

SRM VALLIAMMAI ENGINEERING COLLEGE

**(An Autonomous Institution)
SRM Nagar, Kattankulathur – 603 203**

DEPARTMENT OF COMPUTER APPLICATIONS

QUESTION BANK



III SEMESTER M.C.A

PMC403 SMART CONVERGENT TECHNOLOGIES

Regulation – 2024

Academic Year 2025 – 2026 (Odd Semester)

Prepared by

Ms.N.Jothi (AP O.G/M.C.A.)

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur-603 203

DEPARTMENT OF COMPUTER APPLICATIONS

QUESTION BANK

SUBJECT : PMC403 SMART CONVERGENT TECHNOLOGIES

SEM/YEAR: III / II

UNIT - I: TOWARDS THE IOT UNIVERSE				
Internet of Things Vision - IoT Strategic Research and Innovation Directions – IoT Applications - Internet of Things and Related Future Internet Technologies –Infrastructure - Networks and Communication - Processes - Data Management, Security, Privacy & Trust - Device Level Energy Issues.				
UNIT - I: PART – A				
Q. No	Question	BT Level	Competence	Course Outcome
1	What is the vision of the Internet of Things (IoT)?	BTL-1	Remember	CO1
2	Define IoT strategic research and innovation directions.	BTL-1	Remember	CO1
3	How does IoT contribute to the future of the internet?	BTL-1	Remember	CO1
4	What is the role of IoT in enhancing connectivity and communication in modern infrastructures?	BTL-1	Remember	CO1
5	How does IoT enable smart applications in various industries?	BTL-1	Remember	CO1
6	What are the key challenges in network infrastructure for IoT?	BTL-1	Remember	CO1
7	Explain the importance of data management in IoT systems.	BTL-1	Remember	CO1
8	What role does security play in IoT applications, and why is it critical?	BTL-1	Remember	CO1
9	What are the main privacy concerns in IoT applications?	BTL-1	Remember	CO1
10	How do trust models work in IoT systems?	BTL-1	Remember	CO1
11	Explain the significance of energy efficiency in IoT devices.	BTL-1	Remember	CO1
12	What are the communication models typically used in IoT?	BTL-1	Remember	CO1
13	What is the concept of device-level energy management in IoT?	BTL-1	Remember	CO1
14	What are the different types of networks used in IoT applications?	BTL-2	Understand	CO1
15	How does data aggregation improve IoT applications?	BTL-2	Understand	CO1
16	What is the role of cloud computing in IoT data management?	BTL-2	Understand	CO1
17	How does 5G technology impact the development of IoT?	BTL-2	Understand	CO1
18	What is edge computing, and how does it support IoT applications?	BTL-2	Understand	CO1
19	What are the key protocols used for communication in IoT systems?	BTL-2	Understand	CO1
20	What is the role of the Internet of Things in smart cities?	BTL-2	Understand	CO1

