UNIT – I				
INTRODUCTION TO INTERNET OF THINGS (IoT)				
PART – A (SHORT ANSWER QUESTIONS)				
S. No	**Questions**	**Blooms Taxonomy Level**	**Course OutComes**	**Course Learning Outcome**
1	What is IoT? Write short notes on IoT.	Remember	CO1	ACS510.1
2	List any four characteristics of IoT.	Remember	CO1	ACS510.1
3	State the importance of IoT.	Remember	CO1	ACS510.1
4	What is the Thing in IoT?	Understand	CO1	ACS510.1
5	State about the importance of Thing in IoT.	Remember	CO1	ACS510.2
6	Write the any three functions of IoT?	Understand	CO1	ACS510.3
7	What are design factors IoT?	Understand	CO1	ACS510.3
8	What are the interfaces of WSN?	Remember	CO1	ACS510.3
9	Define link layer protocols in IoT.	Remember	CO1	ACS510.3
10	State any four domain specific IoT applications.	Remember	CO1	ACS510.3
11	State about the importance of Thing in IoT.	Understand	CO1	ACS510.3
12	Write the functions of IoT.	Understand	CO1	ACS510.3
13	What are design factors IoT?	Remember	CO1	ACS510.3
14	What are applications of IoT?	Remember	CO1	ACS510.3
15	Explain the IoT communication.	Remember	CO1	ACS510.3
PART – B (LONG ANSWER QUESTIONS)				
1	Discuss the characteristic of IoT. Explain them briefly.	Understand	CO1	ACS510.1
2	What are applications of IoT? Explain in detail.	Remember	CO1	ACS510.2
3	Demonstrate the physical design of IoT with Things of IoT and protocols of IoT.	Remember	CO1	ACS510.3
4	Write the logical design of IoT with communication models.	Understand	CO1	ACS510.3
5	Explain the IoT communication APIs and its importance.	Understand	CO1	ACS510.3
6	Discuss about any three IoT enabling technologies.	Remember	CO1	ACS510.2
7	Illustrate the IoT level 1 with neat diagram.	Understand	CO1	ACS510.2
8	Differentiate the IoT level 2 and level 4 in detailed.	Understand	CO1	ACS510.2
9	Explain the IoT level 3 and level 5 with diagrams.	Understand	CO1	ACS510.2
10	Define the various domain specific of IoT	Understand	CO1	ACS510.3
11	Explain domain specific of IoT with home automation.	Remember	CO1	ACS510.2
12	Explain physical design of IoT in detail.	Understand	CO1	ACS510.2
13	Explain Logical design of IoT in detail.	Understand	CO1	ACS510.2
14	Write the logical design of IoT with communication models?	Remember	CO1	ACS510.2
15	Explain the IoT communication APIs with neat diagrams.	Understand	CO1	ACS510.2
16	Discuss about Trending IoT technologies.	Understand	CO1	ACS510.2
17	Illustrate the IoT level 1 with diagram.	Understand	CO1	ACS510.2
18	Differentiate the IoT level 2, level 3 and level 4 in detailed.	Understand	CO1	ACS510.3

