Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	5
Subject Code	PCIT-111	Subject Title	Internet of Things
Mid Semester Examination (MSE) No.	1	Course Coordinator	Prof. Himani Sharma
Max. Marks	24	Time Duration	1 hour 30 minutes
Date Of MST		Roll Number	2104554

Note: Attempt all questions

Q.No.	Question	COs, RBT Level	Marks
Q1	Interpret the following statement: "Internet of Things is a vision where things become 'smart' and function like living entities by sensing, computing and communicating through embedded devices which interact with remote objects or persons through the Internet or Near-Field Communication (NFC) etc."	CO1, L3	2
Q2	Analyze the components required for the remote authentication system to open the door with the help of a program to simulate the opening of the door.	CO1, L4	2
Q3	Interpret the following statement: a) Machine to machine communication refers to communication of machines with others of the same type, mostly for monitoring and also for control purposes using M2M architecture. b) Describe the features of the Apple smart watch.	CO1, L3 / CO2, L2	4
Q4	Elucidate the various domains and services capabilities in ETSI high level architecture for applications and services in the internet of ATM machine.	CO2, L2	4
Q5	Compare and Contrast the various wired and wireless communication mediums for Internet application and services. a) NFC b) BT LE c) Zigbee IP d) Wi-fi.	CO2, L4	4
Q6	Design and develop the Architectural view of an M2M application for a car for traffic reports, control and monitoring	CO2, L6	8

Course Outcomes (CO)
Students will be able to

1	Analyze IOT in terms of Conceptual framework
2	Illustrate the design principles for connected devices and web- connectivity
3	Discriminate the functionality of IP and MAC addresses along with the application layer protocols
4	Outline cloud computing paradigm for data Collection, storage and computing services
5	Elucidate sensor technology for sensing the real world using analog and digital sensors
6	Outline security tomography of large networks and layered attacker model

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana

Department of Information Technology

Program	B.Tech.(IT)	Semester	5
Subject Code	PCIT-111	Subject Title	Internet of Things
Mid Semester Examination (MSE) No.	2	Course Coordinator	Prof. Himani Sharma
Max. Marks	24	Time Duration	1 hour 30 minutes
Date Of MST		Roll Number	

Note: Attempt all questions

Q.No.	Question	COs,RBT Level	Marks
Q1	Interpret the following statement: "6LowPAN is an adaptation layer protocol for the IEEE 802.15.4 network devices.The devices are the nodes having low speed and low power.They are the WPAN nodes of a multiple device mesh network.IPV6 receives and transmits from adaptation layer".	CO3, L3	2

Q2	Analyze the IOT data to be pushed in the cloud using JSON Format (code) :
	    Location ="FOE"
	    room = "CR2046"
	    user_ id = x
	    Sensors = ["DHT11","BMP 180"]
	    DHT 11_ humidity = 57
	    DHT 11_ temperature=23
	    BMP 180_ pressure=1009.
	Note - Replace X with your full Student ID(10 digits).
		CO4, L4	2

Q3	Interpret the following statement: a) WSN is defined as a network in which each sensor node connects wirelessly and has the capability of computation, aggregation and analysis.WSN consists of spatially distributed autonomous devices(sensors). b) Describe the latest features of Xively(Pachube/ CoSM), Nimbits Cloud platform.	CO5, L3 CO4, L2	4
Q4	a) Elucidate the Security Model and Access Control for Industrial usage in IOT. b) Describe participatory sensing used for city traffic densities management using IOT.	CO6, L2 CO5, L2	4

Q5	Compare and Contrast the DHT11/ DHT22 sensors with Arduino code to print temperature and humidity Readings.	CO5, L4	4
Q6	Design and develop the Architectural view of RFIDs for a supply chain Application for container tracking system and Internet Connected Smart Home Services and Monitoring.	CO5, L6	8

Course Outcomes (CO)
Students will be able to

1	Analyze IOT in terms of Conceptual framework
2	Illustrate the design principles for connected devices and web- connectivity
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RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

[Total No. of Questions: 09]

[Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)
Semester: 5th
Name of Subject: Internet of Things
Subject Code: PCIT-111
Paper ID: 16442
Scientific calculator is Not Allowed

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A   [Marks: 02 each]

Q1.

a) Define IoT and its vision.

b) Illustrate the IoT conceptual framework.

c) Explain the technology behind IoT.

d) Discuss the LINUX significance in IoT deployment.

e) Write a program using python for reading data from a sensor (simulated as a random number generator) and sending it to an IoT platform (simulated as printing the data).

f) Discuss about Ardiuno/ Raspberry Pi with a neat sketch.

Part – B   [Marks: 04 each]

Q2. List the properties of constrained environments. Use examples of connected devices, such as streetlights, RFIDs, and ATMs with the Internet.

Q3. Distinguish among the various wired and wireless communication mediums with one another, in detail.

