1. Question

What is the function of the RCC_APB2ENR register in STM32?
a) Enable clock for advanced peripherals
b) Enable clock for GPIO ports
c) Enable clock for APB1 peripherals
d) Configure the clock source

Answer

 a) Enable clock for advanced peripherals

2. Question

Find the mistake in this code snippet: LDR R0, [R1, #-2]

a) Negative offset not allowed
b) Invalid register
c) No error
d) Incorrect syntax

Answer

 a) Negative offset not allowed

3. Question

Which register in STM32 is used to configure the system clock source?
a) RCC_CFGR
b) RCC_CR
c) RCC_PLLCFGR
d) RCC_CIR

Answer

 a) RCC_CFGR

4. Question

This table summarizes key instructions from the ARM Cortex-M0 instruction set, highlighting the type and its description. Fill the table (A,B,C,D&E) appropriately.

Instruction	Type	Description
_____A_____	Data Processing	Moves the value from one register to another.
MUL	Arithmetic Operation	_____B_____
_____C_____	Load/Store	Stores data from a register into memory.
CMP	_____D_____	Compares two registers and sets the condition flags.
BEQ	_____E_____	Branches if the zero flag is set (if equal).

Answer

A = MOV

B = Multiplies two register values.
C = STR
D = Comparison
E = Conditional Branch (Each 1 Mark)

5. Question

What is the purpose of the EXTI_IMR register in STM32?
a) Configure interrupt masks
b) Set interrupt priorities
c) Clear interrupt pending bits
d) Enable clock for external interrupts

Answer

a) Configure interrupt masks

6. Question

Select an ARM Cortex-M processor, that requires low power consumption and cost-effective smart home energy monitoring system.
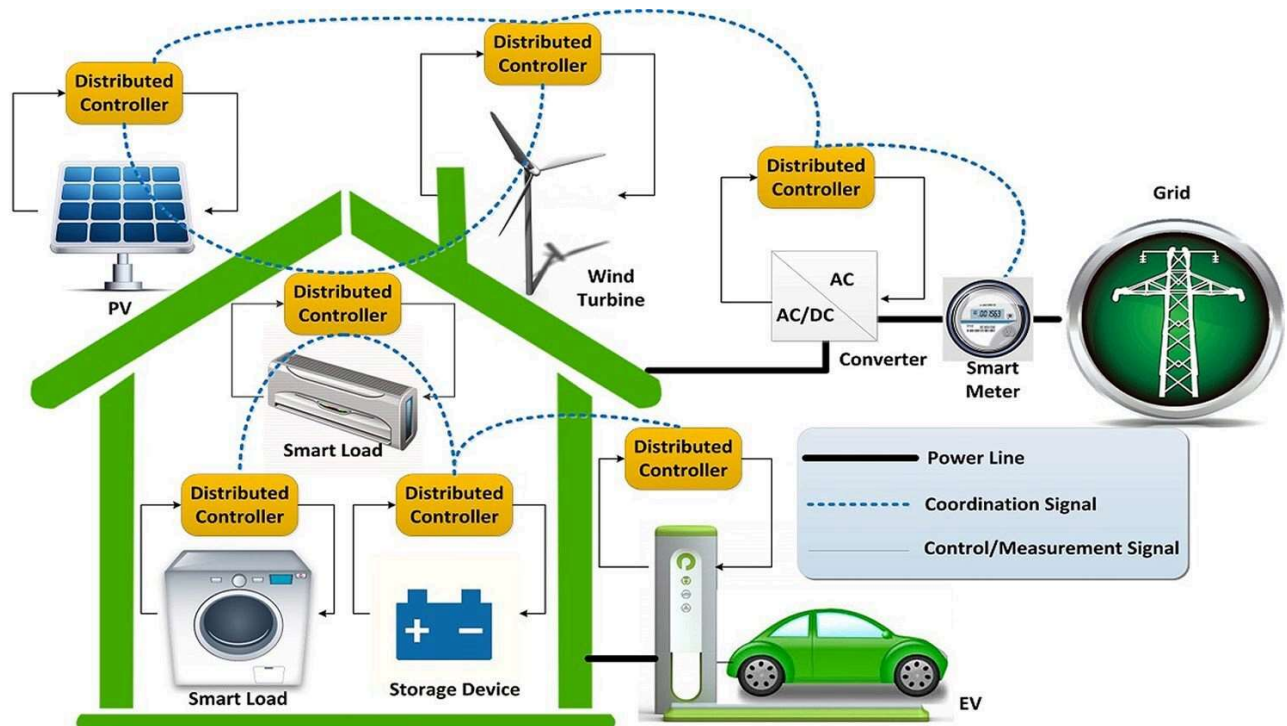

Figure : Smart home energy monitoring system

Answer

The ARM Cortex-M0+ processor is suitable. (2 Marks)
Because it offers ultra-low power consumption and cost-effectiveness, making it ideal for a smart home energy monitoring system. (1 Mark)

7. Question

An engineer is designing a real-time air quality monitoring system for a large industrial complex. The system consists of multiple IoT sensors distributed across the facility, including gas sensors to detect harmful gases like CO2, NO2, and methane. Each sensor module needs to communicate its data to a central microcontroller for processing and then send this data to a cloud server for analysis and visualization.

For communication between the sensor modules and the central microcontroller, USART communication is considered. However, other options also avalable to use like I2C or SPI protocols.

1. Based on the given scenario of an air quality monitoring system, evaluate the suitability of using USART communication for this application.
2. Compare it performance with I2C and SPI protocols by focusing on aspects like communication speed, number of devices, data integrity, complexity, and power consumption.
3. Conclude which communication protocol is the most suitable for this scenario with reason.

Answer

1. USART is suitable as it supports full-duplex communication protocol, meaning it can send and receive data simultaneously. Typically used for point-to-point communication between two devices. (2 Marks)

2. Comparatively USART is slower, support only point to point communication, reliable, easy method and consumes less power than others. (2 Marks)

3. Given that the scenario involves multiple sensors across the facility, USART's point-to-point communication might not be scalable for this use case. Its moderate speed and low power consumption make it good for long-distance communication between fewer devices. (2 Marks)

8. Question

Which of the following is a privileged mode of operation in ARM Cortex-M processors?
a) User mode
b) Handler mode
c) Thread mode
d) Debug mode

