CHRIST (Deemed to be University), Bangalore – 560 029

Department of Computer Science

MID TRIMESTER EXAMINATION – JULY-2024

PG IV Trimester

Programme Name: 4 MSAIM **Max. Marks: 50**
Course Name:INTERNET OF THINGS **Time: 2 Hrs**
Course Code: MAI431

General Instructions

- **All rough work should be done in the answer script.**
- **Do not write or scribble in the question paper except your register number.**
- **Verify the Course code / Course title & number of pages of questions in the question paper.**
- **Make sure your mobile phone is switched off and placed at the designated place in the hall.**
- **Malpractices will be viewed very seriously.**
- **Answers should be written on both sides of the paper in the answer booklet. No sheets should be detached from the answer booklet.**
- **Answers without the question numbers clearly indicated will not be valued. No page should be left blank in the middle of the answer booklet.**

Course Outcomes (COs): The students will able to
CO1: Evaluate the components of the IoT ecosystem within the context of the robotic paradigm.
CO2: Examine fundamental circuits, sensors, data conversion processes, and shield libraries for interfacing with the physical world.
CO3: Apply embedded programming constructs and principles of Tiny ML for practical implementation.
CO4: Demonstrate the process of prototyping IoT solutions to address real-world socio-economic challenges.

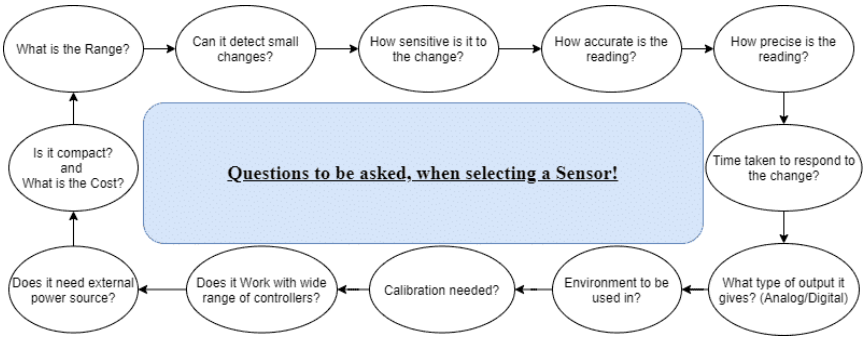
Answer all the questions:
The first 3 questions are compulsory and the remaining are questions with an internal choice. **5 X 10 =50**

Q. No	Questions	CO	RBT
1	**Sensors (2 marks)** ● Definition and Role ● Contribution to IoT Architecture **Actuators (2 marks)**	1	L3

	• Definition and Role • Contribution to IoT Architecture **Communication Module (2 marks)** • Definition and Role • Contribution to IoT Architecture **Power Source (2 marks)** • Definition and Role • Contribution to IoT Architecture **Conclusion (2 marks)** • Summary of Importance of Each Component in IoT Architecture Diagram is mandatory		
2	Discuss the various generations of IoT sensors, including First Generation, Advanced Generation, and Integrated IoT Sensors. Compare and contrast their characteristics, applications, and technological advancements.**(10 marks)** First Generation IoT Sensors (3 marks) Characteristics: Basic sensors with limited processing power and standalone functionality. Applications: Simple monitoring tasks like temperature and humidity measurement. Technological Advancements: Initial development of sensor technology. Advanced Generation IoT Sensors (3 marks) Characteristics: Enhanced processing capabilities, connectivity options, and improved accuracy. Applications: Complex monitoring and control systems, such as smart homes and industrial automation. Technological Advancements: Integration of advanced microcontrollers and communication modules. Integrated IoT Sensors (3 marks) Characteristics: Highly integrated systems combining sensors, processors, and communication in a single package. Applications: Sophisticated applications like autonomous vehicles and smart cities. Technological Advancements: Miniaturization, energy efficiency,	2	L1

	and advanced data analytics. Comparison and Conclusion (1 mark) Comparison: Highlight differences in characteristics, applications, and technological advancements. Conclusion: Summarize the evolution and impact of each generation on IoT technology.		
3	i)Evaluate the process of connecting and controlling an LED using an Arduino.**(4 marks)** ii)Analyze the hardware setup used for this purpose.**(4 marks)** iii)Reflect on the importance of mastering this skill for more complex Arduino projects.**(2 marks)** i) Evaluate the process of connecting and controlling an LED using an Arduino (4 marks) Connecting the LED (2 marks) Connection: Anode to digital pin, cathode to ground via resistor (1 mark) Code: Setup pin mode, use digitalWrite to control LED (1 mark) Controlling the LED (2 marks) Setup and loop functions for initialization and control (1 mark) Upload code and observe LED behavior (1 mark) ii) Analyze the hardware setup used for this purpose (4 marks) Components (2 marks) Arduino board, LED, resistor, breadboard, jumper wires (1 mark) Specifics: e.g., Arduino Uno, 220Ω resistor (1 mark) Wiring Diagram (2 marks) Schematic or description of connections (1 mark) Explanation of circuit function and current flow (1 mark) iii) Reflect on the importance of mastering this skill for more complex Arduino projects (2 marks) Fundamental Skill (1 mark) Foundation for more complex programming and electronics (0.5 mark) Building confidence and understanding (0.5 mark) Application to Complex Projects (1 mark) Relevance to advanced projects like sensors and IoT (0.5 mark) Importance of troubleshooting and problem-solving skills (0.5 mark)	2	L2
4	a)Analyze the various IoT communication models used for communication between systems and servers.**(10 marks)**	2	L4

	 Details with explanation and diagram (4x2=8) Usecase- 2 marks (OR) b)Analyze CISCO's IoT Reference Architecture by identifying its key components and explaining how these components interconnect to enhance the efficiency of IoT solutions.**(10 marks)** Introduction (1 mark) Key Components (5 marks) Diagram (4 marks)		
5	a) Classify sensors based on three criteria: input types, data types, and output types. For each classification, provide examples and discuss their applications in IoT systems.**(8 marks)** Evaluate the significance of understanding these classifications for selecting appropriate sensors in various projects.**(2 marks)** a) Classify Sensors Based on Criteria (8 Marks) Input Types (3 marks) Examples: Temperature sensors, proximity sensors (1.5 marks) Applications: Climate control, automotive systems (1.5 marks) Data Types (3 marks) Examples: Analog sensors (temperature), digital sensors (accelerometers) (1.5 marks) Applications: Home automation, precision devices (1.5 marks) Output Types (2 marks) Examples: Voltage output (LDR), current output sensors (1 mark) Applications: Environmental monitoring, industrial control (1 mark) Evaluate the Significance of Understanding These Classifications (2 Marks) Selection of Appropriate Sensors (1 mark) Project Suitability and Efficiency (1 mark) (OR)	1	L2

	b)Discuss the primary factors driving the deployment of sensor technology in various industries. Analyze how these factors influence the adoption and integration of sensors in IoT applications. Provide examples to illustrate the significance of each factor in enhancing operational efficiency and decision-making.**(10 marks)**  **with explanation (4+6)**		

Revised Bloom's Taxonomy (RBT) Levels :		
L1 – Remembering	L2 – Understanding	L3 – Applying
L4 – Analyzing	L5 – Evaluating	L6 - Creating