Question Paper Code	12492

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
Third Semester
Mechanical and Automation Engineering
20MUPW301 - SENSORS IN AUTOMATION
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

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

Marks,
K-Level, CO

1. Draw the functional block diagram of a measurement system. — *2,K1,CO1*
2. List the factors responsible in selection of transducer. — *2,K1,CO1*
3. Define encoder. — *2,K1,CO2*
4. What is Accelerometer? — *2,K1,CO2*
5. What are the different types of magnetic sensor? — *2,K1,CO3*
6. Choose the different materials used for Semiconductor Hall element. — *2,K2,CO3*
7. Define self-heating error of thermometer. — *2,K1,CO4*
8. What are the suitable materials for piezo electric transducer? — *2,K1,CO4*
9. What is data acquisition system? — *2,K1,CO6*
10. Justify the need for sensors in automobiles. — *2,K2,CO6*

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

11. a) Explain the following static characteristics. (a) Accuracy (b) Drift (c) Hysteresis (d) Sensitivity (e) static error (f) Repeatability. — *13,K2,CO1*

OR

b) In a test, temperature is measured 100 times with variations in apparatus and procedures. After applying the corrections, the results are — *13,K2,CO1*

Temp oC	397	398	399	400	401	402	403	404	405
Freq of Occurance	1	3	12	23	37	16	4	2	2

Calculate (a) arithmetic mean, (b) mean deviation, (c) standard deviation, (d) the probable error of one reading, (e) the probable error of mean and standard deviation, (f) the standard deviation of standard deviation.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12492**

12. a) Explain the working principle of Potentiometer and its types. Also state its advantages, disadvantages and applications. *13,K2,CO2*

OR

b) What is capacitive transducer? Explain its working principle with its advantages and disadvantages. *13,K2,CO2*

13. a) Explain strain gauge load cell with its advantages and applications. *13,K2,CO3*

OR

b) Explain the basic principle of gyroscope and its types. *13,K2,CO3*

14. a) Explain the working principle of pressure diaphragm and bellows with neat sketch. *13,K2,CO4*

OR

b) Describe RTD and explain how it can be used to measure temperature. *13,K2,CO4*

15. a) Discuss the functions of Single Channel and Multi Channel Data Acquisition System with block diagram. *13,K2,CO6*

OR

b) Explain the functions of various sensors in an automated manufacturing process. *13,K2,CO6*

PART - C (1 × 15 = 15 Marks)

16. a) Discuss different standards involved in Smart Sensors interface and also need for standardization. *15,K2,CO5*

OR

b) Explain the construction and working of photo voltaic with neat sketch. *15,K2,CO5*