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Printed Page:-2 **Subject Code:- BCSIOT0301X**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: III - THEORY EXAMINATION (2025- 2026)
Subject: Sensor and It's Applications

Time: 2 Hours **Max. Marks: 50**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*
1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*
2. *Maximum marks for each question are indicated on right -hand side of each question.*
3. *Illustrate your answers with neat sketches wherever necessary.*
4. *Assume suitable data if necessary.*
5. *Preferably, write the answers in sequential order.*
6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 15

1. Attempt all parts:-

1-a. A device measuring displacement by resistance variation is recognized as (CO1, K1) 1

(a) Thermocouple
(b) Potentiometer
(c) Hall Sensor
(d) Piezo Sensor

1-b. Thermocouple output is proportional to the following parameter. (CO2, K1) 1

(a) Pressure difference
(b) Voltage difference
(c) Temperature difference
(d) Current flow

1-c. A microcontroller typically uses the following ADC for medium-speed analog conversion. (CO3, K1) 1

(a) Sigma-Delta
(b) Wheatstone
(c) SAR
(d) R-2R

1-d. Virtual Instrumentation depends primarily on which element to define instrument functions? (CO4, K1) 1

(a) Hardware
(b) Software
(c) Sensors

(d) Memory

1-e. Software-based instruments are preferred due to the following. (CO4, K1) 1

(a) Fixed functions
(b) High cost
(c) Flexibility
(d) No data access

2. Attempt all parts:-

2.a.	Mention any two differences between a sensor and a transducer. (CO1, K1)	2
2.b.	State the reason platinum is preferred in RTDs. (CO2, K2)	2
2.c.	Identify two examples of analog input signals used in DAQ. (CO3, K1)	2
2.d.	Write any two applications of counters in industrial measurement. (CO3, K2).	2
2.e.	Write any two differences between Waveform Graph and Waveform Chart stated. (CO4, K2)	2

SECTION-B 15

3. Answer any three of the following:-

3-a.	Describe the internal construction, operating principle and output characteristics of an LVDT. (CO1, K2)	5
3-b.	Write the comparison between inductive and capacitive proximity sensors with illustrations of use cases. (CO2, K2)	5
3-c.	Design an ultrasonic flow-measurement setup for a water-distribution pipeline. (CO2, K4)	5
3.d.	Compare DAQ system performance for low-frequency vs high-frequency physical signals. (CO3, K2).	5
3.e.	Describe the need of software based instruments for industrial automation. (CO4, K3)	5

SECTION-C 20

4. Answer any five of the following:-

4-a.	Describe the complete working of a potentiometer as a displacement-measuring device, including signal variation with wiper position. (CO1, K2)	4
4-b.	Briefly explain the sensing mechanisms used in smartphones and establish how each sensor enhances user interaction? (CO1, K2)	4
4-c.	Compare NTC and PTC thermistors in terms of behaviour, applications, and limitations. (CO2, K2)	4
4-d.	Discuss the resistance–temperature relationship of RTDs and highlight calibration requirements. (CO2, K3)	4
4-e.	Compare SAR and Sigma-Delta ADCs based on performance characteristics (CO3, K2).	4
4-f.	Describe the way data sockets serve as virtual communication links between devices. (CO3, K2)	4
4-g.	Explain how Virtual Instrumentation reduces industrial hardware cost? (CO4, K2)	4
4-h.	Discuss the role of LabVIEW in automation and control loops.(CO4, K2)	4