Code No: R203204L   R20   SET -1

III B. Tech II Semester Regular/Supplementary Examinations, May/June -2024
IOT AND APPLICATIONS
(Com to EEE,ECE,CSE,IT,AIDS,AIML,CSE(AIML),CSE(CS),CSE(DS))

Time: 3 hours   Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Differentiate between Machine-to-Machine (M2M) communication and IoT technology. How do they complement each other? [7M]
    b) What are the fundamental components of IoT devices and gateways, and how do they contribute to the overall IoT ecosystem? [7M]

(OR)

2. a) Discuss the importance of data management in IoT systems and the challenges associated with handling large volumes of data. [7M]
    b) How do IoT technologies impact traditional business processes, and what opportunities do they present for optimization and efficiency? [7M]

UNIT-II

3. a) Define the terms Raspberry Pi ARM a cortex-M class process? [7M]
    b) Explain challenges associated with hard ware in IOT development and how can addressed during design phase? [7M]

(OR)

4. a) How do hardware development kits and development boards simplify the prototyping and testing of IoT solutions? [7M]
    b) What trends do you foresee in the evolution of IoT hardware components, and how might they shape the future of connected devices and applications? [7M]

UNIT-III

5. a) Define Bluetooth Key Versions, and how do they impact security in Bluetooth-enabled IoT devices? [7M]
    b) Provide an overview of the Bluetooth Low Energy (BLE) protocol and its key features for low-power IoT applications. [7M]

(OR)

6. a) Define the terms (i)Protocols MQTT (ii)Zigbee (iii)COAP with example. [7M]
    b) Explain the architecture and component overview of PSoC4 BLE (Programmable System-on-Chip with Bluetooth Low Energy) for IoT development. [7M]

UNIT-IV

7. a) How do encryption techniques ensure the confidentiality and integrity of data stored on cloud platforms or local servers? [7M]
    b) Discuss the role of access control lists (ACLs) and policy-based access control in regulating access to IoT device data within a solution framework. [7M]

(OR)

8. a) Define device data storage on cloud/local server with example. [7M]
    b) What considerations should be taken into account when designing a solution framework for IoT applications to ensure interoperability, scalability, and maintainability over time? [7M]

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UNIT-V

9. a) Discuss the evolution of cloud computing towards fog computing and its implications for IoT deployments. [7M]

   b) How does cloud computing facilitate the integration of IoT devices and data streams into scalable and centralized architectures? [7M]

(OR)

10. a) Describe the process of connecting IoT devices to cloud platforms, including protocols, APIs, and security considerations. [7M]

   b) What are the challenges associated with cloud storage for IoT applications, such as data volume, reliability, and data privacy? [7M]
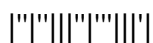
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UNIT-I

1. a) How do IoT platforms facilitate the development, deployment, and management of IoT solutions? [7M]
    b) Expalin some emerging trends and technologies shaping the future of IoT, such as edge computing and AI integration? [7M]

(OR)

2. a) How do regulatory frameworks and compliance requirements impact the deployment and operation of IoT systems in various industries? [7M]
    b) Could you provide examples of successful IoT implementations in different sectors, highlighting their key features and benefits? [7M]

UNIT-II

3. a) Explain the concept of microcontroller units (MCUs) and their significance in the development of IoT solutions. [7M]
    b) What are some common sensors and actuators used in IoT applications, and how are they integrated with hardware platforms like Arduino and Raspberry Pi? [7M]

(OR)

4. a) Discuss the role of input/output (I/O) interfaces in connecting sensors, actuators, and other peripherals to IoT devices. [7M]
    b) How to do real-time operating systems (RTOS) enhance the performance and responsiveness of IoT devices powered by ARM Cortex-M processors? [7M]

UNIT-III

5. a) How do I/O interfaces enable interaction between IoT devices and the physical world, and what are some common examples of I/O peripherals used in IoT projects? [7M]
    b) Discuss the challenges associated with IoT application development, particularly in integrating diverse communication protocols and managing device compatibility. [7M]

(OR)

6. a) Can you walk through the process of developing a simple IoT application using Python/Node.js/Arduino and integrating it with MQTT or Bluetooth for communication? [7M]
    b) What are some best practices for ensuring security, reliability, and scalability in IoT application development, especially when dealing with sensitive data and mission-critical operations? [7M]

UNIT-IV

7. a) Discuss the implementation of device data storage on cloud platforms, including considerations for scalability, reliability, and cost-effectiveness. [7M]
    b) Can you outline the steps involved in setting up a local server for storing IoT device data, and what are the advantages of this approach? [7M]

(OR)

8. a) What are some best practices for securing data transmission between IoT devices and cloud/local servers, especially in untrusted networks? [7M]
    b) Describe the process of implementing authentication mechanisms for IoT devices, such as device certificates, tokens, or biometric authentication. [7M]

UNIT-V

9. a) Discuss the integration challenges that organizations face when connecting IoT devices to cloud platforms, including compatibility, interoperability, and security. [7M]

   b) How can organizations address the challenge of data integration and synchronization between IoT devices and cloud platforms in real-time scenarios? [7M]

(OR)

10. a) Define a case studies about home automation using IOT with detail explanation? [7M]

    b) What strategies can organizations adopt to overcome integration challenges and leverage the full potential of IoT and cloud computing in their operations? [7M]
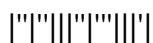
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UNIT-I

1. a) Explain the concept of "Everything as a Service (XaaS)" in the context of IoT. [7M]
        How does it facilitate the deployment and management of IoT solutions?
    b) Define the architectural frame work commonly used in IOT systems? [7M]

(OR)

2. a) What are some of the primary security concerns associated with IoT [7M]
        deployments, and how can they be mitigated?
    b) Explain fundamental technologies used in IOT? [7M]

UNIT-II

3. a) Draw a block diagram illustrating the components and connections typically [7M]
        found in an IoT device powered by an ARM Cortex-M0 processor.
    b) Explain in detail role of ARM cortex – A class processors in IOT along with [7M]
        advantages?

