained from the measurement of current: 12.35A, 12.71 A, 12.48 A, 10.24 A, 12.63 A and 12.58 A. Calculate: a. The arithmetic mean b. The average deviation c. The standard deviation d. Variance. (13)	BTL 3	Applying
17.	What is Error analysis? Also explain their Statistical methods. (13)	BTL 2	Understanding
	PART – C		
1.	Explain the following functional elements of an instrument in detail: (i) Primary Sensing element, (5) (ii) Variable conversion element, (5) (iii) Data presentation element. (5)	BTL 2	Understanding
2.	Analyze about the dynamic characteristics of the instrument. (15)	BTL 4	Analyzing
3.	Categorize about the types of errors and explain in detail. (15)	BTL 3	Applying
4.	Describe the statistical analysis of the measurements. (15)	BTL 1	Remembering
5.	(i) The observations of frequency measurement by different persons are 325, 330, 338, 320 and 336. Estimate the standard deviation and the probable error. (8) (ii) Differentiate static and dynamic performance characteristics of an instrument and derive the mathematical model for a measurement system. (7)	BTL 3	Applying

UNIT II – ELECTRICAL AND ELECTRONIC INSTRUMENTS			
Principle and types of analog and digital voltmeters, ammeters, multimeter – Single and three phase wattmeter and energy meters – Magnetic measurements – Determination of B-H curve and measurements of iron loss – Instrument transformers – Instruments for measurement of frequency and phase.			
PART – A			
Q. No	**Questions**	**BTL**	**Competence**
1.	Label the Analog instruments.	BTL 1	Remembering
2.	Justify why Analog instruments are extensive in use?	BTL 4	Analyzing
3.	Classify the types of Analog instruments.	BTL 3	Applying
4.	Elucidate the Hall effect with neat diagram.	BTL 3	Applying
5.	Indicate the Magnetic effect used in the operation of analog instruments.	BTL 2	Understanding
6.	Construct the gravity control system with neat diagram.	BTL 2	Understanding
7.	Illustrate the types of instruments used as ammeters and voltmeters.	BTL 4	Analyzing
8.	State the principle of PMMC instruments.	BTL 1	Remembering
9.	Sketch the block diagram of attraction type moving iron instrument.	BTL 3	Applying
10.	Distinguish between radial vane type and coaxial vane type.	BTL 4	Analyzing
11.	Name the various errors in the moving instruments.	BTL 1	Remembering
12.	Construct the successive approximation type DVM.	BTL 2	Understanding
13.	Define digital voltmeter.	BTL 1	Remembering
14.	Mention the features of linear ramp type DVM.	BTL 2	Understanding
15.	Illustrate the basic block diagram of a digital multimeter.	BTL 3	Applying
16.	Estimate the errors in electrodynamometer type wattmeter.	BTL 2	Understanding
17.	Outline the features of three phase wattmeter.	BTL 1	Remembering
18.	Point out the advantages of instrument transformers.	BTL 4	Analyzing
19.	Classify the different types of tests conducted on magnetic materials.	BTL 2	Understanding
20.	Assess the two common forms of the magnetic forms of the magnetic squares.	BTL 3	Applying
21.	Tabulate the different types of frequency meters.	BTL 1	Remembering
22.	What modifications are done to use the power factor meter in single phase circuits?	BTL 3	Applying
23.	How are basic instruments converted into higher range ammeter?	BTL 4	Analyzing
24.	Categorize the types of tests that are used for magnetic materials testing.	BTL 4	Analyzing