Answer

b) Handler mode

9. Question

In a real-time IoT application using the ARM Cortex-M0 processor to monitor and control a smart home system, the design includes 1 GB of RAM. Considering that the ARM Cortex-M0 processor has 32 address lines, analyze the suitability of the address lines for accessing 1 GB of RAM and discuss how this impacts the system's design and functionality.
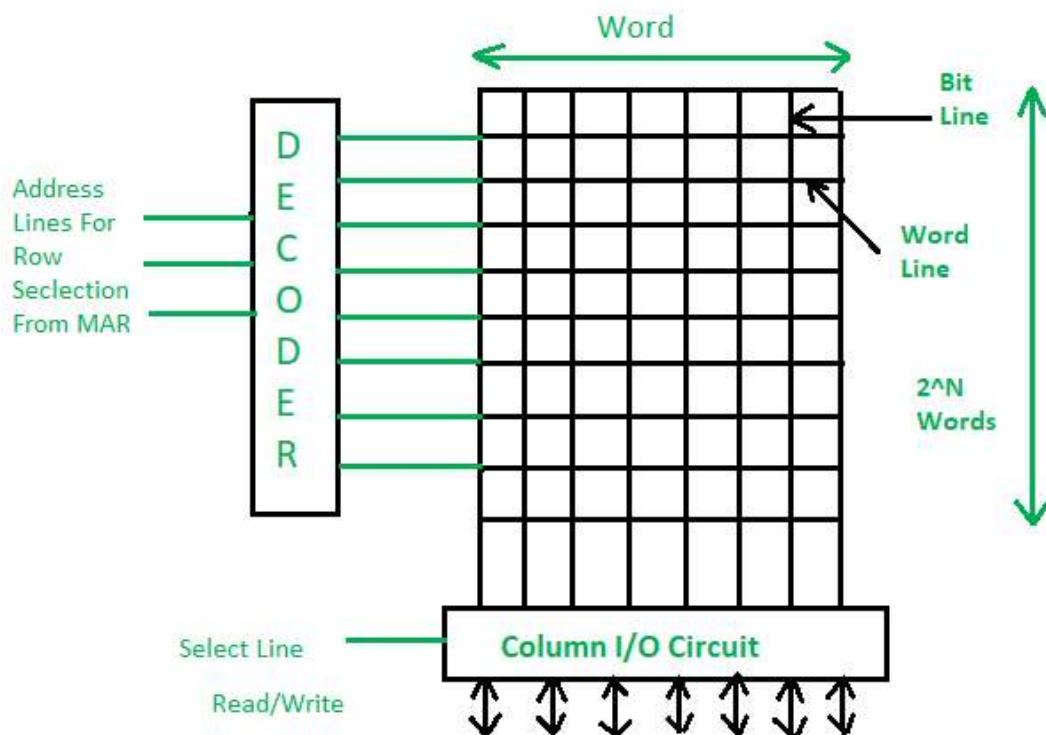

Figure : Memory Organisation

Answer

Suitability of 32 Address Lines:
The ARM Cortex-M0 processor has 32 address lines, which allows it to address up to 4 GB of memory (2^{32} bytes). (2 Marks)
Given that the system design includes 1 GB of RAM, this is well within the addressable range of the processor. (2 Marks)

10. Question

Indicate the correctness of the Assertion and Reason.

Assertion: The ARM Cortex-M4 processor is suitable for audio signal processing applications.

Reason: It includes DSP extensions and an optional Floating Point Unit

Answer

Both the assertion and reason are correct. (2 Marks)

11. Question

In a temperature monitoring IoT application using the ARM Cortex-M0, a specific register is crucial for managing the stack, which supports function calls and local variable storage. Analyze the suitable register and tell its management and critical role in such applications.
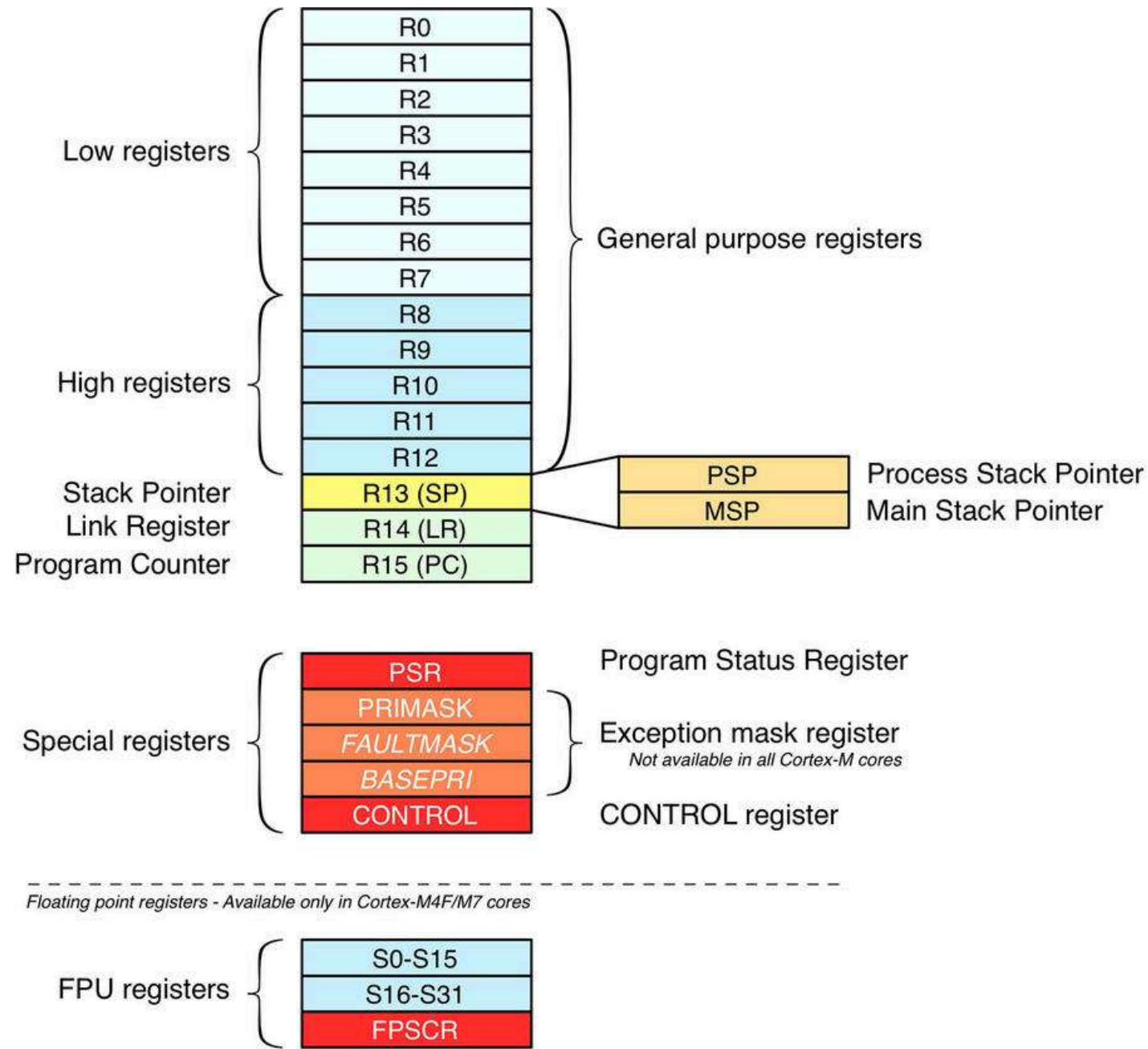

Figure: Processor register set on ARM Cortex-M Microprocessor

Answer

The stack pointer (SP) in the ARM Cortex-M0 can be used. (2 Marks)

It is a special area of memory that supports function calls and local variable storage.