UNIT - I: PART – B

Q. No	Question	Mark	BT Level	Competence	Course Outcome
1	Discuss the vision of the Internet of Things (IoT) and how it aims to connect physical objects with the digital world. What are the potential societal impacts of IoT?	16	BTL-3	Apply	CO1
2	Describe the strategic research and innovation directions for IoT in the coming years. How will these directions influence IoT technology development?	16	BTL-3	Apply	CO1
3	Explain the key IoT applications across various sectors (e.g., healthcare, agriculture, transportation, smart cities). How do these applications improve efficiency, safety, and quality of life?	16	BTL-3	Apply	CO1
4	How does the Internet of Things contribute to the future of the internet and the next generation of internet technologies? Discuss the concept of the "Future Internet" and how IoT plays a role in its evolution.	16	BTL-3	Apply	CO1
5	Discuss the various infrastructure components that enable IoT systems, such as sensors, gateways, networks, and cloud platforms. How do these components work together to support IoT applications?	16	BTL-3	Apply	CO1
6	Explain the different types of networks and communication protocols used in IoT. Discuss the pros and cons of protocols like Zigbee, LoRa, Bluetooth, and 5G in IoT applications.	16	BTL-3	Apply	CO1
7	Discuss the role of data management in IoT. How can big data analytics, real-time processing, and cloud platforms contribute to effective data management in IoT applications?	16	BTL-3	Apply	CO1
8	Explain the critical importance of security in IoT applications. How do common IoT security protocols (e.g., TLS, AES encryption) ensure data integrity and confidentiality in IoT networks?	16	BTL-3	Apply	CO1
9	What are the privacy concerns related to IoT devices and data collection? Discuss how regulations such as GDPR are impacting IoT privacy and how privacy-preserving techniques are implemented in IoT systems.	16	BTL-4	Analyze	CO1
10	How does trust play a role in the successful deployment of IoT applications? Discuss various trust models and mechanisms that ensure reliability and confidence in IoT systems.	16	BTL-4	Analyze	CO1
11	Discuss the energy management issues faced by IoT devices. What are the approaches to reduce energy consumption in IoT networks, and why is energy efficiency crucial for the scalability of IoT applications?	16	BTL-4	Analyze	CO1
12	Discuss the challenges and solutions related to IoT network infrastructures. How do issues like network congestion, latency, and security affect IoT applications, and how can they be addressed?	16	BTL-4	Analyze	CO1
13	What are the key challenges in ensuring effective communication between devices in IoT applications? How do various communication models (e.g., publish-subscribe, client-server) address these challenges?	16	BTL-4	Apply	CO1
14	Explain how device-level energy management is critical to the IoT ecosystem. What strategies can be implemented to extend battery life and optimize power usage in IoT devices?	16	BTL-5	Evaluate	CO1
15	Discuss the role of 5G technology in enabling IoT applications. How does	16	BTL-5	Evaluate	CO1

	the higher bandwidth, lower latency, and increased capacity of 5G networks enhance IoT services in sectors like smart cities and healthcare?				
16	What is edge computing, and why is it important for IoT applications? How does edge computing reduce latency, improve security, and optimize data processing for IoT devices?	16	BTL-6	Create	CO1
17	How do IoT communication protocols ensure reliable and secure data transmission in different applications? Compare common protocols like MQTT, CoAP, and HTTP in the context of IoT systems.	16	BTL-6	Create	CO1
18	Explain how IoT applications can be implemented in smart cities. Discuss the role of IoT in improving urban infrastructure, such as transportation, energy management, and waste management. What are the benefits and challenges?	16	BTL-5	Evaluate	CO1

UNIT II IOT APPLICATIONS — VALUE CREATION FOR INDUSTRY

Introduction - IoT Applications for Industry — Value Creation and Challenges – Future Factory Concepts - Brownfield IoT: Technologies for Retrofitting - Smart Objects, Smart Applications – Four Aspects in your Business to Master IoT - Value Creation from Big Data and Serialization in the Pharmaceutical Industry - IoT for Retailing Industry- IoT for Oil and Gas Industry - Opinion on IoT Application and Value for Industry- Data Aggregation for the IoT in Smart Cities.

UNIT II PART – A

Q. No	Questions	BT Level	Competence	Course Outcome
1	What are the key value creation opportunities for industries through IoT?	BTL-1	Remember	CO2
2	Define "Future Factory Concepts" in the context of IoT.	BTL-1	Remember	CO2
3	What is Brownfield IoT, and how does it differ from Greenfield IoT?	BTL-1	Remember	CO2
4	What is the significance of retrofitting technologies in Brownfield IoT?	BTL-1	Remember	CO2
5	Explain the role of smart objects in IoT-enabled industries.	BTL-1	Remember	CO2
6	What are smart applications in IoT? Provide an example of their use in industry.	BTL-1	Remember	CO2
7	How does Big Data contribute to value creation in IoT applications?	BTL-1	Remember	CO2
8	What is serialization, and how does it impact the pharmaceutical industry in IoT applications?	BTL-1	Remember	CO2
9	Describe how IoT is applied in the retail industry.	BTL-1	Remember	CO2
10	What are the main challenges faced by the oil and gas industry in implementing IoT solutions?	BTL-1	Remember	CO2
11	How does data aggregation support IoT applications in smart cities?	BTL-1	Remember	CO2
12	What are the primary concerns regarding the integration of IoT in business processes?	BTL-1	Remember	CO2
13	What is the importance of scalability in IoT applications for industry?	BTL-1	Remember	CO2
14	How does IoT impact supply chain management in industries like retail?	BTL-2	Understand	CO2

