SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT

OF

ELECTRONICS AND INSTRUMENTATION ENGINEERING

QUESTION BANK

VI SEMESTER
PEI104 – Sensor for IoT Application
Regulation – 2023
Academic Year 2025 – 2026 EVEN

Prepared by

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SUBJECT : PEI104 – SENSOR FOR IoT APPLICATION
SEM / YEAR : VI / III

UNIT I - FUNDAMENTALS OF IoT CONCEPTS				
Introduction to IoT concept, Objective, IoT History, Introduction to IoT communication, Why IoT, IoT Architecture, Telemetry Vs IoT, IoT Technologies behind smart & Intelligence devices, Building blocks of an IoT device - Programming Inputs and outputs, Serial, SPI and I2C - Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo / ARM Cortex / Arduino).				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	Define Internet of Things (IoT).	**CO1**	**BTL 1**	Remember
2.	State any two objectives of IoT.	**CO1**	**BTL 1**	Remember
3.	Who coined the term "Internet of Things" and in which year?	**CO1**	**BTL 1**	Remember
4.	List any two applications of IoT.	**CO1**	**BTL 1**	Remember
5.	What is meant by IoT communication?	**CO1**	**BTL 1**	Remember
6.	Mention any two reasons why IoT is required.	**CO1**	**BTL 1**	Remember
7.	List the layers of IoT architecture.	**CO1**	**BTL 1**	Remember
8.	What is telemetry?	**CO1**	**BTL 1**	Remember
9.	Differentiate between Telemetry and IoT.	**CO1**	**BTL 2**	Understand
10.	What are smart and intelligent devices?	**CO1**	**BTL 2**	Understand
11.	List any two technologies behind smart IoT devices.	**CO1**	**BTL 1**	Remember
12.	What is meant by an IoT device?	**CO1**	**BTL 1**	Remember
13.	List the basic building blocks of an IoT system.	**CO1**	**BTL 1**	Remember
14.	What are inputs and outputs in an IoT system?	**CO1**	**BTL 2**	Understand
15.	Define serial communication.	**CO1**	**BTL 1**	Remember
16.	Expand UART, SPI and I^2C.	**CO1**	**BTL 1**	Remember
17.	State any two differences between SPI and I^2C.	**CO1**	**BTL 2**	Understand
18.	What is a sensor?	**CO1**	**BTL 1**	Remember
19.	What is a sensor node?	**CO1**	**BTL 2**	Understand
20.	List any two functions of a sensor node.	**CO1**	**BTL 1**	Remember
21.	Name any two embedded target boards used in IoT.	**CO1**	**BTL 1**	Remember
22.	What is Raspberry Pi?	**CO1**	**BTL 1**	Remember
23.	Why are embedded boards used in IoT applications?	**CO1**	**BTL 2**	Understand
24.	State any two advantages of IoT systems.	**CO1**	**BTL 1**	Remember
PART-B				
1.	Demonstrate how IoT concepts can be used to develop a basic monitoring system and relate it to IoT objectives. **(16)**	**CO1**	**BTL 3**	Apply
2.	Explain the significance of IoT objectives in modern technological applications with suitable illustrations. **(16)**	**CO1**	**BTL 4**	Analyze
3.	Analyze the evolution of the Internet of Things (IoT) and explain how it emerged from traditional communication systems. **(16)**	**CO1**	**BTL 4**	Analyze
4.	Demonstrate an appropriate IoT communication model for a smart home application and explain the **(16)**	**CO1**	**BTL 3**	Apply