The stack pointer keeps track of the top of the stack, growing downwards in memory. It ensures that each function call and interrupt has the necessary context to execute correctly without interfering with other operations. (2 Marks)

12. Question

Which of the following is crucial for application servers in LoRa networks?

a) Real-time data processing

b) High-energy consumption

c) Limited data storage

d) Power management

Answer

a) Real-time data processing

13. Question

For a smart city IoT solution focused on traffic management, a deployment model was designed with multiple edge devices deployed at various intersections. What is the need for the edge device & its role in this application? and Why the Information View should be thoroughly developed and refined in this case?
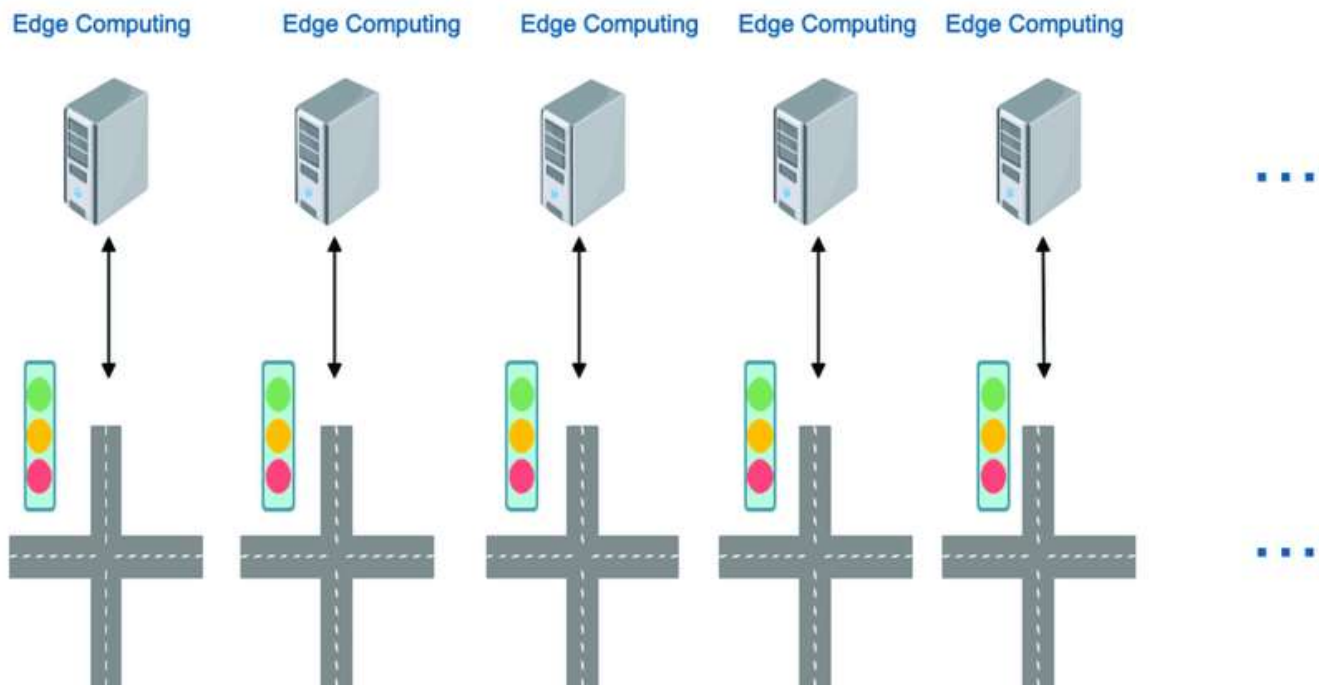

Figure: Traffic management system with multiple edge devices

Answer

Edge device will redcue the data size to be uploaded in the cloud and reduces time and cost. (2 Marks)

Edge computing device will process the data in the user end itself. (2 Marks)

The Information View is crucial. It defines how data from the various intersections will be collected, processed, and shared, ensuring the data flows efficiently and accurately to support traffic management decisions. (2 Marks)

14. Question

Indicate the correctness of the Assertion and reason.

Assertion: In a smart healthcare system, the IoT Deployment View must prioritize security and privacy configurations.

Reason: Healthcare data is highly sensitive, and any breach can lead to significant legal and ethical consequences.

Answer

Both the assertion and reason are correct. (2 Marks)

15. Question

Which of the following is a key concern in the operational view of IoT architecture?
a) Device configuration and firmware updates
b) Data encryption methods
c) Network topology
d) Business process modelling

Answer

a) Device configuration and firmware updates

16. Question

Which of the following layers in the IoT reference model is responsible for data acquisition and device control?
a) Connectivity Layer
b) Device Layer
c) Application Layer
d) Data Processing Layer

Answer

b) Device Layer

17. Question

Which sensor is commonly used for detecting motion?
a) Temperature sensor
b) Proximity sensor
c) Accelerometer
d) Light sensor

Answer

c) Accelerometer

18. Question

The functional view of an IoT architecture includes which of the following components?
a) Sensors, data processing units, and applications
b) Deployment strategies and network design
c) User interfaces and data visualization tools
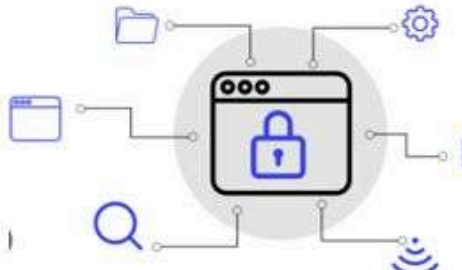d) Physical layout of devices and connectivity options

Answer

a) Sensors, data processing units, and applications

19. Question

Match the following Layers with their respective functions in an IoT-based system for remote monitoring and control applications.

	Layers		Function		Diagram
A1	Sensing Layer	B2	Collects data from the environment using IoT sensors	C3	
A2	Application Layer	B4	Provides a user interface for farmers to view and control	C1	
A3	Network Layer	B3	Facilitates communication between layers and devices	C6	
A4	Security Layer	B1	Ensures secure transmission of data across all components	C5	
A5	Cloud Storage Layer	B6	Stores large amounts of crop and environmental data	C2	
A6	IoT Gateway Layer	B5	Acts as a bridge between sensors and cloud/server infrastructure	C4	

Answer

A1-B2-C3

A2-B4-C1

A3-B3-C6

A4-B1-C5

A5-B6-C2

A6-B5-C4

20. Question

In a smart agriculture IoT system, sensors are deployed across fields to monitor various parameters such as soil moisture, temperature, humidity, and light intensity. These sensors communicate with a central gateway, which processes the data and sends it to the cloud. Based on this data, automated irrigation and fertilization can be controlled remotely, ensuring optimal growth conditions for crops.

How does the functional view of an IoT system apply to the Smart Agriculture system in terms of sensing and data processing?

Answer

In the IoT functional view, the sensing layer is responsible for capturing real-time data such as soil moisture and temperature. In the Smart Agriculture system, these sensors collect the necessary environmental data and send it to the gateway for initial

processing. (2 Marks)

The data processing layer then processes the sensor data to determine whether any action, like irrigation, is needed, ensuring that the system functions efficiently by controlling resources such as water and nutrients. (1 Mark)

21. Question

Indicate the correctness of the Assertion and reason.