(OR)

4. a) Explain ATM cortex – M0 processor architecture along with Block diagram. [7M]

    b) How does the choice of processor architecture impact the power consumption [7M]
   and battery life of IoT devices?

UNIT-III

5. a) Compare and contrast ZigBee and Bluetooth protocols in terms of their [7M]
        suitability for different IoT scenarios and requirements.
    b) Discuss the characteristics and advantages of CoAP (Constrained Application [7M]
        Protocol) for resource-constrained IoT devices and networks

(OR)

6. a) How do UDP (User Datagram Protocol) and TCP (Transmission Control [7M]
        Protocol) differ in terms of connection establishment, reliability, and overhead
        in IoT communications?
    b) Explain the role of Bluetooth technology in IoT connectivity and the evolution [7M]
        from traditional Bluetooth to Bluetooth Low Energy (BLE).

UNIT-IV

7. a) Compare and contrast the benefits and limitations of storing IoT device data on [7M]
        cloud platforms versus local servers.
    b) What are the challenges associated with managing unstructured data generated [7M]
        by IoT devices, and how can they be addressed in a solution framework?

(OR)

8. a) Explain the role of authentication and authorization mechanisms in ensuring [7M]
        the security of IoT devices and data within a solution framework.
    b) How do access control policies and role-based permissions contribute to the [7M]
        secure operation of IoT applications?

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UNIT-V

9. a) Describe a home automation project leveraging IoT technologies, including the devices involved and the automation tasks performed. [7M]

    b) What is cloud analytics, and how does it enable organizations to derive insights from IoT data stored in cloud platforms? [7M]

(OR)

10. a) Explain the concept of cloud computing and its role in supporting IoT applications, including scalability, flexibility, and cost-effectiveness. [7M]

    b) Differentiate between cloud computing and fog computing, highlighting the advantages of fog computing in edge processing and latency-sensitive IoT applications. [7M]
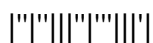
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UNIT-I

1. a) What is the primary concept behind the Internet of Things (IoT), and how does it differ from traditional internet-connected devices? [7M]
   b) Can you provide an overview of the architectural framework commonly used in IoT systems? [7M]

(OR)

2. a) What are some key design principles that should be considered when developing IoT solutions? [7M]
   b) Could you explain the role of networking in IoT and how it enables communication between devices? [7M]

UNIT-II

3. a) What are the primary differences between Arduino and Raspberry Pi in terms of hardware architecture and use cases within IoT projects? [7M]
   b) Can you explain the role of ARM Cortex-A class processors in IoT applications, and what advantages do they offer over other processor types? [7M]

(OR)

4. a) Could you provide an overview of the ARM Cortex-M0 processor architecture and its suitability for low-power IoT applications? [7M]
   b) What are embedded devices, and how do ARM Cortex-M class processors contribute to their functionality in IoT systems? [7M]

UNIT-III

5. a) What are the key considerations when developing IoT applications, particularly regarding communication, sensing, and actuation functionalities? [7M]
   b) Can you provide examples of IoT applications that leverage different communication protocols such as MQTT, ZigBee, CoAP, UDP, TCP, and Bluetooth? [7M]

(OR)

6. a) Explain the role of programming APIs in IoT application development, and how does Python, Node.js, and Arduino facilitate communication with IoT devices? [7M]
   b) What are the primary features and use cases of MQTT (Message Queuing Telemetry Transport) in IoT communication? [7M]

UNIT-IV

7. a) What are the key components of a solution framework for IoT applications, and how do they contribute to the overall system architecture? [7M]
   b) Explain the process of device integration within an IoT solution framework, including device discovery, registration, and management. [7M]

(OR)

8. a) How is data acquisition performed in IoT applications, and what are the methods for integrating data from diverse sources and formats? [7M]
   b) Discuss the importance of data integration within the context of IoT applications, and how does it facilitate real-time decision-making and insights generation? [7M]

UNIT-V

9. a) Can you provide examples of IoT case studies in industrial automation, [7M]
       showcasing how IoT technologies have improved efficiency, safety, and
       productivity?
    b) Discuss a mini project based on IoT in transportation, highlighting its [7M]
       objectives, implementation, and benefits.

(OR)

10. a) How has IoT been applied in agriculture, and what are some examples of IoT [7M]
       solutions addressing challenges in farming and crop management?
    b) Share a case study illustrating the use of IoT in healthcare, emphasizing patient [7M]
       monitoring, remote diagnostics, or smart healthcare systems.

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