

Reg. No.

Question Paper Code

11705

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

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

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. Differentiate gross error and systematic error. | 2,K2,CO1 |
| 2. Define an Inverse transducer. Give an example. | 2,K1,CO1 |
| 3. What is the difference between inductive and capacitive sensors? | 2,K1,CO2 |
| 4. What is the purpose of Wheatstone bridge? | 2,K1,CO2 |
| 5. Define the term Hall voltage. | 2,K1,CO3 |
| 6. Calculate the change in resistance in strain gauge for the given values,
R=100 ohms, G=2, strain=0.001 | 2,K2,CO3 |
| 7. What is piezo electric effect? | 2,K1,CO4 |
| 8. List the thermocouple laws. | 2,K1,CO4 |
| 9. What are the difference between data loggers and data acquisition system? | 2,K1,CO6 |
| 10. Mention the merits and demerits of DAQ systems. | 2,K1,CO6 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Explain the various calibration techniques in detail and sketch the calibration curve in general. 13,K2,CO1
- OR**
- b) Explain the various static and dynamic characteristics of a measurement system in depth. 13,K2,CO1
12. a) Discuss in detail about the architecture, working principle, types and applications of LiDAR. 13,K2,CO2
- OR**
- b) Explain the working principle of Potentiometer and its types. Also state its advantages, disadvantages and applications. 13,K2,CO2
13. a) Define Hall effect. Explain the working principle of Hall effect 13,K2,CO3

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

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13. a) Define Hall effect. Explain the working principle of Hall effect sensor with neat diagram. *13,K2,CO3*

OR

b) Describe the principles of operation and different types of magnetic sensors in detail. *13,K2,CO3*

14. a) With neat sketch, examine working principle of resistance thermometer. Also draw the temperature response graph for various metals. *13,K2,CO4*

OR

b) Explain the principle, construction, working and applications of Ultrasonic Flow meter with neat sketch. *13,K2,CO4*

15. a) Describe the design and operation of a single channel and multichannel data acquisition system. *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) Explain the construction and working of photo voltaic with neat sketch. *15,K2,CO5*

OR

b) Illustrate with a neat sketch, the constructional and operation of smart sensor and outline its interface standard. *15,K3,CO5*