19	Differentiate logical design and physical design of IoT.	Remember	CO1	ACS510.2
20	Explain domain specific of IoT with home automation example.	Understand	CO1	ACS510.2
PART – C (CRITICAL THINKING QUESTIONS)				
1	Describe with an example of IoT service that uses publish-subscribe and web socket based communication.	Understand	CO1	ACS510.2
2	Determine the IoT levels for designing home automation IoT system including smart lighting and intrusion detection.	Remember	CO1	ACS510.3
3	Determine the various communication models that can be used for weather monitoring system. Which is a more appropriate model for this system. Describe the pros andcons.	Understand	CO1	ACS510.3
4	In Forest fire detection which level of IoT is used? Explain with a neat diagram and its working principle.	Understand	CO1	ACS510.3
5	Determine the IoT levels for designing structural health monitoring. Explain with a neat diagram.	Remember	CO1	ACS510.2
6	What is the role of coordinator in wireless sensor network	Understand	CO1	ACS510.3
7	What are architectural constraints of REST?	Understand	CO1	ACS510.2
8	What is the role of controller service in IoT systems?	Understand	CO1	ACS510.3
9	Describe an example of IoT service with an example of web-based communication model	Understand	CO1	ACS510.2
10	What is the function of communication functional block in an IoT systems?	Remember	CO1	ACS510.2
UNIT-II IoT AND M2M				
PART – A (SHORT ANSWER QUESTIONS)				
1	Write a short note on M2M?	Understand	CO2	ACS510.4
2	Give the purpose of communication protocols used in M2M?	Remember	CO2	ACS510.4
3	State Software Defined Networking?	Remember	CO2	ACS510.4
4	Discuss the purpose of Conventional Networks?	Remember	CO2	ACS510.4
5	List the advantages of SDN?	Understand	CO2	ACS510.4
6	What is Network Function Virtualization?	Understand	CO2	ACS510.5
7	State the differences and similarities between IoT and M2M?	Remember	CO2	ACS510.5
8	How do data collection and analysis approaches differ in M2M andIoT?	Remember	CO2	ACS510.5
9	Differentiate between configuration and state data?	Understand	CO2	ACS510.4
10	What is the function of a data model manager?	Understand	CO2	ACS510.4
11	Explain is M2M gate way?	Understand	CO2	ACS510.4
12	State are communication protocols in IoT	Understand	CO2	ACS510.4
13	State are communication protocols in M2M	Understand	CO2	ACS510.4
14	Write a short note on SDN?	Understand	CO2	ACS510.4
15	Write a short note on M2M?	Understand	CO2	ACS510.4

PART – B (LONG ANSWER QUESTIONS)				
1	Differentiate between IoT and M2M.	Remember	CO2	ACS510.4
2	Explain the limitations of conventional network architectures.	Understand	CO2	ACS510.5
3	Discuss about the key elements of SDN	Understand	CO2	ACS510.4
4	Describe how SDN can be used for various levels of IoT.	Remember	CO2	ACS510.5
5	What is the function of a centralized network controller in SDN.	Understand	CO2	ACS510.6
6	Define network function virtualization and explain with neat diagram.	Remember	CO2	ACS510.6
7	Discuss about network function virtualization with example.	Understand	CO2	ACS510.6
8	Describe the IoT system management in detailed.	Remember	CO2	ACS510.5
9	What is the role of IoT NETCONF-YANG management?	Remember	CO2	ACS510.6
10	Discuss about the IoT NETCONF-YANG with components.	Remember	CO2	ACS510.6
11	Differentiate between IoT and M2M.	Remember	CO2	ACS510.4
12	Explain the limitations of conventional network architectures.	Understand	CO2	ACS510.5
13	Discuss SDN architecture in detail	Understand	CO2	ACS510.4
14	Describe how SDN can be used for various levels of IoT.	Remember	CO2	ACS510.5
15	Describe how SDN is used for different IoT levels	Remember	CO2	ACS510.6
16	Describe how NFV is used for virtualization of IoT	Remember	CO2	ACS510.4
17	Difference between SDN and NFV	Understand	CO2	ACS510.5
18	What is the function of centralized network controller in SDN	Understand	CO2	ACS510.4
19	Which communication protocols are used in M2M local area network?	Remember	CO2	ACS510.5
20	Describe YANG hierarchical structure with data types	Remember	CO2	ACS510.6
PART – C (CRITICAL THINKING QUESTIONS)				
1	What is the function of centralized network controller in SDN? Differentiate between SDN and NVF?	Understand	CO2	ACS510.4
2	What are the differences between Machines in M2M and things in IoT and communication protocols in M2M and IoT?	Understand	CO2	ACS510.4
3	Why is network wide configuration important for IoT systemswith multiple nodes? Explain with an illustration.	Understand	CO2	ACS510.5
4	What is NETCONF server explain its significance in IoTsystemManagement withNETCONF-YANG?	Understand	CO2	ACS510.4
5	Describe the roles of YANG and Trans API modules in device management, with a neat sketch.	Understand	CO2	ACS510.5

