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BTECH
(SEM III) THEORY EXAMINATION 2023-24
SENSOR & INSTRUMENTATION

TIME: 3HRS

M.MARKS: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 7 = 14

Q no.	Question	Marks	CO
a.	Define sensors and transducers.	2	1
b.	Discuss the use of a strain gauge in force measurement.	2	1
c.	Explain the operation of a thermistor.	2	2
d.	Why is there a need for software-based instruments in industrial automation?	2	3
e.	Compare successive approximation and sigma-delta ADCs.	2	4
f.	Explain the working principle of a successive approximation ADC.	2	4
g.	Define self-calibration in the context of smart sensors.	2	5

SECTION B

2. Attempt any three of the following:

7 x 3 = 21

a.	Discuss the selection criteria for sensors in industrial applications.	7	1
b.	Describe the working principle of a thermocouple and its advantages and limitations.	7	2
c.	Define virtual instrumentation and explain its graphical programming techniques.	7	3
d.	Describe the operation of counters and timers in data acquisition systems.	7	4
e.	Explain the characteristics of smart sensors	7	5

SECTION C

3. Attempt any one part of the following:

7 x 1 = 7

a.	Describe the working principle and construction of an LVDT. How is it used for displacement measurement?	7	1
b.	Discuss the working principle and application of piezoelectric sensors in pressure measurement.	7	1

4. Attempt any one part of the following:

7 x 1 = 7

a.	Describe the principles and applications of ultrasonic and laser flow sensors.	7	2
b.	Describe the working principle of Hall effect sensors for position measurement.	7	2

5. Attempt any one part of the following:

7 x 1 = 7

a.	Explain the concept of WHILE and FOR loops in graphical programming.	7	3
b.	Discuss the structures such as Case, Sequence, and Formula nodes in virtual instrumentation.	7	3



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Subject Code: BOE305

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6. Attempt any one part of the following:

7 x 1 = 7

a.	Discuss the basic block diagram of a data acquisition system.	7	4
b.	Explain the operation of an R-2R ladder DAC.	7	4

7. Attempt any one part of the following:

7 x 1 = 7

a.	Describe the general structure of smart sensors and their components.	7	5
b.	Discuss the applications of smart sensors in automatic robot control and automobile engine control.	7	5

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