15	What are the security concerns related to IoT in industries such as oil and gas?	BTL-2	Understand	CO2
16	Why is real-time monitoring important in IoT applications for industries?	BTL-2	Understand	CO2
17	What are the benefits of predictive maintenance using IoT in industries?	BTL-2	Understand	CO2
18	How does IoT contribute to reducing operational costs in industries?	BTL-2	Understand	CO2
19	What is the role of cloud computing in IoT-enabled industries?	BTL-2	Understand	CO2
20	How do IoT devices enable smart decision-making in industries?	BTL-2	Understand	CO2

UNIT II PART – B

Q. No	Questions	Mark	BT Level	Competence	Course Outcome
1	Explain how IoT creates value for industries. Discuss the key value propositions, such as improved efficiency, cost reduction, and automation, that IoT brings to various industrial sectors.	16	BTL-3	Apply	CO2
2	Discuss the concept of "Future Factory" in the context of IoT. How does the vision of smart manufacturing, automation, and real-time data analytics shape the factory of the future?	16	BTL-3	Apply	CO2
3	Explain Brownfield IoT and its relevance to industries looking to implement IoT in existing infrastructures. Discuss the challenges and solutions for retrofitting legacy systems with IoT technologies.	16	BTL-3	Apply	CO2
4	What is the role of smart objects in IoT applications? How do they interact with other devices and systems in industrial IoT applications to create a more efficient and automated environment?	16	BTL-3	Apply	CO2
5	Define and explain smart applications in the context of IoT. Discuss specific examples of smart applications used in industries like manufacturing, healthcare, and transportation.	16	BTL-3	Apply	CO2
6	How does the value creation from Big Data impact IoT applications in industries? Explain how data analytics, machine learning, and AI are leveraged to optimize operations, predict failures, and improve product quality.	16	BTL-3	Apply	CO2
7	Explain the concept of serialization in the pharmaceutical industry. How does IoT-enabled serialization ensure the traceability and security of pharmaceutical products?	16	BTL-3	Apply	CO2
8	Discuss the IoT applications in the retail industry. How do IoT devices enhance customer experience, improve inventory management, and enable smart retail environments?	16	BTL-3	Apply	CO2
9	What are the challenges and benefits of applying IoT to the oil and gas industry? Discuss how IoT technologies like remote monitoring, predictive maintenance, and asset tracking improve safety and operational efficiency in this sector.	16	BTL-4	Analyze	CO2
10	How does data aggregation play a role in IoT applications for smart	16	BTL-4	Analyze	CO2

	cities? Explain how aggregated data from various IoT devices can be used to improve urban management, transportation, and energy efficiency.				
11	How can IoT technologies transform the pharmaceutical industry? Discuss the role of IoT in improving supply chain transparency, regulatory compliance, and patient safety.	16	BTL-4	Analyze	CO2
12	Discuss the importance of integrating IoT in the supply chain for retail businesses. How does IoT-enabled real-time tracking, smart shelves, and demand forecasting improve the efficiency of retail supply chains?	16	BTL-4	Analyze	CO2
13	Explain the concept of predictive maintenance in the oil and gas industry. How do IoT-enabled sensors and data analytics help anticipate equipment failures before they occur?	16	BTL-4	Analyze	CO2
14	How does IoT provide solutions to environmental monitoring in industries such as oil and gas and manufacturing? Discuss IoT applications for detecting leaks, pollution levels, and other environmental hazards.	16	BTL-5	Evaluate	CO2
15	Discuss the role of data security in the oil and gas industry when using IoT solutions. What are the security risks, and how can they be mitigated to ensure safe and reliable IoT deployments?	16	BTL-5	Evaluate	CO2
16	Describe the challenges in implementing IoT in the retail industry. How do issues like data privacy, device interoperability, and scalability impact the adoption of IoT technologies in retail environments?	16	BTL-6	Create	CO2
17	How does IoT technology contribute to achieving sustainability goals in the oil and gas industry? Discuss the potential environmental benefits of IoT applications like emissions monitoring and energy consumption tracking.	16	BTL-6	Create	CO2
18	Explain the significance of IoT in improving customer experience and business intelligence in the retail sector. How can data from connected devices enable personalized services, smart recommendations, and optimized pricing strategies?	16	BTL-6	Create	CO2

UNIT – III RFID PERVASIVE NETWORKS

RFID Tags- RFID Automatic Identification and Data Capture RFID Data Warehousing and analysis- RFID Data Management Issues, Solutions, and Directions- RFID Security: Threats and Solutions- RFID Geometric Context of Wireless Tags- RFID Application in Animal Monitoring- RFID Enabled Logistics Services - Location Tracking in an Office Environment: The Nationwide Case Study- Pervasive Computing Security: Bluetooth's Example- Internet of Things: A Context-Awareness Perspective - Index.