PART –B			
1.	Explain the principle of operation of analog Instruments. (13)	BTL 4	Analyzing
2.	Summarize the Permanent Magnet Moving Coil Instruments (PMMC) with torque equations. (13)	BTL 2	Understanding
3.	(i) Examine the Moving iron attraction type instrument. (7) (ii) Illustrate the Moving iron repulsion type instrument. (6)	BTL 3	Applying
4.	Write short notes on (i) Multi range ammeters. (6) (ii) Universal or Aryton shunt. (7)	BTL 1	Remembering
5.	Describe the following in detail (i) Servo potentiometric type DVM. (7) (ii) Successive approximation type DVM. (6)	BTL 1	Remembering
6.	Summarize the following (i) Linear ramp type DVM. (6) (ii) Staircase ramp type DVM. (7)	BTL 2	Understanding
7.	Enumerate the Electrodynamometer wattmeter with necessary diagrams. (13)	BTL 3	Applying
8.	Examine the three-phase power measurement by using 3- single phase wattmeter. (13)	BTL 1	Remembering
9.	Illustrate the following (i) Current transformer. (6) (ii) Potential transformer. (7)	BTL 3	Applying
10.	Explain the measurement of flux density B in magnetic measurement with a neat diagram. (13)	BTL 4	Analyzing
11.	Analyse the principle of operation for the measurement of iron losses using wattmeter method. (13)	BTL 4	Analyzing
12.	(i) Manipulate the measurement of magnetizing force (H). (6) (ii) Interpret the types of tests conducted on magnetic materials. (7)	BTL 3	Applying
13.	Describe the two methods available for the determination of B-H Curve. (13)	BTL 2	Understanding
14.	Construct the digital frequency meter with a neat block diagram. (13)	BTL 3	Applying
15.	List the different types of ratios present in Instrument transformers & write how it is calculated. (13)	BTL 1	Remembering
16.	Categorize and explain the method for determination of B-H curve of a magnetic material using Method of reversals and Step by step method. (13)	BTL 4	Analyzing
17.	Explain about the construction and working of rotating and static type phase sequence indicators. (13)	BTL 2	Understanding
PART – C			
1.	Assess the PMMC instrument with torque equation and neat diagram. (15)	BTL 4	Analyzing
2.	Discuss on the following errors: (i) Hysteresis error (3) (ii) Temperature error (3) (iii) Stray magnetic fields (3)	BTL 2	Understanding

	(iv) Frequency error (3) Eddy current error (3)		
3.	Manipulate the process of designing the Volt-Ohm-milli-ammeter (V.O.M) with required diagrams. (15)	BTL 3	Applying
4.	Illustrate on the following: (i) Mechanical resonance type frequency meter. (7) (ii) Electrical resonance type frequency meter. (8)	BTL 3	Applying
5.	With a neat sketch and phasor diagram, discuss the construction and operation of Single-phase energy meter. (15)	BTL 1	Remembering

UNIT III - COMPARISON METHODS OF MEASUREMENTS

D.C & A.C potentiometers, DC Bridges –Wheatstone, Kelvin , AC bridges- Maxwell, Hay, Schering and Wien bridge.– Multiple earth and earth loops - Electrostatic and electromagnetic interference –Grounding techniques.

PART – A

Q. No	Questions	BTL	Competence
1.	Define potentiometer.	BTL 1	Remembering
2.	Categorize different types of potentiometers.	BTL 4	Analyzing
3.	Show the need of a protective resistance in the laboratory type D.C potentiometer.	BTL 3	Applying
4.	Summarize the two ranges of vernier potentiometer.	BTL 2	Understanding
5.	What is the need of thermocouple in deflection potentiometer?	BTL 1	Remembering
6.	Draw the Drysdale polar A.C potentiometer.	BTL 1	Remembering
7.	Classify the types of bridges.	BTL 2	Understanding
8.	Estimate the Thevenin's equivalent circuit of Wheatstone bridge.	BTL 3	Applying
9.	Distinguish between Wheatstone bridge and Kelvin's bridge.	BTL 2	Understanding
10.	Point out the advantages of Maxwell bridge.	BTL 4	Analyzing
11.	Express the power factor and dissipation factor for Schering bridge.	BTL 2	Understanding
12.	Analyze the Hay bridge circuit.	BTL 4	Analyzing
13.	Illustrate the operation of Wein bridge.	BTL 4	Analyzing
14.	List out the types of A.C bridges.	BTL 1	Remembering
15.	Identify the sources of electromagnetic interferences.	BTL 2	Understanding
16.	Show the formation of earth loop.	BTL 3	Applying
17.	Illustrate the different methods to obtain the ground connection.	BTL 3	Applying
18.	Show the effects of electromagnetic interference with neat sketches.	BTL 3	Applying
19.	What is electromagnetic interference?	BTL 1	Remembering
20.	Classify the external interference signal.	BTL 3	Applying

