B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023
Third Semester
Electronics and Instrumentation Engineering
(Common to Instrumentation and Control Engineering)
20EIPC302 - SENSORS AND TRANSDUCERS
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	Compare direct and indirect methods of measurement.	2,K2,CO1
2.	Define static calibration.	2,K1,CO1
3.	Illustrate the term damping ratio.	2,K2,CO2
4.	Recall time constant and dynamic error.	2,K1,CO2
5.	Write the principle of hot wire anemometer.	2,K1,CO3
6.	Mention the characteristics of RTD.	2,K1,CO3
7.	State the principle of Induction Potentiometer.	2,K1,CO4
8.	State the principle of Capacitor Microphone.	2,K1,CO4
9.	List the applications of Fiber optic sensors.	2,K1,CO5
10.	State the basic principle of hall effect transducers.	2,K1,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) (i) Describe various factors affecting the selection of transducers.   6,K2,CO1
    (ii) Explain different classification of errors in the measurement   7,K2,CO1
    System.

OR

b) In a test, temperature is measured 100 times with variations in   13,K3,CO1
apparatus and procedures. After supplying corrections, the results are

Temp in degree C	401	402	403	404	405	406	407	408	409
Frequency	1	3	23	12	37	16	4	2	2

Find the (i) Mean (ii) Average deviation (iii) Standard deviation (iv) probable error of one reading (v) the probable error of mean (vi) Range (vii) variance (viii) standard deviation of standard deviation.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12058**

12. a) Derive the Impulse response of the Second order system for undamped and over damped conditions. 13,K2,CO2

OR

b) Describe the static characteristics of transducer. 13,K2,CO2

13. a) Discuss the construction of hot wire anemometer and constant current type and also mention its applications. 13,K2,CO3

OR

b) Derive the Gauge factor of strain gauge. 13,K2,CO3

14. a) Discuss how capacitive transducers are used for linear displacement when there is a change in distance between the plates and derive an expression for sensitivity. 13,K2,CO4

OR

b) Describe the principle of operation, construction details, and characteristics of LVDT. 13,K2,CO4

15. a) Describe the principle of operation, construction details, and characteristics of Piezoelectric transducer and derive an expression for voltage sensitivity. 13,K2,CO5

OR

b) Explain the construction and working of Fiber optic sensors. 13,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) (i) Write short notes on EI Pick up. 7,K2,CO4

(ii) Explain the working principle of Nano Sensor. 8,K2,CO5

OR

b) (i) Explain the principle and operation of Proximity sensor. 8,K2,CO5

(ii) Describe the working of smart sensor. 7,K2,CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create **12058**