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**B TECH**  
**(SEM-III) THEORY EXAMINATION 2020-21**  
**SENSOR AND INSTRUMENTATION**

Time: 3 Hours

Total Marks: 100

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

**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

Q no.	Question	Marks	CO
a.	classify the types of sensors	2	CO 1
b.	Explain piezoelectric sensor.	2	CO 1
c.	What is the Concept of thermal imaging?	2	CO 2
d.	Draw characteristics for Thermocouple.	2	CO 2
e.	Mention the role of software's in Virtual Instrumentation.	2	CO 3
f.	Define Clusters.	2	CO 3
g.	Explain Data Acquisition.	2	CO 4
h.	What is the Use of Data Sockets for Networked Communication?	2	CO 4
i.	Give few Applications of smart sensors.	2	CO 5
j.	Define Intelligent Sensors.	2	CO 5

**SECTION B****2. Attempt any three of the following:****3 x 10 = 30**

Q no.	Question	Marks	CO
a.	How can you classify sensors? Explain each of them in detail. Give their suitable application with examples.	10	CO 1
b.	Explain the working of Inductive type Proximity sensors.	10	CO 2
c.	Differentiate between 'traditional instruments' and 'virtual instruments'.	10	CO 3
d.	Explain successive approximation for analog to digital conversion.	10	CO 4
e.	What are the various applications of smart sensors? Explain any one in detail.	10	CO 5

**SECTION C****3. Attempt any one part of the following:**

Q no.	Question	Marks	CO
a.	With the help of a neat sketch explain the working of a 'LVDT'. What are its advantages and disadvantages?	10	CO 1
b.	A Strain Gauge having a Resistance of $120\Omega$ gauge factor of 2 is connected in series with a ballast resistance of $120\Omega$ across a 12v supply. Calculate the difference between the output voltage (voltage across strain gauge) with no stress applied & with a stress of $140\text{ MN/m}^2$ , Modulus of elasticity of the member undergoing strain is $200\text{GN/m}$	10	CO 1

**4. Attempt any one part of the following:**

a.	Briefly describe a 'Capacitive-type' level sensor.	10	CO 2
b.	Explain the working of ultrasonic and laser flow sensor.	10	CO 2

**5. Attempt any one part of the following:**

a.	Explain array and its function in detail.	10	CO 3
b.	Draw the architecture of Virtual Instrumentation and indicate the parts.	10	CO 3

**6. Attempt any one part of the following:**

a.	Explain the working of R-2R Ladder type for Digital to analog conversion.	10	CO 4
b.	Draw and explain a DAQ system with a neat block diagram.	10	CO 4

**7. Attempt any one part of the following:**

a.	Explain the General Structure of smart sensors & its components.	10	CO 5
b.	Discuss the various Characteristic of smart sensors.	10	CO 5