

Register No : _____

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Seventh Semester

Mechanical Engineering

ME3791- Mechatronics and IoT

Regulations - 2021

Duration: 3 Hrs

Maximum: 100 Marks

PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Differentiate between analog and digital sensors.	AN	1	2
2.	What is the function of a relay in actuator control systems?	RE	1	2
3.	Differentiate between analog and digital signal conditioning techniques.	AN	2	2
4.	State the importance of scan cycle time in PLC operation.	RE	2	2
5.	Define IoT and explain its significance in the modern world.	RE	3	2
6.	What is firmware, and how does it relate to embedded systems?	RE	3	2
7.	List two common data types in both C++ and Python.	RE	4	2
8.	How does a light intensity sensor detect changes in light levels?	RE	4	2
9.	Name two sensors commonly used for navigation and stabilization in drones.	RE	5	2
10.	How does EBD help improve braking efficiency and stability?	RE	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Define mechatronics and explain its modular approach in integrating mechanical, electrical, and computer engineering principles.	UN	1	13
	Or			
	b Describe the working principles of ultrasonic sensors and their applications in object detection and distance measurement.	UN	1	13
12.	a i What are the design considerations for instrumentation amplifiers?	UN	2	6
	li What are protection circuits, and why are they important in electronic systems?	UN	2	7

Or

	b	What is a Programmable Logic Controller (PLC), and its main components? Explain in detail with a suitable sketch.	RE	2	13
13.	a	Classify the various layers in an IoT framework (e.g., perception layer, network layer, application layer) and their functionalities.	AN	3	13
Or					
	b	What is an embedded system, and what distinguishes it from general-purpose computing systems?	AN	3	13
14.	a	Explain the architecture of the Linux operating system, detailing its kernel and user space components.	UN	4	13
Or					
	b	Illustrate the significance of the ESP8266 Wi-Fi module in IoT (Internet of Things) applications, discussing its capabilities and limitations	UN	4	13
15.	a	Discuss the key components of drone actuation and control systems and how they interact to achieve stable flight.	UN	5	13
Or					
	b	Discuss the role of IoT sensors in precision agriculture, soil monitoring, crop health management, and resource optimization.	UN	5	13

PART – C (Marks 1*15 = 15)

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	Evaluate the importance of solid-state, piezoelectric, and ultrasonic sensors in mechatronic applications.	EV	1	15
Or					
	b	Explain the role of vision systems in enabling robot autonomy, including object recognition, navigation, and path planning.	EV	5	15