SIDDHARTH INSTITUTE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION TO IOT (19EC4109)

QUESTION BANK

UNIT –I

1. A) Define IoT. **[CO1][L2][2M]**
   B) Describe the characteristics of IoT. **[CO1][L2][5M]**
   C) Explain the role of things in IoT. **[CO1][L2][5M]**
2. A) Mention the applications of IoT. **[CO3][L1][3M]**
   B) Explain various link layer protocols of IoT. **[CO2][L1][5M]**
   C) With a neat sketch, explain the publish-subscribe communication model of IoT. **[CO3][L1][4M]**
3. A) Describe an example of an IoT system in which information and knowledge are inferred from the data. **[CO3][L2][6M]**
   B) What are the protocols associated with network/internet layer of IoT? Explain them in detail. **[CO2][L1][6M]**
4. Explain briefly about the application layer protocols of IoT. **[CO2][L2][12M]**
5. A) With a neat sketch, explain the request-response communication model of IoT. **[CO3][L2][4M]**
   B)Illustrate the generic block diagram of an IoT device and explain it briefly. **[CO4][L2][4M]**
   C)With a neat sketch, explain the exclusive pair communication model of IoT. **[CO3][L2][4M]**
6. A) Compare the protocols associated with transport layer of IoT. **[CO2][L2][4M]**
   B) With a neat sketch, explain the push-pull communication model of IoT. **[CO3][L2][4M]**
   C) Justify why do IoT systems have to be self-adapting and self-configuring. **[CO3][L5][4M]**
7. A) Describe various functional blocks of IoT. **[CO4][L2][6M]**
   B) Describe an example of IoT service that uses Websocket-based communication **[CO3][L2][6M]**
8. A) Explain how cloud computing is playing key role in IoT. **[CO2][L2][6M]**
   B) What is the technology that performs analysis on data given by the IoT devices? Explain in detail. **[CO2][L2][6M]**
9. A)Discuss the role of communication protocols and embedded systems in IoT. **[CO2][L2][6M]**
   B)Describehow wireless sensor networks became one of the enabling technologies of IoT . **[CO2][L2][6M]**
10. With the help of neat diagrams, describe the levels of IoT with an example each. **[CO2][L2][12M]**

UNIT-II

1. A) Define how the IoT technology can be implemented in smart lightening and intrusion detection systems. **[CO3][L2][6M]**
   B)Describe how the IoT technology can be implemented in smart appliances and smoke/gas detection systems. **[CO3][L2][6M]**
2. Explain the implementation of IoT technology in following areas: **[CO3][L2][12M]**
   (i) Smart Parking (ii)Smart Lightening (iii) Emergency response (iv) smart roads in smart cities
3. Explain how IoT technology can used in the following application areas **[CO3][L2][12M]**
   (i) Structural health monitoring (ii) Surveillance (iii) Emergency response (iv) Weather monitoring
4. Describe how the environment can be more protected with the help of IoT technology in the following categories: **[CO3][L2][12M]**
   (i) Air pollution monitoring (ii) Noise pollution monitoring

(iii) Forest fire detection (iv) River flood detection

5. Describe the implementation of IoT technology into distributed energy systems to optimize the efficiency of energy infrastructure and reduce wastage in the following categories: **[CO3][L2][12M]**
   (i) Smart grids (ii) Renewable energy systems (iii) Prognostics.
6. Explain the necessity of adopting IoT technology for a growing need to increase customer loyalty and deliver the best in-store experience by retail sector in the following sectors: **[CO3][L2][12M]**
   (i) Inventory management (ii) Smart payments (iii) Smart vending machines
7. With the help of following sectors explain how IoT technology is impacting on the end-to-end value chain in the logistics sector : **[CO3][L2][12M]**
   (i) Route generation & Scheduling (ii) Fleet tracking (iii) Shipment Monitoring (iv) Remote vehicle diagnostics
8. Explain how IoT technology used to enable the agricultural industry to increase operational efficiency, lower costs, reduce waste, and improve the quality of their yield. **[CO3][L2][12M]**
9. Describe how the IoT technology is transforming the Industries to reduce operational costs and increasing safety & productivity in the following areas:
   (i) Machine diagnostics & Prognosis (ii) Indoor air quality monitoring **[CO3][L3][12M]**
10. Explain how the IoT technology is impacting the healthcare sector and changing our everyday lifestyle with the following examples: **[CO3][L2][12M]**
    (i) Health & Fitness monitoring (ii) Wearable electronics