Assertion: In a remote industrial equipment monitoring system, continuous performance analysis is crucial for predictive maintenance.
Reason: Predictive maintenance relies on real-time data to anticipate equipment failures before they occur.

Answer

Both the assertion and reason are correct. (2 Marks)

22. Question

A smart agricultural system uses IoT to monitor soil moisture levels, weather conditions, and crop health. Considering the IoT Reference Model and the Functional View, which IoT components would be prioritize in ensuring real-time data collection and decision-making for irrigation control? Evaluate the decision.
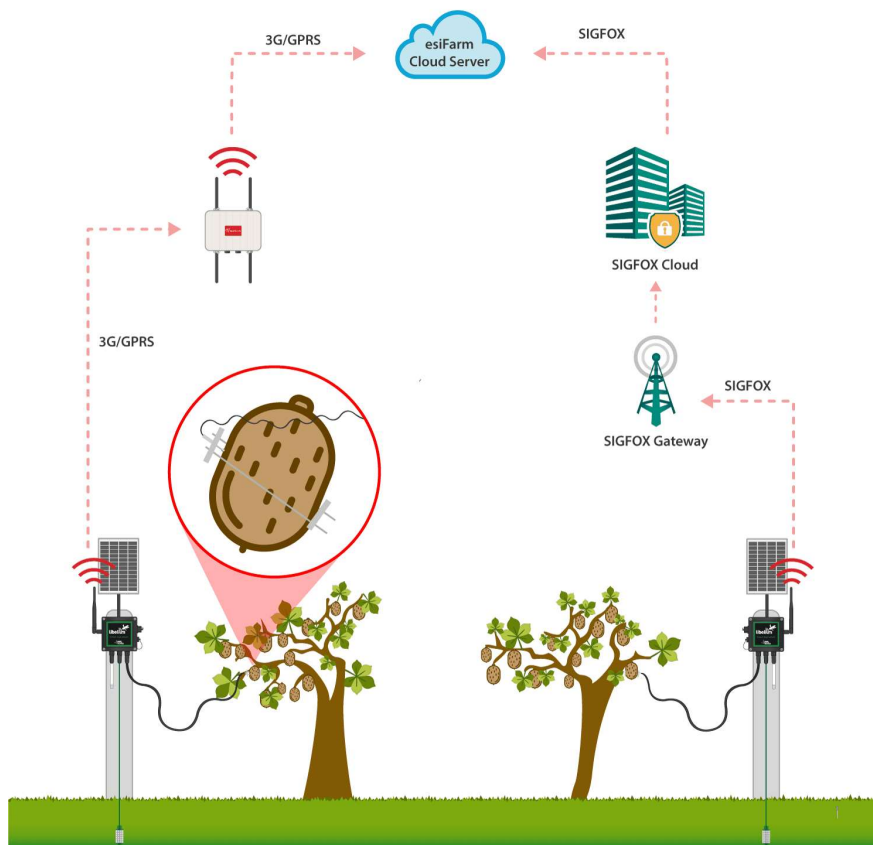

Figure : smart agricultural system

Answer

Edge devices will be prioritized with sensors for soil moisture and weather conditions, along with a gateway to process data locally. (2 Marks)

This setup ensures real-time data processing and quick decision-making for irrigation without relying heavily on cloud processing, which could introduce latency. (3 Marks)

23. Question
Which IoT layer is responsible for converting raw data into meaningful information?

a) Device Layer
b) Connectivity Layer
c) Data Processing Layer
d) Application Layer

Answer

c) Data Processing Layer

24. Question

6LoWPAN allows IPv6 packets to be sent over IEEE 802.15.4 networks.
a) True
b) False

Answer

a) True

25. Question

What happens if an MQTT subscriber does not receive a message?

a) The message is resent immediately

b) The subscriber requests the message again

c) The message is lost if QoS 0 is used

d) The connection is reset

Answer

c) The message is lost if QoS 0 is used

26. Question

Which of the following tools is commonly used to configure a LoRaWAN gateway?

a) Gateway web interface

b) Command-line interface (CLI)

c) LoRaWAN mobile app

d) Network analyzer

Answer

a) Gateway web interface

27. Question

Rearrange the steps for implementing a smart building management system where temperature and humidity sensors send data via LoRa, and device control (e.g., turning on/off HVAC systems) is done through MQTT.

1. Application server processes the sensor data and detects that temperature is too high.
2. MQTT broker receives the command and forwards it to the actuator node.
3. LoRa-based temperature sensors transmit data to the gateway.
4. The gateway forwards the sensor data to the application server.
5. The actuator node receives the MQTT message and turns on the HVAC system.
6. The application server sends a control command via MQTT to lower the temperature.
7. LoRa communication transmits the data over a long range to the gateway.
8. HVAC system cools the room as per the control instructions.

Answer

3 → 7 → 4 → 1 → 6 → 2 → 5 → 8. (Each 0.5 Mark)

28. Question

Indicate the correctness of the Assertion and reason.
Assertion: In a smart grid application using LoRaWAN communication, an open-source LoRaWAN server is essential for managing sensor data efficiently.

Reason: Open-source LoRaWAN servers allow for cost-effective customization and scalable network management in large IoT deployments.

Answer

Both the assertion and reason are correct. (2 Marks)

29. Question

What is the purpose of an application server in IoT device control using LoRa communication?

a) Manage the LoRaWAN protocol

b) Process, store, and control data from end nodes

c) Encrypt data at the network layer

d) Assign IP addresses to end nodes

Answer

b) Process, store, and control data from end nodes

30. Question

According to the statistical information, LoRa provides a 10% packet loss rate in urban environments with heavy interference but compensates with adaptive data rates (ADR) and high penetration through obstacles like buildings.
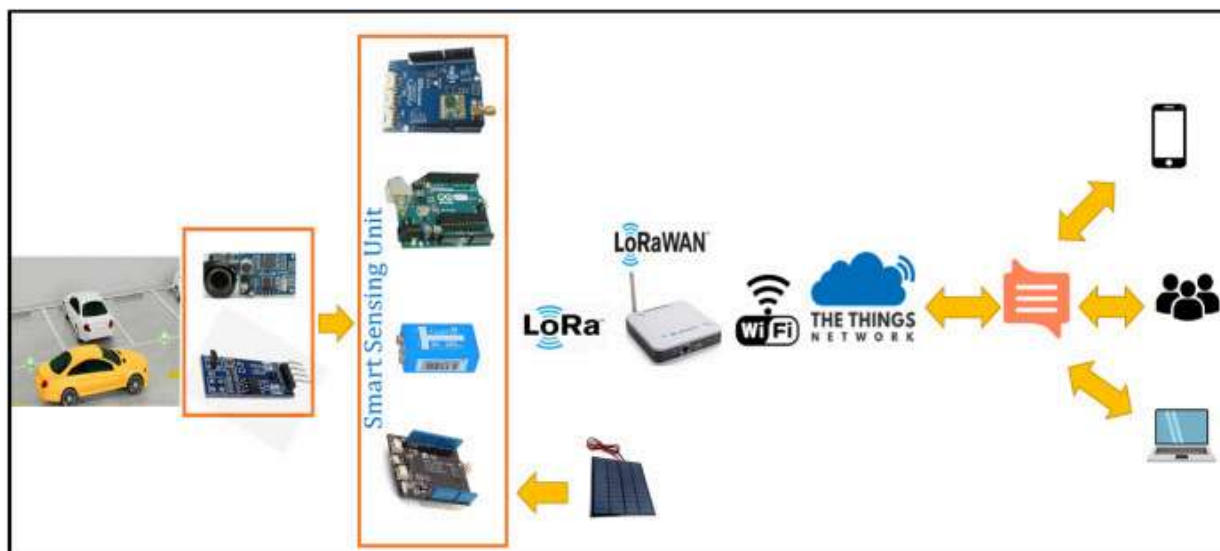

Figure : LoRaWAN architecture based Smart parking

1. Analyze how LoRaWAN architecture could optimize parking space management in a smart city.

2. Given the necessity for real-time updates, is LoRaWAN suitable for this application, or should alternatives like LTE-M be considered?

