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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION - JULY 2024

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| **Semester : VI & V** | **Date : 10/07/2024** |
| **Course Code : ECE3075** | **Time : 9:30am – 12:30pm** |
| **Course Name : IoT Architecture and Protocols** | **Max Marks : 100** |
| **Program : B.Tech.** | **Weightage : 50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | IoT protocols uses the TCP/IP model. **List the four layers of TCP/IP model**. | (CO1) | [Knowledge] |
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| 2 | Sensors or any IoT devices are a key component that helps to collect live real-time data from the surrounding environment. **List the various types of sensors that supports any IoT system.** | (CO1) | [Knowledge] |
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| 3 | To establish device-to-device or device-to-cloud communication bridge between different communication technologies is essential. **Define the communication medium used.** | (CO2) | [Knowledge] |
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| 4 | The architecture of Internet of Things(IoT) depends upon its functionality and implementation in different sectors. Still, there is a basic process flow based on which IoT is built. **List the names of the basic fundamental layers of an IoT architecture.** | (CO2) | [Knowledge] |
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| 5 | An Application Programming Interface (API) defines the rules that you must follow to communicate with other software systems. **List 2 popular API used in IoT platform designing.** | (CO3) | [Knowledge] |
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| 6 | The deployment of Internet of Thing (IoT) applications consist of the number of processing nodes, cost of implementation, the data processing, and computational complexity. **Describe the level-one deployment model based on these parameters.** | (CO3) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 7 | IoT is a trend that is driving the ongoing digitization and datafication in many new and amazing ways, possible due to these networks of connected things. **Discuss the technological trends that has shaped the IoT.** | (CO1) | [Comprehension] |
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| 8 | Sensing forms the first step and Actuation forms the final step in the whole operation of an IoT application deployment. **Compare between sensors and actuators.** | (CO1) | [Comprehension] |
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| 9 | Internet of Things devices communicate using IoT protocols. Internet protocol is a set of rules that dictates how data sent over the internet. **Tabulate the protocols as applicable to all the layers in the IoT protocol**. | (CO2) | [Comprehension] |
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| 10 | The environment monitoring system consist of multiple nodes at different locations monitors temperature, humidity and Co2 level in a forest. The end nodes are the sensors and that the coordinator node collects data from end nodes as gateway and connects the system to internet. The controller services on coordinator sends collected data to the cloud. Data is stored in a cloud and computation is done in the cloud to modify the data and make decisions. A cloud base application is used to view the data. **Identify the IoT level used in this Application and draw its architecture**. | (CO2) | [Comprehension] |
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| 11 | To access, store and distribute the data through an IoT network we need communication models. The real-time data may be transferred between the clients and the servers as well as between the brokers and subscribers in any IoT network. **Describe the request-response and publish-subscribe communication models.** | (CO2) | [Comprehension] |
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| 12 | An attendance system is required to be implemented across the campus of the university using the star, mesh, and peer-to-peer topologies. **Describe the suitable topologies for long range, medium range and short range.** | (CO3) | [Comprehension] |
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| 13 | The design of a smart home automation application requires choosing a suitable protocol for sending and receiving messages. **Examine and compare the characteristics of CoAP and MQTT protocols to deploy the application**. | (CO3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | Secure communication, resulting in a secure exchange of data between Operational Technology (OT) and Information Technology (IT), is the backbone of digitalization. **Discuss the importance of IT and OT system in Internet of Things systems.** | (CO1) | [Application] |
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| 15 | The design of a smart irrigation system requires to decompose the problem in smaller parts. **Analyze the IoT application by mapping the different technologies with the seven layer of IoT World forum reference model** | (CO2) | [Application] |
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| 16 | IoT designs are dependent on embedded systems and embedded systems are dependent on the memory management. **Explain the concept using a suitable diagram the hierarchical structure of memory.** | (CO3) | [Application] |
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