UNIT-III

1. A) Define M2M. **[CO4][L2][2M]**
   B) With the help of neat diagrams, Explain the M2M system architecture. **[CO4][L2][10M]**
2. A) Mention the communication protocols used for M2M local area networks. **[CO4][L2][2M]**
   B) Explain the differences between Machines in M2M and Things in IOT. **[CO4][L2][10M]**
3. A) Define SDN. **[CO4][L2][2M]**
   B) Describe how SDN can be used for various levels of IoT. **[CO4][L2][10M]**
4. A) Define NFV. **[CO4][L2][2M]**
   B) Describe how NFV can be used for virtualizing IoT device. **[CO4][L2][10M]**
5. A) Describe the need of systems management in IoT. **[CO5][L3][6M]**
   B) Which limitations make SNMP unsuitable for IoT systems? **[CO5][L3][6M]**
6. A) Explain, why network wide configuration important for IoT systems with multiple nodes. **[CO5][L2][3M]**
   B) With the help of neat diagram, explain simple network management protocol. **[CO5][L2][9M]**
7. A) Mention the network operator requirements to address the limitations of the existing network management protocols. **[CO5][L2][6M]**
   B) What is NETCONF protocol? Explain what the different protocol layers present in Network configuration protocol. **[CO5][L2][6M]**
8. A) Mention the differences between configuration and state data. **[CO5][L2][6M]**
   B) Explain how the YANG data modelling language used to model configuration and state data manipulated by the NETCONF protocol. **[CO5][L1][6M]**
9. A) Explain how to manage IoT systems with NETCONF and YANG. **[CO5][L2][6M]**
   B) What is NETOPEER and explain how it is used to implement IoT device management. **[CO5][L2][6M]**
10. A) Describe the roles of YANG and TransAPI modules in device management. **[CO5][L2][4M]**
    B) Write a short note on the function of a data model manager? **[CO5][L2][2M]**
    C) Mention the role of a NETCONF server. **[CO5][L2][2M]**
    D) List the steps of IoT device management with NETCONF-YANG. **[CO5][L2][4M]**

UNIT-IV

1. A) Mention the advantages of IoT design methodology contrast to traditional designing of IoT. **[CO4][L2][3M]**
   B) List out the various steps involved in IoT system design methodology. **[CO4][L2][4M]**
   C) What is the difference between a Physical entity and virtual entity? **[CO4][L2][2M]**
   D) Write a short on various service types used in service specifications step of IoT system design methodology. **[CO4][L2][3M]**
2. Describe the following steps involved in IoT system design methodology:
   (i) Purpose & Requirements Specification **[CO4][L2][3M]**
   (ii) Process Specification **[CO4][L2][4M]**
   (iii) Domain model specification **[CO4][L2][5M]**
3. Describe the following steps involved in IoT system design methodology:
   (i) Information model Specification **[CO4][L2][3M]**
   (ii) Service Specifications **[CO4][L2][4M]**
   (iii) Domain model specification **[CO4][L2][5M]**
4. A) Distinguish between procedure-oriented programming and object-oriented programming. **[CO4][L1][3M]**
   B) Explain the characteristics of Python programming language. **[CO4][L1][9M]**
5. Explain the following data types of python with an example:
   (i) Numbers **[CO4][L2][4M]**
   (ii) Strings **[CO4][L2][4M]**
   (iii) Lists **[CO4][L2][4M]**
6. Explain the following data types of python with an example:
   (i) Tuples **[CO4][L2][4M]**
   (ii) Dictionaries **[CO4][L2][4M]**
   (iii) Type conversions **[CO4][L2][4M]**
7. Explain the various control flow statements of python with an example each. **[CO4][L1][12M]**
8. A) What is a function in python? **[CO4][L2][2M]**
   B) Explain the function with default arguments, passing by reference, keyword arguments and variable length arguments with an example each. **[CO4][L2][10M]**
9. A) What is a module in python? Explain with an example. **[CO4][L5][6M]**
   B) What is the difference between a module and a package in python? Explain package in python with an example. **[CO4][L5][6M]**
10. Describe how the python file handling with some example. **[CO4][L5][12M]**
11. A) Elaborate the principles of Object-Oriented Programming. **[CO4][L5][4M]**
    B) Explain about the classes in python with some examples. **[CO4][L2][8M]**
12. Explain about the following python packages used frequently in IoT programming:
    (i) JSON **[CO4][L1][3M]**
    (ii) XML **[CO4][L1][3M]**
    (iii)HTTPLib & URLLib **[CO4][L1][3M]**
    (iv)SMTP lib **[CO4][L1][3M]**