3. What are the important factors to consider when selecting and configuring a LoRaWAN gateway to ensure efficient communication and data management?

Answer

1. LoRaWAN's adaptive data rates (ADR) help overcome interference and ensure that critical data (such as parking space availability) is transmitted efficiently despite a 10% packet loss in dense urban environments.
LoRaWAN's strong penetration through buildings ensures reliable communication between parking sensors and gateways, which is essential in a city landscape. (2 Marks)

2. While LTE-M offers lower latency and more reliable real-time communication, it comes at the cost of higher power consumption and shorter battery life, making LoRaWAN the better choice for long-term deployments where power conservation is key. (2 Marks)

3. Considerations should include the gateway's location for maximum coverage, network scalability to handle multiple sensors, and frequency configuration to minimize interference. (2 Marks)

31. Question

1. Identify the difference between LoRa and LoRaWAN using the figure below.

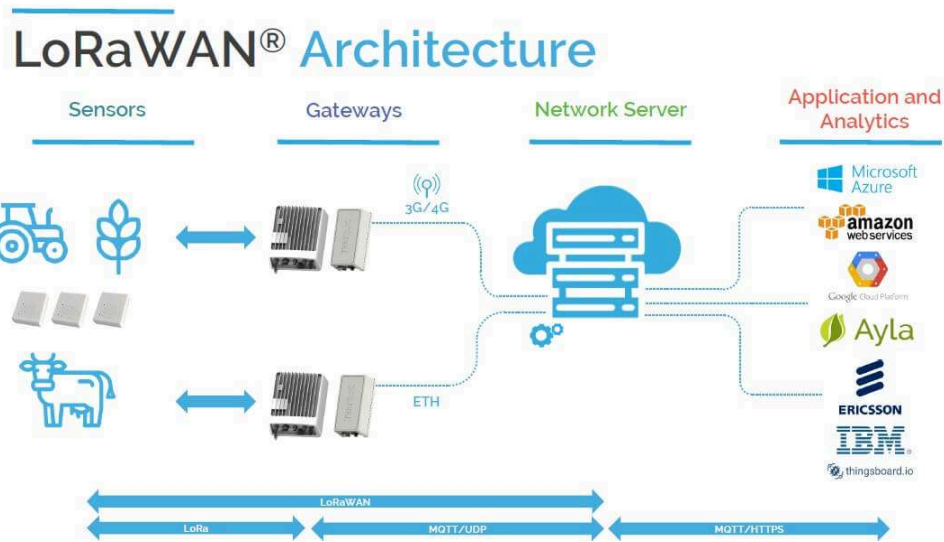2. Does the network server store any information about the IoT controller or gateway?

Figure : LoRaWAN Architecture

Answer

1. LoRa is a modulation technique, while LoRaWAN is a communication protocol architecture that leverages LoRa for transmitting and receiving data. (2 Marks)

2. Yes, the network server stores the gateway and controller IDs, which are used for device identification and communication management. (2 Marks)

32. Question

Which of the following is a typical requirement for connecting a LoRaWAN gateway to a network server?

a) IP address configuration

b) Firmware upgrade

c) End node pairing

d) Channel bandwidth adjustment

Answer

a) IP address configuration

33. Question

What is the primary function of a LoRaWAN server in an IoT network?

a) Manage sensor data

b) Forward data packets to application servers

c) Handle frequency allocation

d) Authenticate and route data between gateways and application servers

Answer

d) Authenticate and route data between gateways and application servers

34. Question

In a remote agricultural monitoring system using LoRaWAN for soil moisture sensors, is it feasible to use the 433 MHz frequency instead of 865 MHz for managing data and controlling irrigation schedules? Will the system support this configuration?
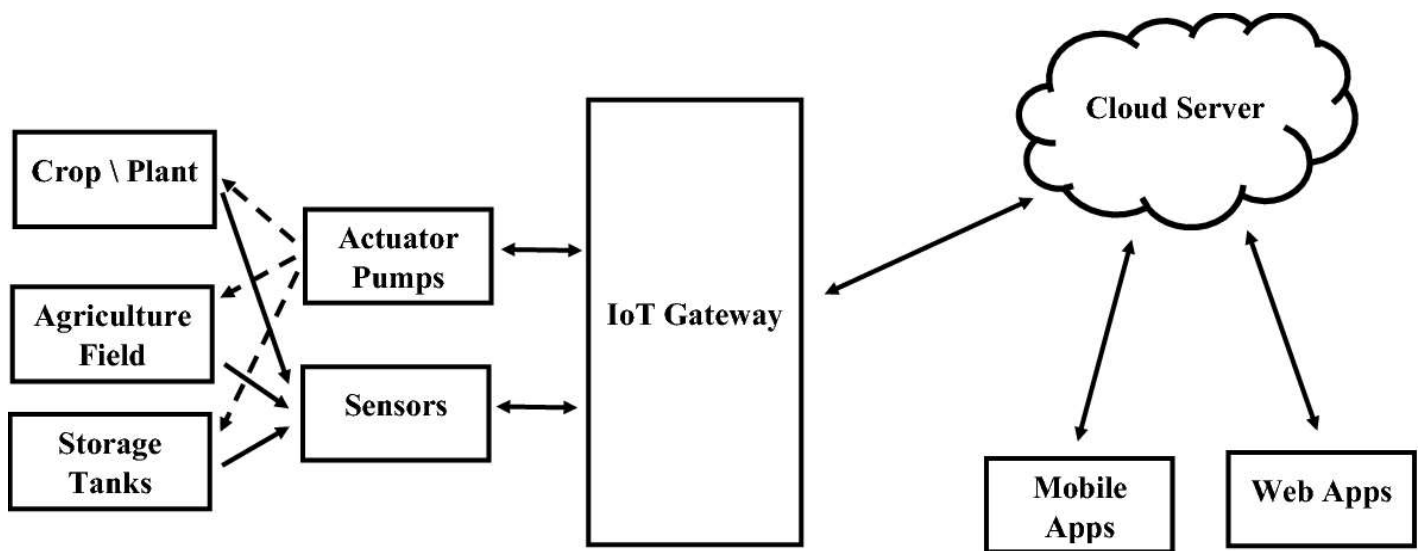
Figure: Smart Agriculture

Answer

1. 433 MHz is typically used in for short-range, low-power IoT applications. However, it has lower data rates and coverage compared to 865 MHz. (1 Mark)

2. 865-867 MHz is allocated for LoRaWAN, offering better network reliability and is more suited for long-range agricultural setups. (2 Marks)

In summary, the system can support 433 MHz only if regional regulations allow it, but using 865 MHz would provide better coverage and performance for managing irrigation schedules.

