

SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

(Common to Medical Electronics)

QUESTION BANK



VI SEMESTER

1908609– INTERNET OF THINGS AND ITS APPLICATIONS

Regulation – 2019

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING QUESTION BANK

SUBJECT : 1908609– INTERNET OF THINGS AND ITS APPLICATIONS
SEM/YEAR : VI / III

UNIT – I: FUNDAMENTALS OF IoT			
Evolution of Internet of Things - Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT models – Simplified IoT Architecture and Core IoT Functional Stack -- Fog, Edge and Cloud in IoT – Functional blocks of an IoT ecosystem – Sensors, Actuators, Smart Objects and Connecting Smart Objects			
PART – A			
Q.No.	Questions	BT Level	Competence
1	Define IoT.	BTL-1	Remember
2	Write the evolutionary phases of IoT.	BTL-2	Understand
3	Interpret the responsibilities of IT and OT in the IoT reference model	BTL-2	Understand
4	Point out the challenges faced by Internet of Things.	BTL-4	Analyze
5	Summarize the benefits of convergence of IT and OT as IoT.	BTL-2	Understand
6	List the applications of IoT.	BTL-1	Remember
7	Define Big data.	BTL-2	Understand
8	Mention two examples where Big data is generated in IoT systems.	BTL-1	Remember
9	Sketch the IoT Reference model.	BTL-3	Apply
10	Compare two IoT architectures oneM2M and IoTWF.	BTL-4	Analyze
11	List the layers and sublayers of the functional stack of core IoT.	BTL-1	Remember
12	Identify the hierarchy of Fog, Edge and Cloud.	BTL-3	Apply
13	Distinguish the following: active and passive sensor	BTL-4	Analyze
14	Write the difference between Invasive and non-invasive sensor.	BTL-2	Understand
15	How do you classify sensors and actuators layers ?	BTL-1	Remember
16	Enumerate the purpose of Sensors, Actuators and Smart Objects.	BTL-4	Analyze
17	What is called as IoT ecosystem? Name the functional blocks of it.	BTL-1	Remember
18	Mention the defining characteristics of Fog Computing.	BTL-3	Apply
19	Enumerate the types of sensors.	BTL-4	Analyze
20	Compare Fog and Edge computing.	BTL-4	Analyze
21	Illustrate how sensors and actuators interact with the physical world.	BTL-3	Apply
22	Identify the communication criteria used for connecting smart objects.	BTL-3	Apply
23	Summarize the functionalities of collaboration and process layer of IoTWF model.	BTL-3	Apply
24.	Point out the trends in smart objects.	BTL-2	Understand
PART – B			
1	(i) Summarize the evolutionary phases of the Internet. (10) (ii) Write a note on IoT and Digitization (3)	BTL-2	Understand
2	Illustrate each layer of the oneM2M IoT standardized architecture with neat diagram. (13)	BTL-3	Apply

3	Describe the seven layers of IoT Reference model designed by IoTWF. (13)	BTL-1	Remember
4	(i) Categorize the Alternative IoT Reference Models. (6) (ii) Describe the simplified IoT Architecture. (7)	BTL-1	Remember
5	Draw and explain the expanded view of simplified IoT architecture. (13)	BTL-1	Remember
6	(i) Describe about components of Core IoT functional stack (8) (ii) Write the example of sensor applications based on mobility and throughput. (5)	BTL-2	Understand
7	(i) Describe the architectural classification of 'Things' or 'smart objects' in core IoT functional stack. (7) (ii) Write short notes on access technologies used in IoT. (6)	BTL-1	Remember
8	Analyze the following functions of applications and analytics layer of IoT network. (i) Analytics versus Control applications (4) (ii) Data Versus Network analytics (4) (iii) Data analytics Versus Business benefits (5)	BTL-4	Analyze
9	(i) Summarize the smart services offered by applications and analytics layer of IoT. (7) (ii) Interpret the responsibilities of IT and OT in the IoT reference model. (6)	BTL-2	Understand
10	Draw the layered structure of IoT data management and compute stack with fog layer. Justify why fog layer is introduced in it. Also comment about Edge computing. (13)	BTL-3	Apply
11	Analyze in detail the hierarchy followed in Edge, Fog and Cloud with suitable illustration. (13)	BTL-4	Analyze
12	Explain in detail about actuators and Micro Electro Mechanical Systems. (13)	BTL-4	Analyze
13	(i) Examine the different ways of categorizing sensors with necessary explanation. (7) (ii) Write examples for any six types of sensors and relate its name with its principle of operation. (6)	BTL-4	Analyze
14	List out and explain the communication criteria that must be considered in connecting smart objects. (13)	BTL-2	Understand
15	(i) Point out about the IoT Challenges. (9) (ii) Illustrate about the trends in smart objects that are impacting IoT. (4)	BTL-3	Apply
16	Describe in detail about M2M ecosystem with necessary diagram. (13)	BTL-4	Analyze
17	(i) Explain in detail about the sensors used in a smart phone with necessary diagram. (10) (ii) Write a note on biodegradable sensors for smart farming. (3)	BTL-3	Apply
PART – C			
1	Explain in detail about the two architecture supported by OneM2M and IoTWF with necessary diagrams. (15)	BTL-4	Analyze
2	Identify the need for incorporation of Fog and Edge layers into the traditional Cloud computing model and explain how the requirements are satisfied by these layers. (15)	BTL-3	Apply
3	Elaborate in detail about the technologies for connecting smart objects and identify the communication criteria for IoT applications. (15)	BTL-4	Analyze
4	Describe in detail about the characteristics of smart objects and mention the trends impacting IoT. (15)	BTL-1	Remember
5	(i) Create a scenario to illustrate the applications of IoT by means of connected cars. (9) (ii) Mention the challenges addressed by the connected roadways in IoT (6)	BTL-2	Understand