Q. No	Questions	BT Level	Competence	Course Outcome
UNIT IV PART – A				
1	What is an RFID tag and how does it function in automatic identification?	BTL-1	Remember	CO4
2	Explain the difference between active and passive RFID tags in terms of energy source.	BTL-1	Remember	CO4
3	What is the role of an RFID reader in data capture?	BTL-1	Remember	CO4
4	Name two industries that benefit from RFID for automatic identification and data capture.	BTL-1	Remember	CO4

5	How does RFID help in reducing human error in data entry?	BTL-1	Remember	CO4
6	What is RFID data warehousing and why is it critical in supply chain management?	BTL-1	Remember	CO4
7	How can RFID data be used to analyze inventory levels in real-time?	BTL-1	Remember	CO4
8	Explain the concept of "data mining" in the context of RFID data analysis.	BTL-1	Remember	CO4
9	What are the challenges faced in integrating RFID data into existing data warehouses?	BTL-1	Remember	CO4
10	How can RFID data be analyzed to forecast demand and optimize stock levels?	BTL-1	Remember	CO4
11	What are two common challenges in managing RFID data?	BTL-1	Remember	CO4
12	Explain how RFID data management systems can reduce operational costs.	BTL-1	Remember	CO4
13	What future trends are expected in RFID data management?	BTL-1	Remember	CO4
14	How can companies address the issue of data redundancy in RFID systems?	BTL-2	Understand	CO4
15	What is the role of real-time analytics in RFID data management?	BTL-2	Understand	CO4
16	What are the primary security threats associated with RFID systems?	BTL-2	Understand	CO4
17	How can encryption help secure RFID communication?	BTL-2	Understand	CO4
18	Explain the concept of 'skimming' in RFID security and how to prevent it.	BTL-2	Understand	CO4
19	What is the role of authentication in securing RFID systems?	BTL-2	Understand	CO4
20	How can RFID systems be protected against cloning attacks?	BTL-2	Understand	CO4

UNIT III PART – B					
Q. No	Questions	Mark	BT Level	Competence	Course Outcome
1	Explain the working principle of RFID technology. Discuss the types of RFID tags (passive, active, and semi-passive) and their applications.	16	BTL-3	Apply	CO3
2	Describe the concept of RFID Automatic Identification and Data Capture (AIDC). How does it improve operational efficiency in industries like retail and healthcare?	16	BTL-3	Apply	CO3
3	Discuss the importance of RFID data warehousing. How does data aggregation and warehousing contribute to effective decision-making in supply chain management?	16	BTL-3	Apply	CO3
4	What are the main issues related to RFID data management? Discuss the challenges such as data overload, data accuracy, and the potential solutions to these problems.	16	BTL-3	Apply	CO3
5	Discuss the security threats associated with RFID technology. How can RFID systems be secured against unauthorized access, data breaches, and cloning?	16	BTL-3	Apply	CO3
6	Explain the concept of RFID geometric context and its relevance to wireless tags. How can RFID systems be used for precise location tracking in real-time?	16	BTL-4	Analyze	CO3
7	How is RFID used for animal monitoring? Discuss how RFID	16	BTL-4	Analyze	CO3

