

Basavarajeswari Group of Institutions  
**BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT**  
(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code 

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Fifth Semester B.E. Degree Examinations, April/May 2024

**SENSORS AND ACTUATORS FOR ENGINEERING APPLICATIONS**

Duration: 3 hrs

Max. Marks: 100

*Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.  
2. Missing data, if any, may be suitably assumed*

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<b><u>Module-1</u></b>			
1.	a. Define a sensor and an actuator. Discuss the classification of sensors and actuators.	10	(2 :1: 1.3.1)
	b. Outline the general requirements for interfacing sensors and actuators in a system.	10	(2 :1: 1.1.1)
(OR)			
2.	a. List and explain any four performance characteristics considerations for sensors and actuators.	10	(2 :1: 2.1.3)
	b. Outline the different measurements unit with example.	10	(2 :1: 1.3.1)
<b><u>Module-2</u></b>			
3.	a. Discuss the working principle of Resistance Temperature Detectors (RTD) with necessary equations.	10	(2 :2: 1.2.1)
	b. Explain the working principle of thermocouple.	10	(2 :2: 1.3.1)
(OR)			
4.	a. Discuss the working principle of Photo-conducting sensor with necessary equations.	10	(2 :2: 1.1.1)
	b. Describe the working principle of CCD sensor.	10	(2 :2: 1.2.1)
<b><u>Module-3</u></b>			
5.	a. Explain capacitive fluid level sensors.	10	(2 :3: 1.2.1)
	b. With neat diagram explain the construction and operation of Linear Variable Differential Transformer (LVDT).	10	(2 :3: 1.3.1)
(OR)			
6.	a. Interpret motors as magnetic actuators.	10	(2 :3: 1.3.1)
	b. Explain the operation of voltage sensors and current sensors.	10	(2 :3: 1.3.1)
<b><u>Module-4</u></b>			
7.	a. Discuss the working principle of strain gauges with equations.	10	(2 :4: 1.3.1)
	b. Explain the working operation of carbon microphone with neat diagrams.	10	(2 :4: 1.3.1)
(OR)			

**Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)**

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|-----------|-----------|---|-----------|---------------|
| <b>8.</b> | <b>a.</b> | Explain the construction of an ultrasonic sensor with a neat diagram. | <b>10</b> | (2 :4: 1.3.1) |
|           | <b>b.</b> | Write a short note on Piezoelectric actuators.                        | <b>10</b> | (2 :4: 1.3.1) |

**Module-5**

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|-----------|-----------|---|-----------|---------------|
| <b>9.</b> | <b>a.</b> | Outline general schematic of a smart sensor with a neat block diagram.          | <b>10</b> | (2 :5: 2.2.3) |
|           | <b>b.</b> | Discuss the different structures of a sensor network with appropriate diagrams. | <b>10</b> | (2 :5: 1.3.1) |

**(OR)**

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|-----------|-----------|---|-----------|---------------|
| <b>10</b> | <b>a.</b> | Describe general requirements for interfacing sensors and actuators with microprocessors. | <b>10</b> | (2 :5: 1.3.1) |
|           | <b>b.</b> | Summarize different errors in sensors and actuators.                                      | <b>10</b> | (2 :5: 1.3.1) |

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