UNIT – II : IoT PROTOCOLS

IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN – Network Layer: IP versions, Constrained Nodes and Constrained Networks – Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks – Application Transport Methods: Supervisory Control and Data Acquisition – Application Layer Protocols: CoAP and MQTT

PART – A

Q.No.	Questions	BT Level	Competence
1	Mention the significance of IEEE 802.15.4 standard.	BTL-2	Understand
2	Define the medium access methods used in IEEE 802.15.4 standard.	BTL-1	Remember
3	Identify the applications of ZigBee protocol.	BTL-2	Understand
4	Name the types of deployments of IEEE 802.15.4 standard.	BTL-1	Remember
5	Write the relationship between IEEE 1901.2a and NB-PLC.	BTL-2	Understand
6	Draw the high level ZigBee Protocol stack.	BTL-3	Apply
7	List the topologies supported by IEEE 802.15.4 standard.	BTL-1	Remember
8	Compare ZigBee and ZigBee IP.	BTL-4	Analyze
9	Identify the applications of IEEE1901.2a.	BTL-3	Apply
10	Label the MAC Layer Security frame format of IEEE 802.15.4g/e .	BTL-4	Analyze
11	How does the data rate vary in LoRaWAN?.	BTL-3	Apply
12	Point out the LoRaWAN layers.	BTL-2	Understand
13	What are the protocols used for optimizing IP for IoT.	BTL-3	Analyze
14	Write about the concept of constrained nodes and constrained networks.	BTL-2	Understand
15	What is an acronym of 6LoWPAN? and Explain.	BTL-1	Remember
16	Outline the features of 6LoWPAN.	BTL-3	Apply
17	Differentiate 6LoWPAN from 6Lo.	BTL-4	Analyze
18	Categorize the scheduling management mechanism in 6TiSCH.	BTL-4	Analyze
19	Why the protocol translation of SCADA is needed in IoT protocols.	BTL-1	Remember
20	Classify the IoT Application Transport methods.	BTL-4	Analyze
21	Name the three level of QoS supported by MQTT.	BTL-1	Remember
22	Identify the protocol used for resource-oriented applications in constrained networks.	BTL-3	Apply
23	Mention the features of CoAP.	BTL-2	Understand
24	Sketch the high level IoT protocol stack for CoAP and MQTT.	BTL-3	Apply

PART – B

1	(i) Draw and explain the MAC frame format of IEEE 802.15.4. (10) (ii) List the types of topology used in IEEE 802.15.4 protocol. (3)	BTL-2	Understand
2	Explain in detail about ZigBee protocol with necessary diagrams. (13)	BTL-3	Apply
3	Describe in detail about the protocol stacks utilizing IEEE 802.15.4 with necessary applications. (13)	BTL-1	Remember
4	Illustrate the security header format of IEEE 802.15.4g/e and also specify the improvements in physical and MAC layers for IoT use cases. (13)	BTL-1	Remember
5	Describe about LoRaWAN architecture with necessary diagrams. (13)	BTL-1	Remember
6	Compare and contrast the physical and MAC layers of IoT Access technologies with suitable illustration. (13)	BTL-4	Analyze
7	Explain the following: (i) LoRaWAN security (6)	BTL-1	Remember