	technology helps in tracking animals in sectors like agriculture, wildlife monitoring, and veterinary practices.				
8	Discuss the role of RFID-enabled logistics services in supply chain management. How does RFID enhance the efficiency of logistics by enabling real-time tracking and inventory management?	16	BTL-5	Evaluate	CO3
9	Explain how RFID technology can be used for location tracking in office environments. Discuss the Nationwide case study as an example of RFID implementation in such environments.	16	BTL-6	Create	CO3
10	How does Bluetooth security contribute to pervasive computing? Discuss the security mechanisms Bluetooth uses to ensure data privacy and protection in wireless environments.	16	BTL-3	Apply	CO3
11	Explain the concept of pervasive computing. How do RFID systems integrate with pervasive computing technologies to create intelligent environments?	16	BTL-3	Apply	CO3
12	How does context-awareness in IoT impact application development? Discuss the role of context-aware systems in IoT applications like smart homes, healthcare, and urban management.	16	BTL-3	Apply	CO3
13	Discuss the role of RFID in healthcare systems. How is RFID used for patient monitoring, medication tracking, and inventory management in hospitals?	16	BTL-4	Analyze	CO3
14	Describe the challenges and solutions in scaling RFID systems for nationwide deployments. Discuss the Nationwide case study and how RFID technology was implemented to track and manage assets across multiple locations.	16	BTL-4	Analyze	CO3
15	What are the potential privacy concerns when using RFID technology? Discuss the ethical issues and possible solutions to ensure consumer privacy.	16	BTL-4	Apply	CO3
16	How does RFID technology contribute to asset management in industries such as manufacturing, retail, and logistics? Discuss the benefits of using RFID for tracking and managing assets in real-time.	16	BTL-5	Evaluate	CO3
17	What are the emerging trends in RFID technology, and how are they likely to impact industries in the future? Discuss innovations like RFID sensors, integration with IoT, and blockchain for secure data management.	16	BTL-6	Create	CO3
18	Explain how the integration of RFID with the Internet of Things (IoT) enables the development of smart environments. Discuss the benefits of IoT-enabled RFID systems in smart cities, supply chains, and healthcare.	16	BTL-6	Create	CO3

UNIT – IV INTRODUCTION TO INDUSTRIAL INTERNET OF THINGS

Industrial Internet- Key IIoT Technologies- Innovation and the IIoT - Key Opportunities and Benefits the Digital and Human Workforce - Logistics and the Industrial Internet- IOT Innovations in Retail Cyber Physical Systems (CPS) – IP Mobility – Network Virtualization - SDN (Software Defined Networks)- The Cloud and Fog.

Q. No	Questions	BT Level	Competence	Course Outcome
UNIT IV PART – A				
1	What is the Industrial Internet of Things (IIoT)?	BTL-1	Remember	CO4

2	What are the key technologies involved in IIoT?	BTL-1	Remember	CO4
3	How does IIoT impact the workforce in industrial sectors?	BTL-1	Remember	CO4
4	What is the difference between IIoT and consumer IoT?	BTL-1	Remember	CO4
5	How do sensors and actuators contribute to IIoT?	BTL-1	Remember	CO4
6	What is network virtualization in the context of IIoT?	BTL-1	Remember	CO4
7	What are Software Defined Networks (SDN), and how are they used in IIoT?	BTL-1	Remember	CO4
8	What is the role of cloud computing in IIoT applications?	BTL-1	Remember	CO4
9	Explain the concept of fog computing and how it complements cloud computing.	BTL-1	Remember	CO4
10	What are Cyber-Physical Systems (CPS) in the industrial context?	BTL-1	Remember	CO4
11	How does IP mobility enhance IIoT operations?	BTL-1	Remember	CO4
12	What is the significance of logistics in IIoT applications?	BTL-1	Remember	CO4
13	How does IIoT improve industrial processes and supply chain management?	BTL-1	Remember	CO4
14	What are the key benefits of IIoT for the digital workforce?	BTL-2	Understand	CO4
15	How does network virtualization help in the scalability of IIoT systems?	BTL-2	Understand	CO4
16	What is the main function of SDN in the industrial IoT ecosystem?	BTL-2	Understand	CO4
17	What are the primary challenges associated with implementing IIoT technologies in industries?	BTL-2	Understand	CO4
18	How does fog computing differ from cloud computing in terms of latency and processing?	BTL-2	Understand	CO4
19	What role does data analytics play in IIoT?	BTL-2	Understand	CO4
20	What is the relationship between IoT innovations and retail?	BTL-2	Understand	CO4