UNIT-III				
IOT ARCHITECTURE AND PYTHON				
PART – A (SHORT ANSWER QUESTIONS)				
1	Define node.	Understand	CO2	ACS510.7
2	What is gateway?	Remember	CO2	ACS510.7
3	State node structure used in IoT.	Understand	CO2	ACS510.7
4	What is state of art?	Remember	CO2	ACS510.8
5	List out various IoT devices used in reference model?	Understand	CO2	ACS510.8
6	Define package?	Remember	CO2	ACS510.7
7	Differentiate procedure oriented programming and object oriented programming?	Understand	CO2	ACS510.9
8	What is the use of keyword argument in Python?	Understand	CO2	ACS510.7
9	Illustrate the IoT data types and data structures with example?	Remember	CO2	ACS510.7
10	Explain working with lists in Python?	Understand	CO2	ACS510.8
11	Explain control flow in computer networks	Remember	CO2	ACS510.7
12	Illustrate importing of packages from Arduino software	Understand	CO2	ACS510.8
13	List out packages required for humidity sensor	Remember	CO2	ACS510.7
PART – B (LONG ANSWER QUESTIONS)				
1	Explain the architecture reference model IoT.	Remember	CO2	ACS510.7
2	Demonstrate the IoT architecture with diagram and explain.	Understand	CO2	ACS510.8
3	Describe the working of modules in Python.	Understand	CO2	ACS510.9
4	Illustrate the IoT data types and data structures with example.	Remember	CO2	ACS510.7
5	Explain about i) control flow ii) packages iii) file handling of IoT.	Remember	CO2	ACS510.7
6	What type of Architecture reference model is used for IoT and explain.	Understand	CO2	ACS510.8
7	Discuss about IoT reference model with diagram.	Remember	CO2	ACS510.8
8	What is State of the art introduction of IoT architecture?	Understand	CO2	ACS510.9
9	Explain about various stages of IoT with neat diagram.	Remember	CO2	ACS510.8
10	What is the importance of IoT architecture and explain?	Understand	CO2	ACS510.8
PART – C (CRITICAL THINKING QUESTIONS)				
1	An Architectural Reference Model (ARM) can be visualised as the *matrix* that eventually derives into a large set of concrete IoT architectures. Justify your answer with neat diagram.	Understand	CO2	ACS510.8
2	In any metamorphic representation IoT ARM can represented in the form of a tree. Represent it and explain its parts realte to IoT.	Understand	CO2	ACS510.7
3	The foundation of the IoT Reference Model is the IoT Domain Model, which introduces the main concepts of the Internet of Things like Devices, IoT	Understand	CO2	ACS510.8

	Services and*Virtual Entities* (VE). Justify your answer with a neat sketch and explain.			
4	What is the difference between a Python module and a package? Illustrate with an example.	Understand	CO2	ACS510.9
5	How is function overriding implemented in Python? Explain with an example.	Understand	CO2	ACS510.8
6	Difference between physical and virtual entry	Understand	CO2	ACS510.9
7	What is the purpose of information model?	Understand	CO2	ACS510.9
8	Discuss in detail about IoT reference model with diagram.	Understand	CO2	ACS510.9
9	Discuss State of the art introduction of IoT architecture?	Understand	CO2	ACS510.9
UNIT – IV				
IoT PHYSICAL DEVICES AND END POINTS				
PART – A (SHORT ANSWER QUESTIONS)				
1	What are the basic building blocks of an IoT device?	Remember	CO3	ACS510.10
2	List out the Raspberry Pi interfaces?	Remember	CO3	ACS510.10
3	Write about Raspberry Pi?	Remember	CO3	ACS510.10
4	Write the purpose of Serial Raspberry Pi interface?	Remember	CO3	ACS510.11
5	Write the purpose of SPI Raspberry Pi interface?	Remember	CO3	ACS510.11
6	Write the purpose of I2C Raspberry Pi interface?	Remember	CO3	ACS510.12
7	What are the various components/peripherals labeled with the Raspberry Pi board?	Understand	CO3	ACS510.12
8	How is Raspberry Pi different from a Desktop computer?	Understand	CO3	ACS510.12
9	What is the use of GPIO pins?	Remember	CO3	ACS510.12
10	What is Cubieboard?	Remember	CO3	ACS510.12
11	Write short note on pcDuino?	Remember	CO3	ACS510.11
12	Discuss abotBeagleBone Black.	Remember	CO3	ACS510.12
13	Write about Arduino	Understand	CO3	ACS510.12
14	Write the purpose od Arduino digital pins	Remember	CO3	ACS510.12
15	Write about the purpose of analog pin	Remember	CO3	ACS510.12
PART – B (LONG ANSWER QUESTIONS)				
1	Discuss various building blocks of IoT with help of neat sketch.	Understand	CO4	ACS510.12
2	What is Raspberry Pi? Explain Raspberry Pi board with various components?	Remember	CO4	ACS510.10
3	Discuss Raspberry Pi GPIO with PINs.	Remember	CO4	ACS510.12
4	Demonstrate Raspberry Pi with interfacing LED.	Understand	CO4	ACS510.11
5	Explain about Raspberry Pi interfaces.	Understand	CO4	ACS510.11
6	Write a Python program for blinking LED with Raspberry Pi?	Remember	CO4	ACS510.10
7	What is the impact of Internet of Things having on Healthcare sector?	Understand	CO4	ACS510.10
8	What are the different sectors where the Internet of Things can actually add value to the current processes?	Understand	CO4	ACS510.11