	data exchange process.				
5.	Investigate the relationships among IoT communication techniques and assess how these interactions shape their effectiveness in large-scale applications.	**(16)**	**CO1**	**BTL 4**	Analyze
6.	Illustrate how IoT addresses real-world challenges in smart city or healthcare applications.	**(16)**	**CO1**	**BTL 3**	Apply
7.	Illustrate with a diagram the layered IoT architecture for a smart energy system and explain its operation.	**(16)**	**CO1**	**BTL 3**	Apply
8.	Explain how different IoT architectural layers contribute to intelligent decision-making.	**(16)**	**CO1**	**BTL 4**	Analyze
9.	Analyze the functional differences between Telemetry and IoT systems and discuss their application domains.	**(16)**	**CO1**	**BTL 4**	Analyze
10.	Analyze the importance of enabling technologies in the evolution of smart and intelligent IoT devices.	**(16)**	**CO1**	**BTL 4**	Analyze
11.	Construct a block diagram of an IoT device and explain the role of each component.	**(16)**	**CO1**	**BTL 3**	Apply
12.	Explain the role of essential hardware and software components in an IoT device.	**(16)**	**CO1**	**BTL 4**	Analyze
13.	Demonstrate the use of input and output programming to control devices in an IoT system.	**(16)**	**CO1**	**BTL 3**	Apply
14.	Illustrate the use of UART, SPI, and I²C protocols for interfacing sensors in an IoT system.	**(16)**	**CO1**	**BTL 3**	Apply
15.	Examine the suitability of SPI and I²C protocols for different IoT applications.	**(16)**	**CO1**	**BTL 4**	Analyze
16.	Demonstrate the interfacing of a sensor node with an embedded target platform.	**(16)**	**CO1**	**BTL 3**	Apply
17.	Explain the role of embedded platforms such as Arduino or Raspberry Pi in IoT sensor interfacing.	**(16)**	**CO1**	**BTL 4**	Analyze

UNIT II - SENSORS IN IoT

Introduction to IoT sensors, roles of IoT sensor, Types of IoT sensors – temperature sensor, proximity sensor, pressure sensor, water quality sensor, chemical sensor, gas sensor, infrared sensor, smoke senor, image sensor, level sensor, motion sensor, humidity sensor, acceleration sensor, Gyroscopic sensor – Consideration in IoT sensors, Applications.

PART – A

Q.No	Questions	CO	BT Level	Competence
1.	Define an IoT sensor.	**CO4**	**BTL 1**	Remember
2.	What is the role of sensors in IoT systems?	**CO4**	**BTL 1**	Remember
3.	State any two functions of IoT sensors.	**CO4**	**BTL 1**	Remember
4.	How do IoT sensors differ from conventional sensors?	**CO4**	**BTL 2**	Understand
5.	What is a temperature sensor?	**CO4**	**BTL 1**	Remember
6.	Define proximity sensor.	**CO4**	**BTL 1**	Remember
7.	What is a pressure sensor?	**CO4**	**BTL 1**	Remember
8.	What is meant by a water quality sensor?	**CO4**	**BTL 1**	Remember
9.	Define chemical sensor.	**CO4**	**BTL 1**	Remember
10.	What is a gas sensor used for?	**CO4**	**BTL 1**	Remember
11.	What is an infrared (IR) sensor?	**CO4**	**BTL 1**	Remember
12.	Define smoke sensor	**CO4**	**BTL 1**	Remember