---

35. Question

LoRa Sensing Node (Sender) is functioning as a sensor reading and the sender for transmitting data to the gateway. After sending data, sensing node has been going to sleep for a while, and wake up afterward. The flowchart diagram of a sensing node is given below.
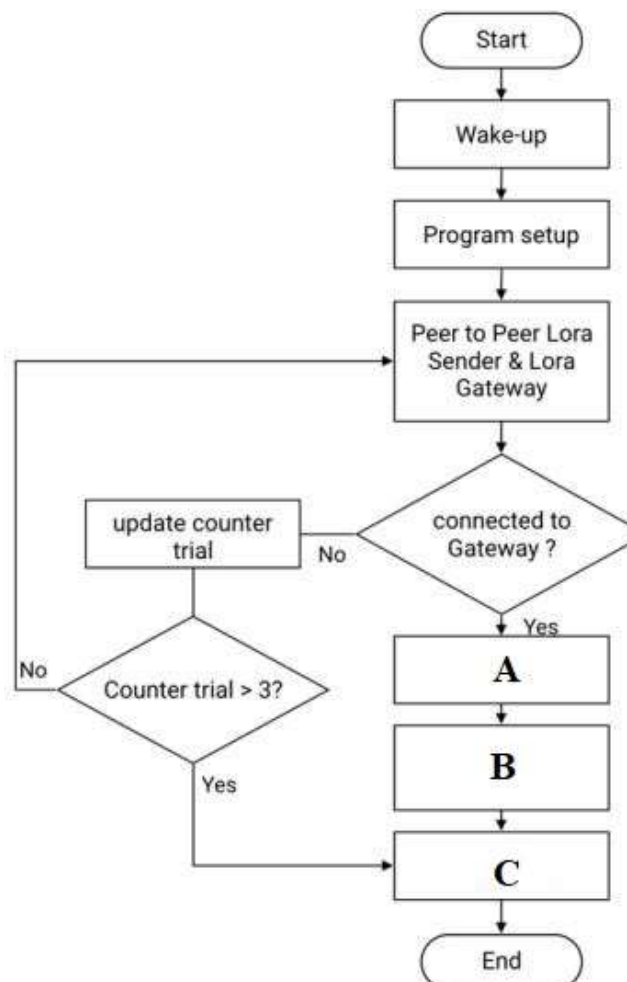

Figure : LoRa sender

1. Find the appropriate steps (A,B&C) from the given list:
* Sending to gateway

* Deep Sleep
* Reading sensor
 2. Analyse the impact on the flow without wakeup steps at the beginning.

Answer

 1.A = Reading sensor (1 Mark)
 B = Sending to gateway (1 Mark)
 C = Deep Sleep (1 Mark)
 2. Without wake-up steps, the devices remain in sleep mode, resulting in delays in transmitting or receiving data. This can disrupt real-time applications like smart water metering or traffic monitoring, where timely responses are critical. (2 Marks)

36. Question

Which of the following is an important step in configuring a LoRaWAN gateway?

a) Setting up end device MAC addresses

b) Configuring frequency bands based on regional regulations

c) Installing encryption keys on the gateway

d) Setting up IP addresses for end devices

Answer

b) Configuring frequency bands based on regional regulations

37. Question

In a smart healthcare system that uses IoT devices to monitor patient health, why end-to-end encryption is needed during device communication? Will it supports data breaching?
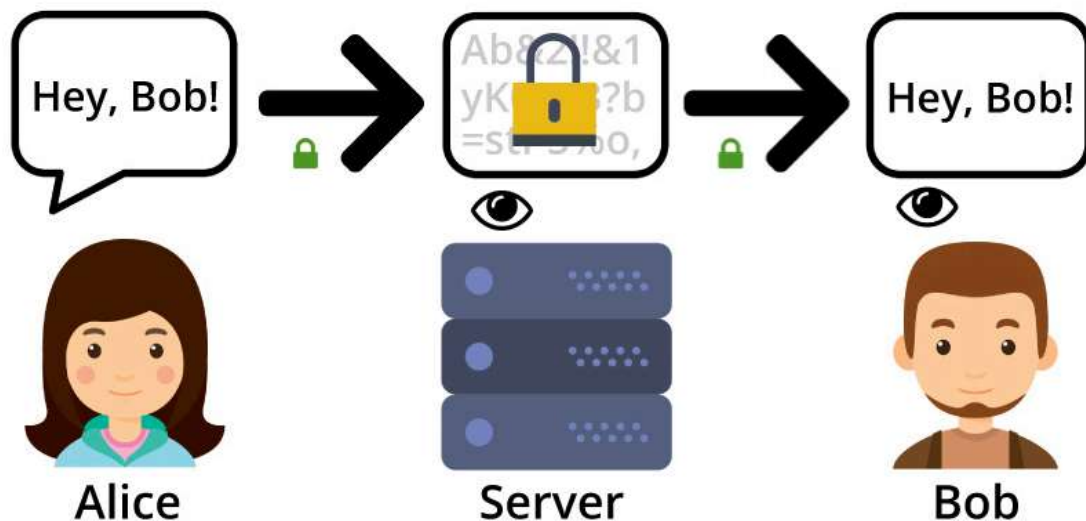

Figure: end-to-end encryption

Answer

End-to-end encryption ensures safety while sending sensitive health data is from the IoT device to the receiving server. (2 Marks)

Yes, it prevents unauthorized access or breaches during transmission. (1 Mark)

38. Question

The following HTML and JavaScript code snippet is intended to display a simple message "Welcome to IoT World!" when a button is clicked. However, it contains several syntax errors. Identify and correct the errors in the code.

```
<!DOCTYPE html>
<html>
<head>
<title>IoT Welcome</title>
function displayMessage() {
document.getelementbyid("message").innerText = "Welcome to IoT World!";
<script>
</head>
```

```
<body>
<h1>IoT Application</h1>
<button onclick="displaymessage();">Click Me!</button>
<p id="message"></p>
</html>
</body>
```

Answer

```
<!DOCTYPE html>
<html>
<head>
<title>IoT Welcome</title>
<script>
function displayMessage() {
    document.getElementByID("message").innerText = "Welcome to IoT World!"; (1 Marks)
</script> (1 Mark)
</head>
<body>
    <h1>IoT Application</h1>
    <button onclick="displayMessage();">Click Me!</button> (1 Marks)
    <p id="message"></p>
</body> (1 Mark)
</html> (1 Mark)
```

39. Question

Match the following technologies with their corresponding roles in a real-time IoT application for energy management.