UNIT IV PART – B

Q. No	Questions	Mark	BT Level	Competence	Course Outcome
1	Explain the concept of Industrial Internet of Things (IIoT). Discuss its applications in industries such as manufacturing, logistics, and energy.	16	BTL-3	Apply	CO4
2	Describe the key technologies that form the foundation of IIoT. Discuss how these technologies enable better connectivity, automation, and efficiency in industrial settings.	16	BTL-3	Apply	CO4
3	How does innovation in IIoT drive the digital transformation of industries? Discuss specific innovations such as predictive maintenance, automation, and remote monitoring.	16	BTL-3	Apply	CO4
4	Discuss the opportunities and benefits of integrating IIoT with the digital and human workforce. How does IIoT improve productivity, safety, and decision-making?	16	BTL-3	Apply	CO4
5	What is the role of IIoT in logistics and supply chain management? Discuss how IIoT improves inventory tracking, delivery times, and resource management in logistics.	16	BTL-3	Apply	CO4
6	Explain the concept of Cyber-Physical Systems (CPS). How do CPS bridge the gap between the physical world and digital systems in IIoT applications?	16	BTL-3	Apply	CO4
7	What is the role of IP mobility in IIoT? How does IP mobility ensure	16	BTL-3	Apply	CO4

	seamless communication and continuity of operations in industrial environments?				
8	Discuss network virtualization in IIoT and its importance. How does it enable more flexible and efficient network management for industrial applications?	16	BTL-3	Apply	CO4
9	Explain the concept of Software Defined Networks (SDN). How does SDN enhance the performance, scalability, and security of IIoT systems?	16	BTL-4	Analyze	CO4
10	Discuss how cloud computing plays a pivotal role in IIoT. Explain its use in data storage, processing, and analytics for industrial applications.	16	BTL-4	Analyze	CO4
11	What is fog computing? How does it complement cloud computing by addressing latency and real-time data processing needs in IIoT applications?	16	BTL-4	Analyze	CO4
12	How does IIoT enable data-driven decision-making in industries like manufacturing and agriculture? Discuss the role of real-time data collection and analysis.	16	BTL-4	Analyze	CO4
13	Discuss the challenges industries face when implementing IIoT systems. What are the technical, organizational, and regulatory hurdles, and how can they be overcome?	16	BTL-4	Apply	CO4
14	What are the benefits and challenges of integrating Cyber-Physical Systems (CPS) with IIoT? Discuss the potential impact on industrial automation and efficiency.	16	BTL-5	Evaluate	CO4
15	Explain the concept of SDN in IIoT. How does SDN enable more efficient network management and security in industrial environments?	16	BTL-5	Evaluate	CO4
16	What are the key differences between cloud computing and fog computing in the context of IIoT? Discuss their respective roles in terms of latency, data storage, and real-time processing.	16	BTL-6	Create	CO4
17	Discuss the impact of IIoT on the traditional industrial sectors. How does IIoT drive transformation in sectors like manufacturing, energy, and healthcare?	16	BTL-6	Create	CO4
18	Explain how IoT innovations in retail have led to smarter shopping experiences, inventory management, and customer engagement. How can IIoT create a more seamless shopping experience for customers?	16	BTL-4	Analyze	CO4

UNIT – V IIOT ARCHITECTURE AND DESIGNING INDUSTRIAL INTERNET SYSTEMS

Industrial Internet Architecture Framework (IIAF) - Industrial Internet Viewpoints - Architectural Topology: The Three-Tier Topology - Wireless Communication Technologies- Proximity Network Communication Protocols-Gateways: industrial gateways - CoAP (Constrained Application Protocol) – NFC

Q. No	Questions	BT Level	Competence	Course Outcome
UNIT V PART – A				
1	What is the Industrial Internet Architecture Framework (IIAF)?	BTL-1	Remember	CO5

2	What are the main viewpoints in the Industrial Internet Architecture?	BTL-1	Remember	CO5
3	Explain the concept of architectural topology in IIoT systems.	BTL-1	Remember	CO5
4	What is the Three-Tier Topology in Industrial Internet Architecture?	BTL-1	Remember	CO5
5	What are the key components of a Three-Tier Topology?	BTL-1	Remember	CO5
6	How does the Three-Tier Topology benefit Industrial IoT systems?	BTL-1	Remember	CO5
7	What is the role of wireless communication technologies in IIoT?	BTL-1	Remember	CO5
8	What is the difference between short-range and long-range wireless communication technologies in IIoT?	BTL-1	Remember	CO5
9	What is the significance of Proximity Network Communication Protocols in IIoT?	BTL-1	Remember	CO5
10	How does the NFC (Near Field Communication) protocol function in IIoT?	BTL-1	Remember	CO5
11	What is an industrial gateway, and how does it support IIoT communication?	BTL-1	Remember	CO5
12	Explain the purpose of gateways in industrial IoT environments.	BTL-1	Remember	CO5
13	What is CoAP (Constrained Application Protocol), and why is it important for IIoT?	BTL-1	Remember	CO5
14	How does CoAP differ from HTTP in terms of efficiency for IoT applications?	BTL-2	Understand	CO5
15	What are the typical use cases for NFC (Near Field Communication) in industrial applications?	BTL-2	Understand	CO5
16	What is the role of wireless sensors in IIoT?	BTL-2	Understand	CO5
17	How do industrial gateways help with data aggregation in IIoT systems?	BTL-2	Understand	CO5
18	What is the role of the cloud in the Three-Tier Topology of IIoT systems?	BTL-2	Understand	CO5
19	How do Proximity Network Communication Protocols facilitate device-to-device communication in IIoT?	BTL-2	Understand	CO5
20	What challenges do wireless communication technologies face in industrial IoT deployments?	BTL-2	Understand	CO5