13.	What is an image sensor?	**CO4**	**BTL 1**	Remember
14.	What is a level sensor?	**CO4**	**BTL 1**	Remember
15.	Define motion sensor.	**CO4**	**BTL 1**	Remember
16.	What is a humidity sensor?	**CO4**	**BTL 1**	Remember
17.	Define accelerometer sensor.	**CO4**	**BTL 1**	Remember
18.	What is a gyroscopic sensor?	**CO4**	**BTL 1**	Remember
19.	List any two considerations in selecting IoT sensors.	**CO4**	**BTL 1**	Remember
20.	Why is power consumption an important factor in IoT sensors?	**CO4**	**BTL 2**	Understand
21.	How does accuracy affect IoT sensor performance?	**CO4**	**BTL 2**	Understand
22.	Mention any two applications of IoT sensors.	**CO4**	**BTL 1**	Remember
23.	How are IoT sensors used in smart homes?	**CO4**	**BTL 2**	Understand
24.	State any two applications of IoT sensors in healthcare or agriculture.	**CO4**	**BTL 2**	Understand
	PART-B			
1.	Demonstrate the role of IoT sensors in a real-time monitoring system. **(16)**	**CO4**	**BTL 3**	Apply
2.	Examine the importance of sensors in enabling IoT-based automation. **(16)**	**CO4**	**BTL 4**	Analyze
3.	Illustrate the working of a temperature sensor used in IoT applications. **(16)**	**CO4**	**BTL 3**	Apply
4.	Analyze how sensors support data acquisition and control in IoT-based automated environments. **(16)**	**CO4**	**BTL 3**	Apply
5.	Apply water quality and chemical sensors in an environmental monitoring system. **(16)**	**CO4**	**BTL 3**	Apply
6.	Analyze the role of gas and smoke sensors in safety-critical IoT applications. **(16)**	**CO4**	**BTL 4**	Analyze
7.	Illustrate the use of infrared sensors in motion detection systems. **(16)**	**CO4**	**BTL 3**	Apply
8.	Illustrate the operation of image sensors in smart monitoring systems. **(16)**	**CO4**	**BTL 4**	Analyze
9.	Demonstrate the application of level sensors in industrial IoT systems. **(16)**	**CO4**	**BTL 3**	Apply
10.	Analyze motion and humidity sensors used in smart home automation. **(16)**	**CO4**	**BTL 4**	Analyze
11.	Illustrate the working of accelerometer and gyroscopic sensors in IoT devices. **(16)**	**CO4**	**BTL 3**	Apply
12.	Explain the key factors to be considered while selecting sensors for IoT applications. **(16)**	**CO4**	**BTL 4**	Analyze
13.	Analyze the impact of power consumption and accuracy on IoT sensor performance. **(16)**	**CO4**	**BTL 4**	Analyze
14.	Apply IoT sensors in the design of a smart agriculture system. **(16)**	**CO4**	**BTL 3**	Apply
15.	Illustrate the use of IoT sensors in healthcare monitoring systems. **(16)**	**CO4**	**BTL 3**	Apply
16.	Analyze the application of IoT sensors in smart cities. **(16)**	**CO4**	**BTL 4**	Analyze
17.	Explain how sensors are used in IoT-based industrial automation. **(16)**	**CO4**	**BTL 4**	Analyze

UNIT III - INTRODUCTION TO SENSORS AND TYPES				
IoT Sensors/Actuators and IoT Challenges: IoT: Sensor Technology, Mobile Phone Based Sensors, Medical Sensors, Neural Sensors, Environmental and Chemical Sensors, Radio Frequency Identification, Actuators, IoT Challenges: Design challenges, Development challenges, Privacy and Security challenges, Data Management and Other challenges.				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	Define an IoT sensor.	**CO6**	**BTL 1**	Remember
2.	What is an actuator in an IoT system?	**CO6**	**BTL 1**	Remember
3.	State the difference between a sensor and an actuator.	**CO6**	**BTL 2**	Understand
4.	What is meant by IoT sensor technology?	**CO6**	**BTL 1**	Remember
5.	List any two sensors available in a smart phone.	**CO6**	**BTL 1**	Remember
6.	What is the role of mobile phone-based sensors in IoT?	**CO6**	**BTL 2**	Understand
7.	What are medical sensors?	**CO6**	**BTL 1**	Remember
8.	Mention any two examples of medical sensors.	**CO6**	**BTL 1**	Remember
9.	Define neural sensors	**CO6**	**BTL 1**	Remember
10.	State one application of neural sensors.	**CO6**	**BTL 2**	Understand
11.	What are environmental sensors?	**CO6**	**BTL 1**	Remember
12.	Define chemical sensors.	**CO6**	**BTL 1**	Remember
13.	Mention any two applications of environmental sensors.	**CO6**	**BTL 2**	Understand
14.	What is RFID?	**CO6**	**BTL 1**	Remember
15.	List the main components of an RFID system.	**CO6**	**BTL 1**	Remember
16.	How does RFID differ from bar-code systems?	**CO6**	**BTL 2**	Understand
17.	List any two types of actuators used in IoT.	**CO6**	**BTL 1**	Remember
18.	What is the function of an actuator in an IoT system?	**CO6**	**BTL 2**	Understand
19.	What are design challenges in IoT?	**CO6**	**BTL 1**	Remember
20.	State any two development challenges in IoT.	**CO6**	**BTL 1**	Remember
21.	What is meant by privacy challenge in IoT?	**CO6**	**BTL 1**	Remember
22.	Why is security a major concern in IoT systems?	**CO6**	**BTL 2**	Understand
23.	What are data management challenges in IoT?	**CO6**	**BTL 1**	Remember
24.	Mention any two other challenges faced by IoT systems.	**CO6**	**BTL 1**	Remember
PART-B				
1.	Illustrate the role of sensors and actuators in an IoT system with a suitable application. **(16)**	**CO6**	**BTL 3**	Apply
2.	Analyze the importance of sensor technology in IoT applications. **(16)**	**CO6**	**BTL 4**	Analyze
3.	Demonstrate how mobile phone-based sensors can be used in an IoT application. **(16)**	**CO6**	**BTL 3**	Apply
4.	Analyze the advantages and limitations of using mobile phone-based sensors in IoT. **(16)**	**CO6**	**BTL 4**	Analyze
5.	Illustrate the working of medical sensors used in healthcare IoT systems. **(16)**	**CO6**	**BTL 3**	Apply
6.	Analyze the role of medical sensors in remote patient monitoring. **(16)**	**CO6**	**BTL 4**	Analyze
7.	Explain the application of neural sensors in brain–computer interface systems. **(16)**	**CO6**	**BTL 3**	Apply
8.	Analyze the challenges involved in using neural sensors in IoT applications. **(16)**	**CO6**	**BTL 4**	Analyze
9.	Demonstrate the use of environmental and chemical sensors in pollution monitoring systems. **(16)**	**CO6**	**BTL 3**	Apply