21.	How to calibrate DC voltmeter using Potentiometer?	BTL 4	Analyzing
22.	State the type of bridges involved in low resistance measurement.	BTL 1	Remembering
23.	What are the sources of errors in bridge circuit?	BTL 2	Understanding
24.	Infer the expression for unknown resistance connected in Wheat Stone bridge.	BTL 4	Analyzing
PART-B			
1.	State and explain the Laboratory type D.C potentiometer. (13)	BTL 1	Remembering
2.	Describe the following in detail: (i) Vernier potentiometer, (7) (ii) Deflection potentiometer. (6)	BTL 2	Understanding
3.	Write short notes on: (i) Co-ordinate potentiometers, (6) (ii) Drysdale polar potentiometer. (7)	BTL 4	Analyzing
4.	Describe about Wheatstone bridge with Thevenin equivalent circuit. (13)	BTL 1	Remembering
5.	Categorize the functional operations of the following: (i) Maxwell bridge, (7) (ii) Hay bridge. (6)	BTL 3	Applying
6.	Illustrate the Kelvin's bridge with its circuit diagram and derive its balance equation. (13)	BTL 2	Understanding
7.	Examine the following bridges with neat diagram: (i) Schering bridge, (7) (ii) Wien Bridge. (6)	BTL 3	Applying
8.	Explain the measurement of resistance using Wheat Stone bridge method and obtain expression for unknown resistance. (13)	BTL 4	Analyzing
9.	Draw a circuit diagram of Maxwell's Bridge and Explain the measurement procedure for measuring unknown inductance using this bridge. (13)	BTL 1	Remembering
10.	Derive the measurement of capacitance with neat diagram using Schering bridge. (13)	BTL 3	Applying
11.	Illustrate the circuit of Kelvin double bridge used for the measurement of low resistance. Derive the conditions for balance. (13)	BTL 2	Understanding
12.	Summarize the following: (i) Earth loop formation, (7) (ii) Methods to obtain ground connection. (6)	BTL 2	Understanding
13.	(i) Define Electromagnetic interference. (4) (ii) Describe the sources of Electromagnetic interference and limiting interference problems. (9)	BTL 1	Remembering
14.	Construct any two types of D.C potentiometers with neat sketch. (13)	BTL 3	Applying

15.	Illustrate on Gall Co-ordinate potentiometer and write the advantages, disadvantages, and applications of AC potentiometer. (13)	BTL 3	Applying
16.	Analyze the following bridges: (i) Series resistance-capacitance comparison bridge (7) (ii)Parallel resistance-capacitance Comparison Bridge (6)	BTL 4	Analyzing
17.	Outline the concept of the following in detail: (i) Electromagnetic Interference (6) (ii) Electrostatic Interference. (7)	BTL 4	Analyzing
PART-C			
1.	Explain the principles of operation and construction of potentiometers. (15)	BTL 4	Analyzing
2.	Summarize the following: (i) Vernier potentiometer (5) (ii) Potentiometer with true zero, (5) (iii) Deflectional potentiometer. (5)	BTL 2	Understanding
3.	Describe about Kelvin's bridge and construct the Kelvin's double bridge from the principle of kelvin's bridge. (15)	BTL 1	Remembering
4.	Illustrate about various AC and DC bridges for the measurement of high resistances. (15)	BTL 3	Applying
5.	Explain how the earth resistance can be measured using 3 point fall of potential method. (15)	BTL 3	Applying

UNIT IV - STORAGE AND DISPLAY DEVICES

Magnetic disk and tape – Recorders, digital plotters and printers, CRT display, digital CRO, LED, LCD & dot matrix display – Data Loggers.

PART – A

Q. No	Questions	BTL	Competence
1.	Obtain the basic components of magnetic tape recorder.	BTL 1	Remembering
2.	Write about the display devices.	BTL 1	Remembering
3.	Identify the advantages and disadvantages of FM recording.	BTL 2	Understanding
4.	Differentiate between FM recording and Pulse duration modulations.	BTL 2	Understanding
5.	Interpret the digital recording with neat sketch.	BTL 2	Understanding
6.	Quote about the basic operating principle of digital tape recorder.	BTL 4	Analyzing
7.	Draw the block diagram for NRZ method recording.	BTL 3	Applying
8.	Specify the applications of X-Y recorder.	BTL 4	Analyzing
9.	Compare the Impact printers with Dot matrix printers.	BTL 4	Analyzing
10.	Define the deflection sensitivity of CRT.	BTL 1	Remembering
11.	Construct the block diagram of digital CRO.	BTL 2	Understanding
12.	Examine the purpose of horizontal amplifier.	BTL 4	Analyzing
13.	Infer the vertical deflection system in CRT.	BTL 2	Understanding

