

Roll No:

JAMIA HAMDARD
Department of Computer Science & Engineering
School of Engineering Sciences & Technology
New Delhi-110062
Examination: Even Semester Examination 2023

Paper Name: Sensors and Instrumentation
Time: 3 Hours

Paper Code: BTECE 607
Maximum Marks: 75

Section A

Note: Attempt ALL the questions

7x5=35

Q. No.	Question	Marks	CO	BL
1.	What do you mean by sensors and transducers? Differentiate between them using examples.	5	CO1	3
2.	Derive the relation between mutual and self-inductive transducers. Also give examples of both of them	5	CO2	1
3.	Show how capacitance will change when the overlapped area between the plates of a capacitive transducer changes. Also list out the advantages and disadvantages of capacitive transducers.	5	CO3	5
4.	A platinum resistive thermometer has a resistance of 300 Ω at 0°C. What is the temperature when resistance is 400 Ω ? Also find the value of temperature when the thermometer is having a resistance of 800 Ω . The resistance temperature coefficient of the platinum is 0.00392/°C.	5	CO1	5
5.	Explain the working of Piezo-electric sensors.	5	CO3	6
6.	Explain the working principle of thermocouples. What are the advantages of using such thermometer?	5	CO4	6
7.	What are smart sensors? What are the different components of a smart sensor?	5	CO5	4

Section B

Note: Attempt any FOUR (4) Questions

(4x10=40)

Q. No.	Question	Marks	CO	BL
1.	Explain loading effect in potentiometers. Also point out its application in different fields of engineering	10	CO1	3
2.	Explain the construction and principle of working of an LVDT. Explain how the magnitude and direction of the displacement of core of an LVDT detected. What are the advantages and disadvantages of LVDT	10	CO2	4

3.	Based on the principle of change of distance between the plates, explain the working of a capacitive transducer.	10	CO3	2
4.	Compare the RTD, the thermistor and the thermocouple as temperature transducers. What is the output, range, sensitivity, advantages and disadvantages of each one?	10	CO4	2
5.	Explain the working and construction of Hall Effect sensor. What are the applications of these sensor? Support your answer with examples.	10	CO5	6
6.	A parallel plate capacitive transducer uses plates of area 500 mm ² which are separated by a distance of 0.2 mm. The dielectric medium between the plates is air having permittivity of 8.85×10^{-12} F/m. If a linear displacement reduces the distance between the plates to 0.18 mm, then find the change in capacitance in pF.	10	CO3	5

BL : Bloom's Taxonomy Level (1-Remembering, 2-Understanding, 3-Applying, 4- Analysing, 5-Evaluating, 6- Creating)