10.	Analyze the impact of environmental sensors on smart city development. **(16)**	**CO6**	**BTL 4**	Analyze
11.	Illustrate the working of an RFID system with a neat block diagram. **(16)**	**CO6**	**BTL 3**	Apply
12.	Analyze the advantages and limitations of RFID in IoT applications. **(16)**	**CO6**	**BTL 4**	Analyze
13.	Demonstrate the use of actuators in an IoT-based automation system. **(16)**	**CO6**	**BTL 3**	Apply
14.	Analyze the major design and development challenges in IoT systems. **(16)**	**CO6**	**BTL 4**	Analyze
15.	Investigate the causes and consequences of privacy and security challenges in IoT systems. **(16)**	**CO6**	**BTL 4**	Analyze
16.	Analyze data management challenges in large-scale IoT systems. **(16)**	**CO6**	**BTL 4**	Analyze
17.	Suggest suitable solutions to overcome the challenges faced by IoT systems. **(16)**	**CO6**	**BTL 3**	Apply

UNIT IV - DOMESTIC APPLICATION OF IoT

Smart Homes - Smart Appliances, Security and Safety. Smart Energy - Smart Meters, Automatic Meter Reading (AMR), Advanced Metering Infrastructure (AMI), Real Time Pricing, Smart grid, Smart Cities: Energy Consumption Monitoring, Smart Energy Meters, Home automation, Solar Energy Harvesting, Intelligent Parking, Data lake services scenarios. Smart Vehicles, Smart Lighting, etc.

PART – A

Q.No	Questions	CO	BT Level	Competence
1.	Define Smart Home.	**CO2**	**BTL 1**	Remember
2.	What are smart appliances?	**CO2**	**BTL 1**	Remember
3.	Mention any two examples of smart home devices.	**CO2**	**BTL 1**	Remember
4.	How does IoT improve security in smart homes?	**CO2**	**BTL 2**	Understand
5.	What is a smart meter?	**CO2**	**BTL 1**	Remember
6.	Define Automatic Meter Reading (AMR).	**CO2**	**BTL 1**	Remember
7.	What is Advanced Metering Infrastructure (AMI)?	**CO2**	**BTL 1**	Remember
8.	State the purpose of real-time pricing in smart energy systems.	**CO2**	**BTL 2**	Understand
9.	What is a smart grid?	**CO2**	**BTL 1**	Remember
10.	What is meant by energy consumption monitoring?	**CO2**	**BTL 1**	Remember
11.	How are smart energy meters used in smart cities?	**CO2**	**BTL 2**	Understand
12.	Define home automation.	**CO2**	**BTL 1**	Remember
13.	What is solar energy harvesting?	**CO2**	**BTL 1**	Remember
14.	Mention one advantage of solar energy harvesting using IoT.	**CO2**	**BTL 2**	Understand
15.	What is intelligent parking?	**CO2**	**BTL 1**	Remember
16.	How does IoT support intelligent parking systems?	**CO2**	**BTL 2**	Understand
17.	What is a data lake?	**CO2**	**BTL 1**	Remember
18.	State the role of data lakes in IoT applications.	**CO2**	**BTL 2**	Understand
19.	What are smart vehicles?	**CO2**	**BTL 1**	Remember
20.	Mention any two features of smart vehicles.	**CO2**	**BTL 1**	Remember
21.	What is smart lighting?	**CO2**	**BTL 1**	Remember
22.	How does IoT enable energy efficiency in smart lighting systems?	**CO2**	**BTL 2**	Understand
23.	List any two domestic applications of IoT.	**CO2**	**BTL 1**	Remember

