PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023

Semester : Semester VI - 2020

Course Code : ECE3076

Course Name : Sem VI - ECE3076 - IOT Platforms and Application Development

Program : ECM

Date : 15-APR-2023

Time : 9.30AM - 11.00AM

Max Marks : 60

Weightage : 30%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   (10 X 1 = 10M)

1. A well-defined architecture and the appropriate combination of the technology stack is a key thing that differentiates a good IoT platform from others. Explain the components of IoT archtecture.

(CO1) [Knowledge]

2. Platforms Sitting Between Networks and Applications support processing post-network and pre-application, such as system-level protocol decoding, converting, decrypting, and so forth. What is the role of this platform?

(CO1) [Knowledge]

3. To design a Good IoT Platform There are functions and features that are musts or are nice to have. Identify the challenges and risks that must be considered during defining the IoT functionality of a good IoT platform.

(CO1) [Knowledge]

4. Internet of things(IoT) devices are found everywhere and will enable circulatory intelligence in the future. Communication models are used in IoT have great value. Name the four models that are used in IoT.

(CO1) [Knowledge]

5. The logical design of Internet of Things(IoT) refers to an abstract representation of entities and processes without going into the low-level specifies of the implementation. List the terms that must be studied to understand the logical design of IoT.

(CO1) [Knowledge]

6. An IoT cloud is a massive network that supports IoT devices and applications. This includes the underlying infrastructure, servers and storage, needed for real-time operations and processing. List minimum 2 cloud services.

(CO2) [Knowledge]

7. Message brokers are generally middleware programs that provide asynchronous communication abilities to all connected applications and devices The most common message broker in IoT is MQTT which stands for MQ Telemetry Transport and is based on publish-subscribe-model. Draw the structure of the public subscribe model of communication.

(CO1) [Knowledge]

8. Messages are sent from the device to the cloud in any IoT platform. Which process enables you to send messages from your devices to cloud services in an automated, scalable, and reliable manner.

(CO2) [Knowledge]

9. Data management systems play a major role in IoT applications. We have to decide whether data will be stored in the cloud or on edge memory storage. List 2 methods of popular data management .

(CO1) [Knowledge]

10. A blind stick designed for specially-abled persons who needs to detect objects in between their walk and has been developed to avoid collision with unexpected obstacles, smart stick robot uses ultrasonic range finders for detection. Design and program this complete system.

(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   (3 X 10 = 30M)

11. IoT technology is emerging in a very fast way but at the same time, various platforms coming together are creating a lot of challenges. List and illustrate various design challenges faced to promote the sustainable development of IoT based smart cities.

(CO1) [Comprehension]

12. Consider a situation when an elderly person is at your home whose cardiac condition should be monitored continuously. For this purpose, the patient's heart rate is one of the parameters which indicate his cardiac condition.
A) Identify the sensors and actuators for designing IoT-based smart gadgets for helping an elderly person[4]
B) How the IoT world forum architecture will help to design and develop this project.[6]

(CO1) [Comprehension]

13. Companies are experiencing an unprecedented burden on their IT infrastructure as they struggle to meet growing customer expectations for fast, reliable, and secure services. As they try to increase the processing power and storage capabilities of their IT systems, often these companies find that the development and maintenance of a robust, scalable, and secure IT infrastructure is prohibitively expensive. there is another option; instead of acquiring extra hardware company can embrace cloud computing. Cloud computing is offered different service models which each satisfy a unique set of business requirements. List these platforms and explain them in detail.[1+3+3+3]

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   **(2 X 10 = 20M)**

14. The system monitors the soil moisture level using a sensor and controls the irrigation system. The sensor collects the soil sensor and moisture data from the sensor that will be sent through Raspberry Pi to the cloud. If the level drops below a certain threshold, the actuators are on. The controller sends the data to the cloud, all the recourses are well managed and monitored. The web-based services are used for storing and retrieving the data which is present in the cloud. A cloud application is used for monitoring the moisture level and making decisions. Answer the following:
a) Identify the number of nodes used in this application [2]
b)Which communication Model will be used in this IoT application[4]
c) Identify the Level of IoT application[2]
d) The data computation level is high or Low [2]

<div align="right">(CO1) [Application]</div>

15. A metro city farmer needs assistance in maintaining his farmland using a smart IoT-based agriculture system.
A) Identify the sensors and actuators required to design the systems.[4]
B) Identify which level of deployment is needed for effective design and implementation and draw the diagram.[6]

<div align="right">(CO2) [Application]</div>