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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023**

Semester : Semester VI - 2020

Course Code : ECE3075

Course Name : Sem VI - ECE3075 - IoT Architecture and Protocols

Program : B.Tech. Electronics and Communication Engineering

Date : 12-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.
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PART A

ANSWER ALL THE QUESTIONS

(5 X 2 = 10M)

1. Basically, Things refer to Internet of Things(IoT) Devices that have unique identities and can perform remote sensing, actuating and monitoring capabilities. Communication between things and cloud-based server over the Internet happens on governed rules. Identify the IoT design & components.
(CO1) [Knowledge]
2. An Internet of Things(IoT) system comprises of a number of blocks that provide the system the capabilities for identification, sensing, actuation, communication and management. List and define all the components of the functional blocks.
(CO1) [Knowledge]
3. Machine to Machine(M2M) communication is a direct communication system between the devices using wired or wireless communications channels without any human interaction explain with two points M2M technology is different from IoT?
(CO1) [Knowledge]
4. BLE(BlueTooth Low Range) is designed for low-powered devices can help IoT devices conserve energy by maintaining the devices in sleep mode-until they are connected_____is the wireless technology standard for exchanging data over short distances among fixed and mobile device.
(CO1) [Knowledge]
5. To establish device-to-device or device-to-cloud communication bridge between different communication technologies is essential. Define the communication medium used.
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(3 X 10 = 30M)

6. A soap factory requires development of an automation system using sensors, network communication, data storage, cloud, and application to monitor and control the chemical composition. The Internet of Things World Forum provides a way of visualizing IoT from a technical perspective. Describe the seven layers of IoTWF reference model using the example of the automation system.
(CO1) [Comprehension]
7. Internet of Things is a trend that is driving the ongoing digitization and datafication of the society in many new and amazing ways. Self-driving cars, autonomous manufacturing robots, and remote medical devices that let doctors diagnose patients and even carry out surgery are all possible due to these networks of connected things. Discuss the technological trends that has shaped the IoT.
(CO1) [Comprehension]
8. Internet of Things devices communicate using IoT protocols. Internet protocol is a set of rules that dictates how data sent over the internet. IoT protocols ensure that information from one device or sensor gets read and understood by another device, a gateway, a service. Different IoT protocols have been designed and optimized for different scenarios and usage. Given the diverse array of IoT devices available, using the right protocol in the right context is important. Tabulate all the significant features of all the layers in the IoT protocol.
(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 10 = 20M)

9. The Bangalore Water Supply and Sewerage Board has a plan to install Smart Water Meters in Bangalore in near future. A smart water meters will have a wireless sensor network that collects and sends the data to a gateway, before it gets uploaded to the cloud, where the actual analysis is done to identify leakage, wastage, excessive usage, and even forecast of water consumption. The analysed data then reaches the user interface, which can be on mobile. Your task is to map the activities of all the processes for this system, that will be taken care at all the levels of The IoT World Forum (IoTWF) Standardized Architecture. You can present your solution using a table by showing the activities and applicable resources.
(CO1) [Application]
10. In this present era, the concept of a smart city depends on the technologies adopted to improve people's quality of life. The Smart Traffic Management system is one of the most inevitable factors in the development of a country. In today's world Internet of Things plays an important role in many applications such as smart home, smart transportation systems, etc. Traffic lights come in a variety of colours. Each one of the light has a purpose, and these lights instruct drivers on how to proceed.
Red light ON- A driver should stop.
Yellow light ON- A driver has to slow down and be ready to stop.
Green light ON- A driver can start driving or keep driving.
Design a traffic light controller system using Arduino for the following scenario.
Two red LEDs will glow at the same time, while one green LED will be turned on. Two yellow LEDs will also be turned on for one second. Each time the colour changes from red to green, a yellow LED will light up. In short, the RED LED will glow for 5 seconds, followed by the YELLOW LED for 1 second, and finally, the Green LED for 5 seconds.
(CO2) [Application]