14.	Explain the working of digital CRO.	BTL 2	Understanding
15.	How the light is visible in LED?	BTL 3	Applying
16.	List the applications of LED.	BTL 1	Remembering
17.	Classify the types of LCD's	BTL 3	Applying
18.	State the data loggers.	BTL 1	Remembering
19.	Relate the input signals fed to the input scanner of the data logger.	BTL 3	Applying
20.	Point out the benefits of dot matrix displays.	BTL 3	Applying
21.	What is an X-Y recorder?	BTL 1	Remembering
22.	Distinguish between RZ and NRZ techniques of digital tape recording.	BTL 4	Analyzing
23.	A tape receives 12000 nos. per second. The tape speed is 1.5m/sec. Determine the no. density of the tape.	BTL 3	Applying
24.	Distinguish between Single point and Multi point recorders.	BTL 4	Analyzing

PART-B			
1.	Illustrate the working of Cathode ray oscilloscope with block diagram. (13)	BTL3	Applying
2.	Describe the basic components of a magnetic tape recorder. (13)	BTL 1	Remembering
3.	Analyze the working of magnetic tape recorder using FM recording. (13)	BTL 4	Analyzing
4.	Outline the operation of a Pulse duration modulation method. (13)	BTL 1	Remembering
5.	Demonstrate the following in detail: (i) Return to zero method (6) (ii) Non-Return to zero method (7)	BTL2	Understanding
6.	Write short notes on: (i) Digital plotters (6) (ii) Dot matrix printer (7)	BTL 1	Remembering
7.	Enumerate about the segmental LED display with necessary diagrams. (13)	BTL 1	Remembering
8.	Interpret on the following with relevant details: (i) Ink-jet printers, (6) (ii) Laser printers. (7)	BTL 4	Analyzing
9.	Categorize the screens for the CRTs and its effects. (13)	BTL3	Applying
10.	Explain the following applications of the oscilloscope: (i) Voltage measurement. (5) (ii) Current measurement. (4) (iii) Time and Frequency measurement. (4)	BTL 2	Understanding
11.	Outline the operation of: (i) Light emitting diode. (6) (ii) Liquid crystal display. (7)	BTL 4	Analyzing
12.	(i) Compare the LED and LCD. (6) (ii) Infer the operation of Dot matrix displays. (7)	BTL3	Applying
13.	Explain the detailed operation of data loggers with its block diagram. (13)	BTL 2	Understanding

14.	Define recorder. Write short notes on Strip chart recorder with its advantages and disadvantages. (13)	BTL 4	Analyzing
15.	Express the principle and working of Nixie Tubes. (13)	BTL 2	Understanding
16.	Examine the FM method of magnetic tape recording and explain its benefits & disadvantages. (13)	BTL 4	Analyzing
17.	Discuss about the different methods used for Digital Tape recording. (13)	BTL3	Applying
PART-C			
1.	Construct the following magnetic tape recorder with its advantages and disadvantages: (i) Direct recording. (7) (ii) PDM recording. (8)	BTL 4	Analyzing
2.	Show the design of an X-Y recorder with neat block diagram and mention its applications. (15)	BTL3	Applying
3.	Illustrate the block diagram of a digital storage oscilloscope along with the observation of waveform. (15)	BTL3	Applying
4.	Describe in detail about the Data loggers with neat sketch. (15)	BTL 1	Remembering
5.	Explain the randomized NRZ technique of digital tape recording. (15)	BTL 2	Understanding

UNIT V - TRANSDUCERS AND DATA ACQUISITION SYSTEMS

Classification of transducers – Passive and Active – variable Resistive, capacitive & inductive transducers and its applications – Strain gauges, Thermistor, RTD, LVDT, capacitor microphone- Thermocouple- Piezoelectric, Photo electric, transducers – Elements of data acquisition system – Smart sensors.