	(ii) Narrowband Power line communication (7)		
8	Analyze the following access technologies with connectivity over IoT networks (i) IEEE 802.11g, (6) (ii) IEEE 802.11ah (7)	BTL-4	Analyze
9	Examine the role of wired access protocol IEEE1901.2a working group in connecting smart objects. (13)	BTL-4	Analyze
10	Write short notes on (i) IoT constrained nodes (7) (ii) IoT constrained networks (6)	BTL-2	Understand
11	Describe about Application Layer Protocols: (i) CoAP (7) (ii) MQTT (6)	BTL-4	Analyze
12	Tabulate and analyze the main characteristics of Constrained application protocol and message queuing telemetry transport application layer protocols. (13)	BTL-4	Analyze
13	Demonstrate how the routing solution is achieved through Routing over Low Power and Lossy Networks with suitable diagrams. (13)	BTL-3	Apply
14	(i) Compare the characteristics of 6LoWPAN Protocol stack using adaptation layer with standard IP Protocol stack. (10) (ii) Mention the need for Optimizing IP for IoT using adaptation layer. (3)	BTL-2	Understand
15	(i) Differentiate 6LoWPAN working group from 6Lo working group. (6) (ii) Write a detailed notes on RPL network. (7)	BTL-3	Apply
16	Categorize the IoT Application Transport Methods and explain in detail about Supervisory Control and Data Acquisition. (13)	BTL-2	Understand
17	(i) Describe in detail about protocol stack for transporting serial DNP3 SCADA over IP. (8) (ii) Write the difference between CoAP and MQTT. (5)	BTL-3	Apply
PART – C			
1.	Analyze in detail how the wireless access technology IEEE 802.15.4 adapts for low cost and low data rate devices and also to address a wide range of IoT use cases. (15)	BTL-4	Analyze
2.	Examine the amendments of IEEE 802.15.4 specification such as IEEE 802.15.4g and IEEE 802.15.4e, IEEE 802.11ah, LoRaWAN for IoT applications. (15)	BTL-4	Analyze
3.	Develop the IETF working group 6LoWPAN and its successor 6Lo to optimize the transmission of IPv6 packets over constrained networks. (15)	BTL-3	Apply
4.	List the functions of web based IoT application layer protocols for constrained networks. Also explain about MQTT publish/subscribe framework based on the TCP/IP architecture. (15)	BTL-1	Remember
5.	Explain in detail with respect to MQTT message format and their QoS flows with necessary diagrams. (15)	BTL-2	Understand

UNIT - III: DESIGN AND DEVELOPMENT

Design Methodology - Embedded computing logic - Microcontroller, System on Chips - IoT system building blocks - Arduino - Board details, IDE programming - Raspberry Pi - Interfaces and Raspberry Pi with Python Programming.

PART – A

Q.No.	Questions	BT Level	Competence
1	What are the steps involved in IoT Design methodology.	BTL-1	Remember
2	Draw the process specification of home automation system.	BTL-3	Apply
3	Identify the role of Embedded computing in building IoT projects.	BTL-3	Apply
4	Name the building blocks of the IoT system.	BTL-1	Remember
5	Interpret the different modules of IoT SoC	BTL-2	Understand
6	Mention the benefits of SoC.	BTL-2	Understand
7	List the interfaces of Raspberry Pi.	BTL-1	Remember
8	Write the major layers of IoT architecture.	BTL-2	Understand
9	Point out the services supported by Management Service Layer.	BTL-3	Apply
10	Compare sensors and actuators.	BTL-4	Analyze
11	Point out the use and purpose of Arduino in building IoT solutions	BTL-4	Analyze
12	Justify how Raspberry Pi is different from a desktop computer	BTL-3	Apply
13	What is the use of GPIO pins in a IoT device?	BTL-1	Remember
14	List out various versions of raspberry pi devices till date.	BTL-2	Understand
15	Name the different IoT platforms	BTL-1	Remember
16	Analyze how programming raspberry pi works.	BTL-4	Analyze
17	Enumerate the various components of Raspberry Pi Processor.	BTL-4	Analyze
18	Summarize on the need of microcontroller in embedded system.	BTL-2	Understand
19	Write a python program to turn the LED ON/OFF with Raspberry Pi.	BTL-3	Apply
20	How the sensors and actuators are programmed with Raspberry Pi processor?	BTL-2	Understand
21	Categorize any five commands on Rasperry pi with its functions.	BTL-4	Analyze
22	Differentiate Raspberry with Arduino	BTL-4	Analyze
23	Outline the characteristics of Python programming language.	BTL-3	Apply
24	List the essential requirements for setting up Raspberry Pi.	BTL-1	Remember