24.	Why are domestic IoT applications considered distributed systems?	**CO2**	**BTL 2**	Understand
	PART-B			
1.	Illustrate an IoT-based smart home system highlighting smart appliances and security features. **(16)**	**CO2**	**BTL 3**	Apply
2.	Analyze the role of IoT in enhancing safety and security in smart homes. **(16)**	**CO2**	**BTL 4**	Analyze
3.	Illustrate the working of a smart meter in an IoT-based energy system. **(16)**	**CO2**	**BTL 3**	Apply
4.	Explain the operation of AMR and AMI in smart energy management. **(16)**	**CO2**	**BTL 3**	Apply
5.	Analyze the importance of real-time pricing in smart grid systems. **(16)**	**CO2**	**BTL 4**	Analyze
6.	Explain with suitable examples how IoT supports intelligent energy distribution in smart grids. **(16)**	**CO2**	**BTL 4**	Analyze
7.	Illustrate an IoT-based energy consumption monitoring system for a smart city. **(16)**	**CO2**	**BTL 3**	Apply
8.	Analyze the role of smart energy meters in smart city infrastructure. **(16)**	**CO2**	**BTL 4**	Analyze
9.	Demonstrate an IoT-based home automation system with suitable components. **(16)**	**CO2**	**BTL 3**	Apply
10.	Compare and analyze conventional grids and IoT-enabled smart grids in terms of energy efficiency. **(16)**	**CO2**	**BTL 4**	Analyze
11.	Elaborate an intelligent parking system using IoT and explain its operation. **(16)**	**CO2**	**BTL 3**	Apply
12.	Analyze the significance of data lake services in smart city IoT applications. **(16)**	**CO2**	**BTL 4**	Analyze
13.	Illustrate the architecture of an IoT-based smart vehicle system. **(16)**	**CO2**	**BTL 3**	Apply
14.	Analyze the impact of IoT on transportation through smart vehicles. **(16)**	**CO2**	**BTL 4**	Analyze
15.	Demonstrate a smart lighting system using IoT for energy optimization. **(16)**	**CO2**	**BTL 3**	Apply
16.	Explain how smart lighting contributes to sustainable smart cities. **(16)**	**CO2**	**BTL 4**	Analyze
17.	Analyze how domestic IoT applications function as distributed smart systems. **(16)**	**CO2**	**BTL 4**	Analyze

UNIT V - IoT FOR FARMING AND HEALTHCARE				
Smart Farming: Weather monitoring, Precision farming, Smart Greenhouse, Drones for pesticides - Architecture of IoT for Healthcare, Multiple views coalescence, SBC ADL to construct the system architecture - Wearable devices for Remote monitoring of Physiological parameter, ECG, EEG, Diabetes and Blood Pressure.				
PART – A				
Q.No	**Questions**	**CO**	**BT Level**	**Competence**
1.	Define Smart Farming.	**CO3**	**BTL 1**	Remember
2.	What is weather monitoring in IoT-based farming?	**CO3**	**BTL 1**	Remember
3.	State the purpose of precision farming.	**CO3**	**BTL 1**	Remember
4.	How does IoT help in precision farming?	**CO3**	**BTL 2**	Understand
5.	What is a smart greenhouse?	**CO3**	**BTL 1**	Remember