PART-A

Q. No	Questions	BT Level	Competence
1.	Define Transducer	BTL 1	Remembering
2.	Point out some advantages of electrical transducers.	BTL 4	Analyzing
3.	Give some basic requirements of a transducer.	BTL 1	Remembering
4.	Classify the different types of transducers.	BTL 2	Understanding
5.	Illustrate the Active transducers with examples.	BTL 3	Applying
6.	Summarize the resistive transducer.	BTL 2	Understanding
7.	Define strain gauge.	BTL 1	Remembering
8.	Analyze the response of the transducer based on changes in self-inductance with number of turns.	BTL 4	Analyzing
9.	Write about the Linear Variable Differential Transformer.	BTL 4	Analyzing
10.	State the advantages and disadvantages of thermistor.	BTL 1	Remembering
11.	Interpret the principle of operation of capacitive transducers.	BTL 2	Understanding
12.	List the materials for piezoelectric transducers.	BTL 1	Remembering
13.	Determine the modes of operation of piezoelectric crystals.	BTL 3	Applying
14.	Examine the principle used in thermocouples.	BTL 4	Analyzing

15.	Mention the objectives of DAS.	BTL 1	Remembering
16.	Express the configuration of data acquisition system.	BTL 2	Understanding
17.	A piezoelectric crystal has a thickness of 2.5mm and a voltage sensitivity of 0.5 V m/N. Determine the output voltage when it is subjected to a pressure of $1.6x10^6$ N/m^2.	BTL 4	Analyzing
18.	Draw the general architecture of smart sensor.	BTL 3	Applying
19.	Enumerate the importance and adoption of smart sensor.	BTL 2	Understanding
20.	Give the applications of smart sensor.	BTL 3	Applying
21.	Classify the factors to be considered for bounded Strain Gauge	BTL 4	Analyzing
22.	Calculate Young's modulus	BTL 3	Applying
23.	Distinguish between RTD and thermistor	BTL 2	Understanding
24.	Show differential output with reference to LVDT.	BTL 3	Applying

PART-B			
1.	Describe the following in detail: (i) Primary and Secondary transducers. (4) (ii) Analog and Digital transducers. (4) (iii) Active and Passive transducers. (5)	BTL1	Remembering
2.	Explain the theory and operating principle of resistance strain gauge. (13)	BTL 2	Understanding
3.	Write short notes on the types of electrical resistance strain gauges. (13)	BTL 4	Analyzing
4.	Illustrate the following inductive transducers: (i) Change self-inductance with number of turns. (4) (ii) Change in self-inductance with change in permeability. (4) (iii) Variable reluctance inductive transducer. (5)	BTL 3	Applying
5.	Analyse the working of Linear Variable Differential Transformer with its advantages. (13)	BTL 4	Analyzing
6.	Examine the differential arrangement of a capacitive transducer to achieve the linear characteristics. (13)	BTL 4	Analyzing
7.	State piezoelectric transducers and modes of operation of piezoelectric crystals. (13)	BTL 1	Remembering
8.	Explain the basic principle and operation of Thermocouples. (13)	BTL 2	Understanding
9.	Demonstrate on the general architecture of smart sensor and explain its importance and adoption. (13)	BTL 2	Understanding
10.	Infer the following DAS: (i) Analog data acquisition system. (6) (ii) Digital data acquisition system. (7)	BTL 3	Applying
11.	Summarize the following: (i) Single channel data acquisition system. (6) (ii) Multichannel analog multiplexed system. (7)	BTL 2	Understanding
12.	Manipulate the low-level multiplexing system with neat sketch. (13)	BTL 3	Applying
13.	Explain about the internal architecture of smart sensor with block level considerations. (13)	BTL 1	Remembering

14.	Write short notes on: (i) Configuration of data acquisition system. (5) (ii) Single channel possibilities. (4) (iii) Multi-channel possibilities. (4)	BTL 1	Remembering
15.	Explain the construction, principle, working of thermistor and its resistance temperature characteristics. (13)	BTL 4	Analyzing
16.	Demonstrate the construction of RTD and explain how it can be used to measure temperature. (13)	BTL 3	Applying
17.	Express the transfer function of LVDT with equivalent circuit and explain any two adjacent circuits for LVDT. (13)	BTL 3	Applying
PART-C			
1.	With neat sketch demonstrate the theory and operating principle of resistance strain gauge. (15)	BTL 3	Applying
2.	Explain about the construction of Linear Variable Differential Transformer and the principle of working. (15)	BTL 2	Understanding
3.	Evaluate the following capacitive transducers: (i) By variation of overlapping area of plates. (8) (ii) By Differential arrangement of capacitors. (7)	BTL 3	Applying
4.	Illustrate the general architecture of smart sensor with block level design consideration. (15)	BTL 4	Analyzing
5.	Describe the methods by which variable inductance transducers are used for the measurement of change in self-inductance (15)	BTL 1	Remembering