UNIT-V

1. A) What is an IoT device? **[CO4][L4][2M]**
   B) With the help of neat diagram explain the basic building blocks of IoT device. **[CO4][L4][8M]**
   C) Justify how Raspberry Pi is different from a desktop computer. **[CO6][L4][2M]**
2. A) List out various versions of raspberry pi devices till date. **[CO6][L2][2M]**
   B) Describe various features of a Raspberry Pi device. **[CO6][L2][10M]**
3. A) Mention the flavors of Linux OS supported by Raspberry pi device. **[CO6][L2][3M]**
   B) List the various frequently used commands during operation of Linux OS. **[CO6][L2][6M]**
   C) Write a short note on various raspberry pi interfaces used for data transfer. **[CO6][L2][3M]**
4. A) List out various single board computers which are alternatives to raspberry pi. **[CO6][L2][3M]**
   B) What is the use of GPIO pins in a IoT device? **[CO6][L6][2M]**
   C) Illustrate how to interface a LED to raspberry pi and write a program to blink. **[CO6][L6][7M]**
5. A) What is the use of SPI and I2C interfaces on raspberry pi? **[CO6][L2][2M]**
   B) Design an automatic refrigerator light system with LED, switch & raspberry pi and write a python program to support the working of that design. **[CO7][L6][10M]**
6. A) Illustrate how to interface a switch to raspberry pi. **[CO6][L2][2M]**
   B) Write a Program to send a mail "Hello, from Raspberry pi" in python. **[CO7][L2][10M]**
7. A) Write a short note on Light Dependent Resistor. **[CO6][L2][2M]**
   B)Illustrate how to interface a Light sensor (LDR) with raspberry pi. **[CO6][L2][3M]**
   C) Design an automatic lightening system with LDR, Light and raspberry pi and write a python program to support the working of that design. **[CO7][L6][7M]**
8. A) Write a short note on PIR sensor. **[CO6][L2][2M]**
   B)Illustrate how to interface a PIR sensor with raspberry pi. **[CO6][L2][3M]**
   C) Design an intruder detection system with PIR sensor, buzzer & raspberry pi and write a python to program support the working of that design. . **[CO7][L6][7M]**
9. A) Explain the principle operation of ultrasonic sensor. **[CO6][L2][2M]**
   B)Illustrate how to interface an ultrasonic sensor with raspberry pi. **[CO6][L2][3M]**
   C) Design a fluid level monitoring system with ultrasonic sensor & raspberry pi and write a python program to support the working of that design. **[CO7][L6][7M]**
10. Design a weather monitoring system with raspberry pi and write a python program send the sensor data to cloud server for monitoring & Visualization of sensor data. **[CO7][L6][12M]**