RAMESH RESHIYA CREATE A FILE

Here's the full solution for the BCA/B.Sc. IT Sem-4 IOT Preliminary Exam (25 Marks) from the paper.

Q1: Answer the Following (10 Marks)

Option 1

1. History & Evolution of IoT:

- The concept of IoT (Internet of Things) originated in the early 1980s, with a Coke machine at Carnegie Mellon University, which was the first internet-connected appliance.
- In 1999, Kevin Ashton coined the term "Internet of Things" while working at Procter & Gamble.
- The evolution moved from RFID systems, to M2M (Machine-to-Machine) communication, then to the modern IoT powered by cloud, sensors, and AI.
- By the 2010s, IoT became mainstream with smart homes, wearables, and industrial automation.

2. Key Concepts & Definitions of IoT:

- IoT is a system of interconnected devices that collect and exchange data using embedded sensors.
- Core concepts:
 - Sensors/Devices to collect data
 - Connectivity via Wi-Fi, Bluetooth, etc.
 - Data Processing in the cloud or locally
 - User Interface to act upon insights
- IoT enables real-time decision-making, automation, and optimization.

Option 2

1. Applications & Use Cases of IoT:

- Smart Homes Lights, thermostats, appliances controlled remotely (e.g., Alexa, Nest).
- Healthcare Wearables to monitor vitals, smart beds, remote diagnostics.
- Industrial IoT (IIoT) Predictive maintenance, automated production.
- **Agriculture** Smart irrigation, soil sensors, weather monitoring.
- **Transportation** Fleet tracking, connected vehicles.
- **Retail** Smart shelves, inventory management.

2. Challenges & Opportunities in IoT:

- Challenges:
 - Security and privacy
 - Standardization issues
 - High data volume management
 - Power consumption

• Opportunities:

- Business automation
- Data-driven decision-making
- Enhanced customer experience
- o Creation of smart cities and infrastructure

Q2: Answer the Following (10 Marks)

Option 1

1. IoT Architecture Overview:

Typical IoT architecture has 4 layers:

- 1. **Perception Layer** Sensors and devices that collect data
- 2. **Network Layer** Transfers data (Wi-Fi, 4G, Zigbee)
- 3. **Middleware Layer** Data processing, filtering, storage (Cloud, Edge)
- 4. **Application Layer** User interaction (apps, dashboards)

2. Technologies Behind IoT:

- RFID, NFC, Bluetooth, Zigbee, LoRaWAN for connectivity
- Cloud Computing for storage and processing
- Big Data & AI for analytics
- Embedded Systems for device control
- Security Protocols to protect data

Option 2

1. Conceptual Framework of IoT:

- IoT includes **Things**, **Internet**, **Data**, and **Users**.
- It works in a loop:
 - 1. Sensing environment
 - 2. Connecting to network
 - 3. Data processing and decision-making
 - 4. Acting or providing feedback

2. M2M Communication:

- Machine-to-Machine (M2M) is direct communication between devices without human intervention.
- Uses protocols like MQTT, CoAP.
- Examples: Smart meters, vehicle-to-vehicle communication, remote sensors.

Q3: Answer the Following (5 Marks)

Option 1: Sensors, Digital Sensors & Actuators

- **Sensor**: A device that detects physical changes (e.g., temperature, light) and converts them into signals.
- **Digital Sensor**: Provides output in digital form (e.g., digital thermometer).

• Actuator: Converts electrical signals into physical action (e.g., motor, servo).

Example: A smart light system uses a light sensor (detects ambient light), a microcontroller, and an actuator (turns light on/off).

Option 2: RFID Technology

- **RFID (Radio Frequency Identification)** is a wireless system to transfer data using radio waves.
- Components:
 - o Tag − stores data
 - o **Reader** reads tag information
 - o **Antenna** transmits signal
- **Types**: Passive (no battery), Active (battery-powered)
- Use Cases: Inventory tracking, passports, toll collection, pet ID tags

Let me know if you'd like this formatted as a PDF or want a mock test based on this paper!