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# Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



B. Tech (Seventh Semester - Regular) Examinations, November - 2024

## 21BAGPC47002 - MECHATRONICS

(Agricultural Engineering)

Time: 3 hrs

Maximum: 70 Marks

### Answer ALL questions

(The figures in the right hand margin indicate marks)

#### PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Define the mechatronics approach. How does a measurement system function in mechatronics?	CO1	K1
b. Write various key applications of flow transducers in industrial systems.	CO2	K2
c. How are sensors used to monitor industrial environmental conditions?	CO2	K3
d. What is a PID controller and how does it work?	CO3	K2
e. Classify robots based on their degree of freedom and provide examples.	CO4	K2

#### PART – B

(15 x 4 = 60 Marks)

Answer All the questions

	Marks	CO #	Blooms Level
2. a. What are the key elements of Mechatronics? Explain the roles of mechanical, electrical, and computer engineering in mechatronics systems.	2+6	CO1	K1
b. Explain the working principle of a microprocessor-based controller. How do microprocessors integrate with sensors in a mechatronic system?	3+4	CO1	K3
(OR)			
c. Define a sensor and a transducer. Discuss the role of sensors and transducers in mechatronic systems.	3+5	CO2	K4
d. Describe the working principle of a sensor. Provide examples of how proximity sensors are used in automotive and manufacturing applications.	3+5	CO2	K3
3.a. Describe the working principle of servo motor and it's applications	5+2	CO2	K2
b. What are the various types of controllers used in mechatronics systems? Discuss the working of PID (Proportional-Integral-Derivative) controllers in detail.	3+5	CO3	K2
(OR)			
c. What are photo-electric transducers? Explain their working principle and their use in industrial automation.	2+6	CO3	K3
d. Describe position and proximity sensors. How do they differ, and what are their applications in automated systems?	3+4	CO3	K2
4.a. Describe the operation of a hydraulic actuator and its application in engineering systems.	8	CO3	K4
b. What is a control system? Discuss the classification of control systems with suitable examples.	2+5	CO3	K3
(OR)			
c. Compare and contrast electro-mechanical systems with hydraulic systems.	8	CO3	K4

d.	Discuss the concept of a feedback system and how it is used to improve the performance of engineering systems.	7	CO3	K4
5.a.	Explain the working principle and applications of a Programmable Logic Controller (PLC) in industrial automation.	8	CO3	K4
b.	What are the key components of a robot, and how do they function together?	7	CO4	K2
(OR)				
c.	What are the key advantages of using robots in manufacturing operations? How do robots enhance efficiency in material transfer systems?	8	CO4	K4
d.	Describe the working principle of robotic in welding process.	7	CO4	K2

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