9	Explain why energy consumption will be an issue when the Internet of Things is implemented?	Understand	CO4	ACS510.12
10	What are the main challenges of the Internet of Things implementation?	Remember	CO4	ACS510.11
11	Discuss various building blocks of IoT with help of neat sketch.	Understand	CO4	ACS510.10
12	Discuss the steps to download Arduino software	Remember	CO4	ACS510.12
13	Illustrate an LED with Arduino	Understand	CO4	ACS510.11
PART – C (CRITICAL THINKING QUESTIONS)				
1	How Rasberry Pi different from a desktop computer? Justify your answer with an illustration.	Understand	CO4	ACS510.10
2	Write a Python program for controlling an LED with a swith.	Understand	CO4	ACS510.11
3	Write a Python program for sending an email on switch press.	Understand	CO4	ACS510.12
4	Write a Python program for switching LED/Light based on reading LDR reading.	Understand	CO4	ACS510.12
5	Which are alternatives to Rasberry Pi? Explain with neat diagrams.	Understand	CO4	ACS510.10
UNIT-V				
IoT PHYSICAL SERVERS AND CLOUD OFFERINGS				
PART – A (SHORT ANSWER QUESTIONS)				
1	What is Arduino?	Remember	CO4	ACS510.14
2	Write short note on web application messaging protocol?	Understand	CO4	ACS510.14
3	Discuss the importance of XML in IoT?	Understand	CO4	ACS510.13
4	Define Virtual workspaces?	Remember	CO4	ACS510.15
5	List out the cloud storage models?	Understand	CO4	ACS510.13
6	What is Xively cloud service?	Understand	CO4	ACS510.15
7	What is Boto?	Remember	CO4	ACS510.15
8	What is Autobahn for IoT?	Understand	CO4	ACS510.15
9	What are the features of Autobahn?	Understand	CO4	ACS510.15
10	Write a short note on about Scikit-learn package?	Remember	CO4	ACS510.14
PART – B (LONG ANSWER QUESTIONS)				
1	Define WAMP protocol and explain WAMP concept.	Remember	CO4	ACS510.14
2	With an example discuss about IoT application with Amazon Auto Scaling by using Python code.	Understand	CO4	ACS510.14
3	Explain about IoT cloud with home automation.	Understand	CO4	ACS510.13
4	Discuss about the analysis of IoT with smart environment.	Remember	CO4	ACS510.15
5	Explain about Xively Cloud for IoT.	Understand	CO4	ACS510.13
6	What are the risks and challenges that we should be aware of when it comes to the Internet of Everything?	Understand	CO4	ACS510.15
7	Explain the concept of Home Automation using IoT.	Remember	CO4	ACS510.15
8	What are the impacts that can be observed in implementing internet of Things on Agriculture sector?	Understand	CO4	ACS510.15

9	What Impacts will the Internet Of Things haveon infrastructure and smart cities sector?	Understand	CO4	ACS510.15
10	Compare the contrast the difference between Wireless Sensor Network (WSN) and Internet Of Things (IoT)?	Remember	CO4	ACS510.14
PART – C (CRITICAL THINKING QUESTIONS)				
1	What does a MapReduce job comprise of? Explain with an example.	Understand	CO4	ACS510.13
2	What are the uses of message queues? What are the message formats supported by Amazon SQS? Explain.	Understand	CO4	ACS510.15
3	What is Amazon DynamoDB? Describe an application that can benefit from Amazon DynamoDB.	Understand	CO4	ACS510.14
4	Extend the functionality of the home intrusion detection IoT system by interfacing a webcam. Implement a function in the controller to capture an image from the webcam and send it as an attachment in the email alert when an intrusion is detected.	Understand	CO4	ACS510.15
5	Implement the air pollution monitoring system using the webSocket approach.	Understand	CO4	ACS510.13

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