Technology		Role		Code Snippet
A1	Apache Apache 2.0	B1	Client-side scripting	C1	`<style>` p { font-size: 32px; color: red; text-align: center; } `</style>`
A2	JSON {JSON}	B2	Handles HTTP requests and responses	C2	Client ← Request / Response → Server

A3	JavaScript JS	B3	style sheet	C3	// Function is called, the return value will end up in x
					 let x = myFunction(4, 3);
					 function myFunction(a, b) {
					 // Function returns the product of a and b
					 return a * b; }

A4	CSS CSS	B4	Data processing and storage format	C4	{ "employees":[{"firstName":"John", "lastName":"Doe"}, {"firstName":"Anna", "lastName":"Smith"}, {"firstName":"Peter", "lastName":"Jones"}] }
A5	jQuery jQuery	B5	greatly simplifies JavaScript programming	C5	$("button").click(function(){ $("h1, h2, p").toggleClass("blue"); });

Answer
  A1-B2-C2
  A2-B4-C4
  A3-B1-C3
  A4-B3-C1
  A5-B5-C5

40. Question
Say True or False: CSS can be used to create responsive designs that adapt to different screen sizes.
a) True
b) False

Answer
  a) True

41. Question
In a Modbus protocol-based industrial automation system, the master device is unable to receive responses from multiple slave devices.
1. Decide whether implementing a timeout mechanism or upgrading to a higher bandwidth would be a better solution for addressing this issue. Justify your choice.
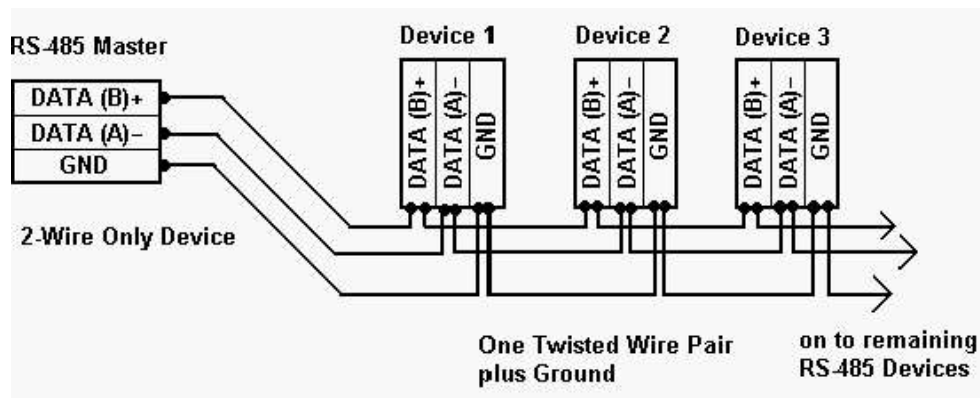2. Provide the reason for using MODBUS protocol for this application.

Figure: Modbus Protocol.

Answer
  1. Implementing a timeout mechanism would be a better solution, as it ensures the master does not wait indefinitely for responses, improving system efficiency. Upgrading bandwidth might help, but the core issue lies in handling delayed responses, which timeout can address. (2 Marks)
  2. Modbus protocol is used due to its simplicity and wide adoption in industrial environments, allowing efficient communication between sensors, controllers, and gateways. Its compatibility with both serial (RTU) and TCP/IP networks makes it versatile for various IoT use cases. (2 Marks)

42. Question
Say True or False: Data encryption alone can ensure complete privacy and security in IoT systems.
a) True
b) False

Answer
  b) False

43. Question
Which HTTP method is commonly used to submit form data to a server?
a) GET
b) POST
c) PUT
d) DELETE

Answer

b) POST

44. Question

In a smart traffic management system, justify the suitability of JSON or XML for data interchange between the server and client applications.
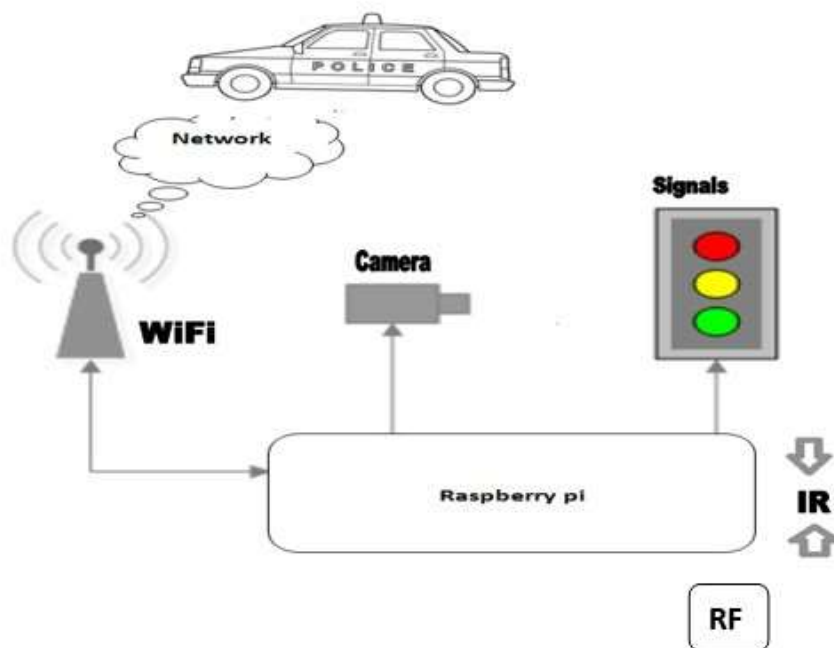

Figure : smart traffic management system

Answer

JSON is Suitable (1 Mark)

Because it is lightweight and faster to parse, making it ideal for the real-time demands of a smart traffic management system where quick data exchange is critical. (2 Marks)

45. Question

In the context of IoT, what is the primary function of a back-end application?
a) Collecting sensor data
b) Processing and analyzing data
c) Managing wireless communication
d) Controlling hardware devices

Answer

b) Processing and analyzing data

46. Question

Which of the following is a common security challenge in IoT devices?
a) High energy consumption
b) Weak authentication mechanisms
c) Excessive data storage
d) High bandwidth requirements

Answer

b) Weak authentication mechanisms

47. Question

A simple IoT jQuery program that creates a basic UI for controlling an LED (simulated) using IoT home automation webpage is given below. This program allows to toggle the LED on or off using jQuery for interaction and updates the UI accordingly. Complete the missing block of codes suitably.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
```