UNIT V PART – B

Q. No	Questions	Mark	BT Level	Competence	Course Outcome
1	Explain the Industrial Internet Architecture Framework (IIAF). Discuss its components and the role of each viewpoint in the IIoT ecosystem.	16	BTL-3	Apply	CO5
2	Discuss the architectural viewpoints in IIoT. How do they help in designing and deploying industrial IoT systems?	16	BTL-3	Apply	CO5
3	Describe the Three-Tier Topology in IIoT. Explain how it organizes and structures the IIoT architecture, and discuss the role of each layer.	16	BTL-3	Apply	CO5
4	Explain the components of the Three-Tier Topology: Perception Layer, Network Layer, and Application Layer. How do they work together in an IIoT system?	16	BTL-3	Apply	CO5
5	What are the benefits of adopting a Three-Tier Topology for IIoT? Discuss how this topology helps in scalability, flexibility, and performance.	16	BTL-3	Apply	CO5
6	How do wireless communication technologies impact Industrial IoT applications? Discuss the different wireless communication options available for IIoT, such as Wi-Fi, Bluetooth, Zigbee, LoRa, and 5G.	16	BTL-3	Apply	CO5
7	Explain the role of Proximity Network Communication Protocols (e.g., NFC, Bluetooth Low Energy) in IIoT. How do these protocols enable efficient	16	BTL-3	Apply	CO5

	communication between devices in industrial settings?				
8	Discuss the role of industrial gateways in IIoT systems. What are their functions, and how do they enable communication between the industrial network and the cloud or other IT systems?	16	BTL-3	Apply	CO5
9	Explain how industrial gateways facilitate data aggregation, filtering, and security in IIoT networks. What are the key features of industrial gateways?	16	BTL-4	Analyze	CO5
10	What is CoAP (Constrained Application Protocol), and how does it address the challenges of IoT environments with limited resources? Compare it with other protocols like HTTP.	16	BTL-4	Analyze	CO5
11	Discuss the key features of CoAP (Constrained Application Protocol) that make it suitable for resource-constrained devices in IIoT. How does it optimize communication in IIoT networks?	16	BTL-4	Analyze	CO5
12	How does NFC (Near Field Communication) enhance the connectivity of IIoT devices? Discuss its role in proximity-based applications in industrial IoT systems.	16	BTL-4	Analyze	CO5
13	Discuss the use of wireless communication technologies in IIoT for real-time data collection and transmission. What are the advantages and limitations of wireless communication in industrial environments?	16	BTL-4	Analyze	CO5
14	Describe the impact of low-power wireless communication technologies like Zigbee and LoRa on IIoT applications. How do these technologies enable long-range communication with minimal energy consumption?	16	BTL-5	Evaluate	CO5
15	Explain how the integration of industrial gateways with cloud computing enhances IIoT systems. Discuss how data is processed and transmitted from industrial devices to the cloud through gateways.	16	BTL-5	Evaluate	CO5
16	Discuss the security challenges in wireless communication for IIoT. How do protocols like CoAP and gateway technologies address issues of data privacy and integrity?	16	BTL-6	Create	CO5
17	What are the challenges in implementing IIoT systems that use wireless communication technologies, and how can these challenges be mitigated?	16	BTL-6	Create	CO5
18	Describe the convergence of IIoT and wireless technologies in enabling smart manufacturing. How do wireless protocols and gateways work together to facilitate automation, real-time monitoring, and predictive maintenance?	16	BTL-5	Evaluate	CO5