PART – B

1	Explain the key steps involved in IoT Design methodology. . (13)	BTL-4	Analyze
2	(i) Summarize in detail about embedded computing. (6) (ii) Explain the microcontroller and chips involved in embedded devices. (7)	BTL-2	Understand
3	Examine on python programming for Raspberry Pi with necessary diagrams. (13)	BTL-4	Analyze
4	Explain in detail about the use of embedded computing in the design of IoT Systems.	BTL-2	Understand
5	(i) Analyze in detail an exemplary device: Raspberry Pi. (6) (ii) Explain in detail the Raspberry Pi interfaces. (7)	BTL-4	Analyze
6	Illustrate the arduino board details and explain the steps for installing the board. (13)	BTL-3	Apply
7	Summarize about the building blocks of IoT and its functionalities with suitable illustration. (13)	BTL-2	Understand

8	(i) List the IoT design methodology. (6) (ii) Examine the building blocks of IoT. (7)	BTL-1	Remember
9	Describe the steps for designing IoT system with neat diagram. (7)	BTL-1	Remember
10	(i) Examine the process of using the Integrated Development Environment (IDE) to prepare an Arduino sketch. (7) (ii) Describe the steps for setting up of arduino board. (6)	BTL-1	Remember
11	Write short notes on the following: (i) Commands and its function on Raspberry Pi. (8) (ii) Raspberry Pi Interfaces. (5)	BTL-2	Understand
12	Explain the following for home automation system: (i) Process Specification (6) (ii) Information model specification (7)	BTL-3	Apply
13	Define IoT device and give a detailed diagram of IoT device with an example in real world applications. (13)	BTL-1	Remember
14	Write its procedure to model an interfacing LED and switch with Raspberry Pi. (13)	BTL-3	Apply
15	Illustrate with necessary diagrams the software and hardware features of Arduino board and explain the procedure to install IDE. (13)	BTL-4	Analyze
16	Analyze the embedded computing logic and use of microcontroller in embedded system with neat diagram. (13)	BTL-4	Analyze
17	With necessary diagrams explain the various components and peripherals of Raspberry Pi processor. (13)	BTL-3	Apply
PART – C			
1	Analyze in detail the design methodology used to implement IoT Devices, explain the level wise design steps with neat diagram. (15)	BTL-4	Analyze
2	Point out some examples that define IoT devices and explain in brief the basic building block and layers in IoT system with diagram. (15)	BTL-1	Remember
3	Analyze and explain in detail programming Raspberry Pi with python by giving suitable example. Also elaborate on Raspberry Pi interfaces. (15)	BTL-4	Analyze
4	Design a basic arduino board and explain the procedure for installing and setting up of IDE. (15)	BTL-3	Apply
5	(i) Describe the services derived from process specification and information model for Home Automation IoT system. (10) (ii) Draw and explain the Deployment design of the home automation IoT system. (5)	BTL-2	Understand

UNIT- IV : DATA ANALYTICS AND SUPPORTING SERVICES

Structured Vs Unstructured Data and Data in Motion Vs Data in Rest – Role of Machine Learning – No SQL Databases – Hadoop Ecosystem – Apache Kafka, Apache Spark – Edge Streaming Analytics and Network Analytics – Xively Cloud for IoT, Python Web Application Framework – Django – AWS for IoT – System Management with NETCONF-YANG.

PART – A

Q.No.	Questions	BT Level	Competence
1	Define Machine Learning.	BTL-1	Remember
2	Identify the need of data analytics for IoT.	BTL-3	Apply
3	Mention the use of AWS in IoT.	BTL-3	Apply
4	Compare Data in motion vs Data at Rest.	BTL-3	Apply
5	Define Neural networks.	BTL-1	Remember