```html
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>IoT LED Control</title>
<script src="https://code.jquery.com/jquery-3.6.0.min.js"></script>
</head>
<body>
  <h1>IoT LED Control</h1>
  <button id="led-toggle">Turn ON ____A____
  <p id="led-status">LED is OFF</p>
  <script>
   $(document).ready(function(){
     let ledOn = false;
     $('#led-toggle').click(function(){
       ledOn =____B_____ ;
       $('#led-status').text(ledOn ? 'LED is ON' : 'LED is OFF');
       $(this).text(ledOn ? ___C___ : 'Turn ON');
     });
   });
  </script>
____D___
</html>
```

Answer

A = </button> (1 mark)
B = !ledOn (1 mark)
C = 'Turn OFF' (1 mark)
D = </body> (1 mark)

48. Question

Which protocol is commonly used for communication between industrial electronic devices?
a) HTTP
b) MQTT
c) Modbus
d) MySQL

Answer

c) Modbus

49. Question

A smart traffic management system in a city collects real-time traffic data using IoT sensors. Use the table below to select the preferred approach for each scenario by mapping the requirements for each selection.

Scenario	Requirements	Option A	Option B
1. Data Privacy: Encryption Scope	Protects data from the source to prevent interception.	Encryption at Device Level	Centralized Encryption Platform
2. Data Trust: Storage Technology	Enables transparency with immutable records.	Block chain	Centralized Database
3. Data Transmission: Method	Secures communication channels from vulnerabilities.	Public Wi-Fi	Private Network with VPN
4. Data Access: Security Technique	Only authorized users can access critical data.	End-to-End Encryption	Simple Authentication
5. Data Availability: Backup Strategy	Ensures high availability and disaster recovery.	Cloud-Based Replication	On-Premises Backups
6. Data Aggregation: Communication Protocol	To ensure reliable and low-latency message delivery.	MQTT	HTTP

Answer

1. Encryption at Device Level: This approach ensures the data is protected from the point of origin, reducing interception risks. (1 Mark)
2. Blockchain: It offers immutable records and ensures trust without depending on a centralized authority. (1 Mark)
3. Private Network with VPN: It provides a secure communication channel, unlike public Wi-Fi, which is prone to attacks. (1 Mark)
4. End-to-End Encryption: This technique ensures only authorized entities can access sensitive data, enhancing security. (1 Mark)
5. Cloud-Based Replication: Cloud backup ensures availability and quick recovery in case of hardware failures or data loss. (1 Mark)

50. Question

What is the role of encryption in securing IoT platforms for smart cities?
a) Increasing communication speed
b) Protecting data from unauthorized access
c) Reducing device power consumption
d) Decreasing network latency

Answer

b) Protecting data from unauthorized access

51. Question

What is the main security threat during data aggregation in IoT for smart cities?
a) Device overload
b) Unauthorized access to data
c) Increased power consumption
d) Slow data transmission

Answer

b) Unauthorized access to data

52. Question

A smart energy management system in a city collects consumption data from various households and businesses. To ensure efficient data storage and analysis on the city's data platform, which of the following storage solutions would be the most appropriate? Provide one reason for the choice.

Figure : Cloud Vs On premise Database

1. Cloud Storage with Distributed Databases
2. On-Premise Data Warehousing

Answer

Cloud Storage with Distributed Databases. (2 Marks)
Reason: It offers scalability and fault tolerance, ensuring that the platform can handle growing data volumes from smart meters while maintaining continuous availability. (1 Mark)

53. Question

Say True or False: Trust management in IoT platforms helps improve the security and reliability of smart city applications.
a) True
b) False

Answer

a) True

54. Question

In a smart health care system, the platform must securely aggregate data from various sensors placed in human body. To ensure data security and privacy, should the platform implement local encryption at the sensor level or rely on server-side encryption? Provide two reasons for the decision.
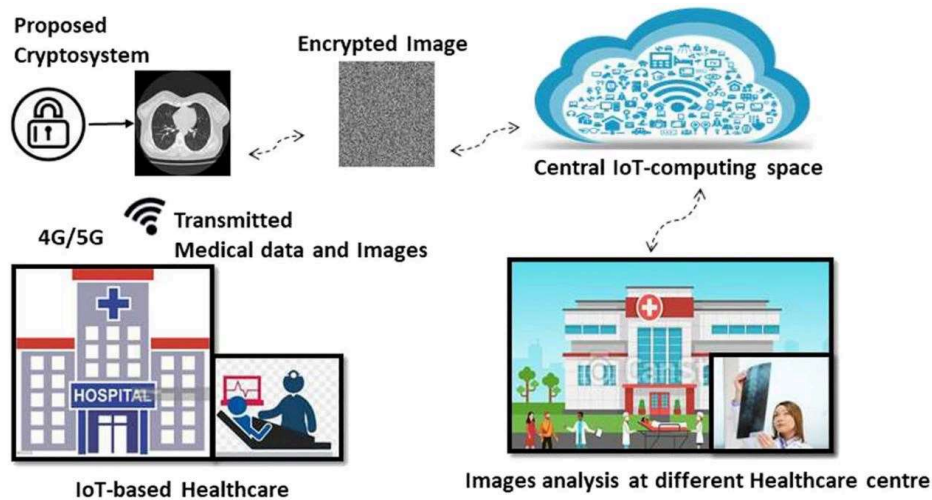

Figure: Smart Health Care

Answer

The platform should implement local encryption at the sensor level . (2 Marks)
Because (1) it protects data as soon as it is generated, preventing potential attacks during transmission, and (2) it ensures that even if communication channels are compromised, the data remains encrypted and unreadable to attackers. (3 Marks)

55. Question

Indicate the correctness of the Assertion and reason
Assertion: In a smart city IoT platform, secure data aggregation is crucial to ensure accurate analysis and decision-making.
Reason: Aggregating data from multiple sources without sufficient encryption may expose the platform to potential breaches, compromising both data integrity and privacy.

Answer

Both the assertion and reason are true. (2 Marks)

56. Question

In a smart city, which type of data is most sensitive to privacy concerns?
a) Device firmware data
b) Personal health and location data
c) Traffic data
d) Weather data

Answer

b) Personal health and location data

57. Question

Which of the following should be implemented to secure a platform during the initial setup?
a) Disabling security features
b) Using strong passwords and encryption
c) Collecting data from all available devices
d) Increasing the number of sensors

Answer

b) Using strong passwords and encryption

58. Question

Which method is commonly used to ensure secure data aggregation?

a) Data filtering
b) Hashing and encryption
c) Reducing the number of IoT devices
d) Data duplication

Answer

b) Hashing and encryption

59. Question

Match the security techniques with their corresponding purpose and diagrams used for data aggregation in smart city IoT platforms.

	Application		Security Technique		Purpose
A1		B1	Digital Signatures	C1	Strengthens security for critical system access
A2		B2	Block chain	C2	Safeguards real-time video feed
A3		B3	Data Masking	C3	Protects data from sensors to platform
A4		B4	Secure Data Tunnelling (VPN)	C4	Verifies authenticity of parking sensor data
A5		B5	End-to-End Encryption	C5	Conceals sensitive data during transmission
A6		B6	Multi-Factor Authentication (MFA)	C6	Provides immutable audit trail of operations

Answer

A1-B5-C3
A2-B4-C2
A3-B2-C6
A4-B3-C5
A5-B6-C1
A6-B1-C4 (Each 1 Marsk)

60. Question

Indicate the correctness of the Assertion and reason
Assertion: In a smart city's IoT data platform, block chain technology can not significantly enhance the trust between various stakeholders, such as citizens, businesses, and government agencies.

Reason: Blockchain provides a transparent and immutable ledger that records all transactions, making it impossible for malicious entities to alter or delete data once recorded.

Answer

The assertion is false and reason is Correct statement. (2 Marks)