6.	Mention any two benefits of a smart greenhouse.	**CO3**	**BTL 1**	Remember
7.	What are agricultural drones?	**CO3**	**BTL 1**	Remember
8.	State one advantage of using drones for pesticide spraying.	**CO3**	**BTL 2**	Understand
9.	What is IoT-based healthcare?	**CO3**	**BTL 1**	Remember
10.	List the layers of IoT architecture for healthcare systems.	**CO3**	**BTL 1**	Remember
11.	What is the role of sensors in IoT healthcare architecture?	**CO3**	**BTL 2**	Understand
12.	Define multiple views coalescence.	**CO3**	**BTL 1**	Remember
13.	Why is multiple views coalescence required in healthcare IoT systems?	**CO3**	**BTL 2**	Understand
14.	What is SBC ADL?	**CO3**	**BTL 1**	Remember
15.	State the purpose of using SBC ADL in IoT systems.	**CO3**	**BTL 2**	Understand
16.	What are wearable devices in IoT healthcare?	**CO3**	**BTL 1**	Remember
17.	Mention any two physiological parameters monitored using wearable devices.	**CO3**	**BTL 1**	Remember
18.	What is remote health monitoring?	**CO3**	**BTL 1**	Remember
19.	Expand ECG.	**CO3**	**BTL 1**	Remember
20.	Expand EEG.	**CO3**	**BTL 1**	Remember
21.	What is IoT-based diabetes monitoring?	**CO3**	**BTL 1**	Remember
22.	How blood pressure is monitored using IoT devices?	**CO3**	**BTL 2**	Understand
23.	Mention any two applications of IoT in farming.	**CO3**	**BTL 1**	Remember
24.	State any two benefits of IoT in healthcare.	**CO3**	**BTL 2**	Understand
	PART-B			
1.	Elaborate an IoT-based weather monitoring system for smart farming. **(16)**	**CO3**	**BTL 3**	Apply
2.	Analyze the role of IoT in enabling precision farming. **(16)**	**CO3**	**BTL 4**	Analyze
3.	Illustrate the working of a smart greenhouse using IoT technologies. **(16)**	**CO3**	**BTL 3**	Apply
4.	Analyze the use of drones for pesticide spraying in smart agriculture. **(16)**	**CO3**	**BTL 4**	Analyze
5.	Elucidate the architecture of an IoT-based healthcare monitoring system. **(16)**	**CO3**	**BTL 3**	Apply
6.	Analyze the functional role of each layer in IoT healthcare architecture. **(16)**	**CO3**	**BTL 4**	Analyze
7.	Explain multiple views coalescence in IoT healthcare systems with a suitable example. **(16)**	**CO3**	**BTL 3**	Apply
8.	Analyze the importance of multiple views coalescence in healthcare decision making. **(16)**	**CO3**	**BTL 4**	Analyze
9.	Demonstrate how SBC ADL is used to construct an IoT healthcare system architecture. **(16)**	**CO3**	**BTL 3**	Apply
10.	Analyze the advantages of using SBC ADL for healthcare IoT system design. **(16)**	**CO3**	**BTL 4**	Analyze
11.	Illustrate the role of wearable devices in remote health monitoring systems. **(16)**	**CO3**	**BTL 3**	Apply
12.	Analyze the challenges involved in wearable-based remote healthcare monitoring. **(16)**	**CO3**	**BTL 4**	Analyze
13.	Explain how ECG signals are monitored and transmitted using IoT systems. **(16)**	**CO3**	**BTL 3**	Apply
14.	Analyze the role of IoT in EEG-based neurological **(16)**	**CO3**	**BTL 4**	Analyze

	monitoring.			
15.	Demonstrate IoT-based diabetes monitoring with a suitable system model. **(16)**	**CO3**	**BTL 3**	Apply
16.	Analyze IoT-based blood pressure monitoring systems and their benefits. **(16)**	**CO3**	**BTL 4**	Analyze
17.	Explain the impact of IoT on improving quality of life through smart farming and healthcare applications. **(16)**	**CO3**	**BTL 4**	Analyze