6	Compare the two categories of machine learning.	BTL-4	Analyze
7	Write the major four domains of applications of ML for IoT.	BTL-4	Analyze
8	List the challenges in IoT data analytics.	BTL-2	Understand
9	Sketch the edge analytics processing unit.	BTL-4	Analyze
10	Point out the use of NoSQL Database.	BTL-4	Analyze
11	Outline on Hadoop.	BTL-4	Analyze
12	Differentiate between Supervised vs Unsupervised learning with examples.	BTL-2	Understand
13	Interpret a note on Hadoop ecosystem.	BTL-2	Understand
14	Write the benefits of flow analytics.	BTL-2	Understand
15	Summarize on Edge streaming analytics.	BTL-2	Understand
16	Define YARN.	BTL-1	Remember
17	Name the core functions of Edge Analytics.	BTL-1	Remember
18	Outline the stages of data processing in an edge APU.	BTL-3	Apply
19	Examine the role of Python Web application framework – Django.	BTL-3	Apply
20	Write the features of Apache spark.	BTL-2	Understand
21	Point out the features of Apache Kafka.	BTL-4	Analyze
22	Compare Big Data and Edge Analytics.	BTL-3	Apply
23	Define Amazon S3 and Amazon RDS.	BTL-1	Remember
24	Identify the role of various components of NETCONF-YANG.	BTL-1	Remember
PART – B			
1	Explain in detail the need of Data Analytics for IoT and brief the challenges faced by IoT Data Analytics. (13)	BTL-4	Analyze
2	Write in detail about: (i) Classification of Machine Learning in IoT. (6) (ii) Distributed analytics systems. (7)	BTL-2	Understand
3	Describe in detail about Hadoop ecosystem and the two key components with suitable illustration. (13)	BTL-1	Remember
4	Compare in detail about (i) Structured Vs Unstructured Data. (6) (ii) Data in Motion Vs Data in Rest. (7)	BTL-3	Apply
5	Identify the necessity of Apache Kafka and Apache Spark with diagram. (13)	BTL-3	Apply
6	(i) Write in detail about the Edge streaming analytics and compare it with data analytics. (10) (ii) Mention the functions of Edge analytics. (3)	BTL-2	Understand
7	Examine the need for Network Analytics and explain on flexible Netflow Architecture. (13)	BTL-1	Remember
8	Describe in detail about Xively cloud for IT and Illustrate Xively dashboard device details. (13)	BTL-4	Analyze
9	Examine the Python Web Application framework – Django architecture and steps to develop a django project. (13)	BTL-3	Apply
10	Elaborate the purpose of Amazon Web service for IoT with necessary illustrations. (13)	BTL-4	Analyze
11	Analyze the role of various components of NETCONF-YANG and steps for IoT device Management with NETCONF-YANG. (13)	BTL-4	Analyze
12	Describe the key components of Hadoop ecosystem: HDFS and Map reduce. (13)	BTL-1	Remember
13	Write a short notes on the uses of (i) Python Web Application Framework – Django. (6) (ii) Flexible NetFlow architecture. (7)	BTL-2	Understand
14	Explain in detail how neural networks are used to recognize a dog in a photo with necessary layers. (13)	BTL-4	Analyze

15	Intrpret a note on the following (i) NoSQL Databases (6) (ii) Distributed Hadoop Cluster (7)	BTL-2	Understand
16	With necessary illustrations explain in details about Edge analytics core functions. (13)	BTL-3	Apply
17	Explain about edge streaming analytics and Data analytics of IoT. (13)	BTL-1	Remember

PART – C

1	Summarize in detail about Apache spark and Apache kafka with data flow diagram. (15)	BTL-2	Understand
2	Examine in detail about network analytics with smart grid FAN analytics with NetFlow example. (15)	BTL-4	Analyze
3	Describe how a neural network recognizes an object in an image with an example. (15)	BTL-3	Apply
4	Elaborate on the following for IoT applications: (i) Machine Learning and its classifications. (8) (ii) Machine Learning and getting intelligence from big data. (7)	BTL-4	Analyze
5	List and explain the purpose of Python Web Application Framework – Django and Amazon Web service for IoT. (15)	BTL-1	Remember

UNIT - V: CASE STUDIES

Cisco IoT system - IBM Watson IoT platform – Manufacturing - Converged Plant wide Ethernet Model (CPwE) – Power Utility Industry – Grid Blocks Reference Model - Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control

