No. of Printed Pages : **2**

Sl. No.

B2.5-R5 : IOT & Cloud Services

NOTE :

1. Answer question 1 and any FOUR from questions 2 to 7.

2. Parts of the same question should be answered together and in the same sequence.

Total Time : 3 Hours **Total Marks : 100**

1. (a) Define cloud computing and explain how the concept of virtualization and the role of a hypervisor are pivotal in its functionality.

(b) Discuss the importance of load balancing in cloud environments and how it contributes to efficient cloud computing.

(c) Explain the significance of IoT hardware platforms, focusing on the selection criteria for microcontrollers and their role in IoT nodes.

(d) Describe the impact of different IoT connectivity standards (like Zigbee, Bluetooth, BLE, LoRa) on the efficiency and functionality of IoT systems.

(e) Outline the IoT framework, emphasizing the importance of an IoT architecture reference model, including device management and data analysis.

(f) Illustrate the application of IoT and cloud services in agriculture, specifically how they contribute to advancements in crop monitoring and irrigation scheduling.

(g) Discuss the role of cloud services and IoT in healthcare, particularly how they enhance patient care through wearable devices and medical sensors. **(7x4)**

2. (a) What is Arduino component ? What are the roles Arduino components play in any IoT system ? Describe in detail with illustration which Arduino boards are used in the development.

(b) Explain with an example differences between Edge and Fog computing. Elaborate on the various hardware requirements for Edge and Fog computing. **(9+9)**

3. (a) Describe the different layers and models in cloud architecture, specifically focusing on IaaS, SaaS and PaaS.

(b) Compare and contrast the three main cloud deployment models : public, private and hybrid, citing appropriate use cases for each. **(9+9)**

4. (a) Differentiate between various Open source and Commercial IoT cloud platforms that can be used in the implementation of cloud and IoT based solutions. Discuss and highlight the pros and cons of choosing them.

(b) Explain the process and significance of interfacing sensors and actuators with Cortex M series controllers. **(9+9)**

5. (a) What is IAM cloud service ? Discuss. What is the process of authentication using OAuth2 protocol ? Explain all the steps required to gain a successful authentication.

(b) Outline the key IoT protocols within the application and transport layers, such as MQTT, CoAP and AMQP and their roles in IoT communications. **(9+9)**

6. (a) Explain with an example how Point to Point and Point to Multi Point Data transfer happens in a cloud and IoT based solutions. Give example from real life problems.

(b) Address the fundamental aspects of IoT security, highlighting common security threats and best practices to mitigate them. **(9+9)**

7. (a) Illustrate how IoT and cloud services can help to smoothen and enhance Supply Chain Management and its Optimization. Give an example from real world.

(b) Discuss the application of IoT and cloud computing in manufacturing, including Industry 4.0 and predictive maintenance.

(c) What is a protocol stack ? Explain IoT Protocol Stack with neat and clean diagram. Explain the components of stack and role they play in Cloud and IoT based solutions. **(6+6+6)**

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