PART – A

Q.N o.	Questions	BT Level	Competence
1	List the six pillars/components of Cisco IoT Systems.	BTL-1	Remember
2	Define Watson IoT Platform.	BTL-1	Remember
3	Brief the sub layers of security in IoT systems.	BTL-1	Remember
4	Analyze the use of Fog Computing	BTL-4	Analyze
5	Classify the key features of IBM Watson platform.	BTL-3	Apply
6	Summarize the use of Watson Conversation services.	BTL-2	Understand
7	Describe in brief Converged Plantwide Ethernet Model.	BTL-1	Remember
8	Point out the use of blockchain services in IBM Watson IoT platform.	BTL-3	Apply
9	Classify the implementation and design guidance of CPwE.	BTL-3	Apply
10	Compose the three stages of power supply-chain in power utility industry.	BTL-3	Apply
11	Outline about the uses of smart traffic application.	BTL-3	Apply
12	Infer how IoT data are Securely connected, managed and analysed.	BTL-4	Analyze
13	Summarize on Grid Blocks reference model.	BTL-2	Understand
14	Mention the challenges that become even more evident as the IT and OT networks become interconnected.	BTL-1	Remember
15	Give the benefits provided by The Grid Blocks reference architecture to utility operators.	BTL-2	Understand
16	Interpret any one use case of smart applications of IoT.	BTL-2	Understand
17	Conclude about IoT Strategy for Smarter Cities.	BTL-4	Analyze
18	Express why LED technology is used in street lighting?	BTL-2	Understand
19	Define connected manufacturing.	BTL-1	Remember
20	Sketch the smart parking use case diagram.	BTL-4	Analyze

21	Categorize the common industry elements for security on the network layer.	BTL-4	Analyze
22	Identify the IoT technologies for roadways.	BTL-3	Apply
23	State about DSRC	BTL-4	Analyze
24	Write about field area network (FAN).	BTL-2	Understand
PART – B			
1	Analyze the purpose of the Six-Pillar Approach for Cisco IoT System also explain the security framework.	BTL-4	Analyze
2	Examine the Features of IBM Watson IoT platform, and brief on the services provided in it. (13)	BTL-1	Remember
3	(i) Describe an IoT strategy for connected Manufacturing. (6) (ii) Examine the architecture for connected factory. (7)	BTL-1	Remember
4	Analyze in detail the architecture of Converged Plantwide Ethernet Model with suitable illustration. (13)	BTL-4	Analyze
5	Examine the challenges faced for parking in cities, and explain how smart parking provides a solution to this. (13)	BTL-1	Remember
6	(i) Explain the use of Power Utility Industry. (7) (ii) Examine the IT/OT divide in Utilities. (6)	BTL-3	Apply
7	Illustrate the 11-Tiered Reference Architecture of Grid Blocks and the use of reference model. (13)	BTL-3	Apply
8	(i) Summarize in detail the architecture model of CPwE. (7) (ii) Interpret on design and implementation guidance of CPwE. (6)	BTL-2	Understand
9	Summarize on the solution for smart lighting and explain street lighting architecture in detail. (13)	BTL-2	Understand
10	(i) Generalize an IoT strategy for smart city. (6) (ii) Design an smart city layered architecture and explain how security is provided. (7)	BTL-3	Apply
11	Summarize the features of Cisco IoT System and explain the components and security involved in it. (13)	BTL-2	Understand
12	Describe the architecture of smart traffic control architecture and explain the applications of smart traffic. (13)	BTL-2	Understand
13	Analyze the grid block reference model and the reference architecture with suitable illustration. (13)	BTL-4	Analyze
14	(i) Define any one use case example of smart city. (6) (ii) Describe the smart city security architecture. (7)	BTL-1	Remember
15	Explain in detail about connected lighting architecture with necessary diagrams. (13)	BTL-3	Apply
16	Describe in detail about connected parking architecture with necessary diagrams. (13)	BTL-4	Analyze
17	(i) Examine the function of DSRC general communication architecture. (8) (ii) Compare the features of DSRC to other protocols for connected roadways. (5)	BTL-4	Analyze
PART – C			
1	Analyze the IoT platform designed by IBM Watson, explain what it can do to your business, and infer how IoT data are securely connected, managed and analyzed. (15)	BTL-4	Analyze
2	Summarize about IoT strategy for smart city and design the layered architecture for implementing smart cities. (15)	BTL-2	Understand
3	Consider any use case example of smart applications of IoT, explain the architecture and technology need in building the application. (15)	BTL-4	Analyze
4	List an Industrial application of IoT system and brief on the various usecase of smart and connected cities. (15)	BTL-1	Remember
5	Describe in detail about FAN multiservice grid network with necessary diagram and state its key advantages. (15)	BTL-3	Apply