Q4. Explain about the privacy and vulnerabilities of IoT. What are the security requirements and threat analysis in IoT?

Q5. Analyse in detail the architectural components of IOT and M2M architecture.

Page 1 of 2

P.T.O.

Q6. Discuss cloud deployment models. Monitor and evaluate the data collection, storage and computing with cloud computing.

Q7. In terms of web connectivity, justify the functionalities of the JSON Format, Tag Length Value Format, and MIME?

<div align="center">

Part – C   [Marks: 12 each]

</div>

Q8. Differentiate between ETSI, ITU-T and Two Domain Models with reference to the functions and capabilities of each layer along-with real-time example demonstration.

<div align="center">OR</div>

Explain the usage of cloud platforms for IoT applications and services with examples of Xively (Pachube/COSM) and Nimbits.

Q9. Elucidate sensor technology for sensing the real world using analog and digital sensors, and examples for sensing devices for IoT and M2M.

<div align="center">OR</div>

Examine functions for source identity-management, identity-establishment, device messages access-control, message-integrity, message non-repudiation and availability in IoT applications and services.

<div align="center">

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Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	6
Subject Code	PCIT-111	Subject Title	Internet of Things
Mid Semester Examination (MSE) No.	1	Course Coordinator	Mohanjit Kaur Kang
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST		Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Define IoT and its role towards society in terms of its vision.	CO1, L1	2
Q2	Illustrate the IoT architecture.	CO1, L4	2
Q3	Explain M2M with architecture and give examples IOT applications.	CO1, L3	4
Q4	What are the domains and services capabilities in ETSI high level architecture for applications and services in internet of ATM machines?	CO2, L1	4
Q5	Distinguish among the various wired and wireless communication mediums with one another, in detail.	CO2, L5	4
Q6	Differentiate between ETS and ITU-T along with architecture diagrams.	CO2, L5	8

Course Outcomes (CO)

Students will be able to

1	Analyze IoT in terms of conceptual framework
2	Illustrate the design principles for connected devices and web-connectivity
3	Discriminate the functionality of IP and MAC addresses along-with the application layer protocols
4	Outline cloud computing paradigm for data collection, storage and computing services
5	Elucidate sensor technology for sensing the real world using analog and digital sensors
6	Outline security tomography of large networks and layered attacker model

RBT Classification	Lower Order Thinking Levels (LOTS)			Higher Order Thinking Levels (HOTS)		
RBT Level Number	L1	L2	L3	L4	L5	L6
RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana

Department of Information Technology

Program	B.Tech.(IT)	Semester	6
Subject Code	PCIT-111	Subject Title	Internet of Things
Mid Semester Examination (MSE) No.	2	Course Coordinator	Mohanjit Kaur Kang
Max. Marks	24	Time Duration	1 hour 30 minutes
Date of MST		Roll Number	

Note: Attempt all questions

Q. No.	Question	COs, RBT level	Marks
Q1	Define Lightweight M2M communication Protocol.	CO2, L2	2
Q2	Illustrate the cloud deployment models.	CO4, L4	2
Q3	Discuss M2M with architecture and give examples IOT applications.	CO2, L2	4
Q4	Describe the usage of communication gateways protocols SOAP, REST, RESTful and web socket by connected devices and web.	CO2, L2	4
Q5	Contrast the various functions of Application layer Protocols.	CO3, L3	4
Q6	Explain the usage of cloud paradigm for data collection, storage and computing for IoT applications and services with example.	CO4, L4	8

Course Outcomes (CO)

Students will be able to

1	Analyze IoT in terms of conceptual framework
2	Illustrate the design principles for connected devices and web-connectivity
3	Discriminate the functionality of IP and MAC addresses along-with the application layer protocols
4	Outline cloud computing paradigm for data collection, storage and computing services
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RBT Level Name	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating

Guru Nanak Dev Engineering College, Ludhiana
Department of Information Technology

Program	B.Tech.(IT)	Semester	5
Subject Code	PCIT-111	Subject Title	Internet of Things
Mid Semester Examination (MSE) No.	2	Course Coordinator	Prof. Himani Sharma
Max. Marks	24	Time Duration	1 hour 30 minutes
Date Of MST		Roll Number	

Note:Attempt all questions

Q.No.	Question	COs,RBT Level	Marks
Q1	Interpret the following statement: "6LowPAN is an adaptation layer protocol for the IEEE 802.15.4 network devices.The devices are the nodes having low speed and low power.They are the WPAN nodes of a multiple device mesh network.IPV6 receives and transmits from adaptation layer".	CO3, L3	2
Q2	Analyze the IOT data to be pushed in the cloud using JSON Format (code) : *Location ="FOE"* room = "CR2046" user_ id = x Sensors = ["DHT11","BMP 180"] DHT 11_ humidity = 57 DHT 11_ temperature=23 BMP 180_ pressure=1009. Note - Replace X with your full Student ID(10 digits).	CO4, L4	2
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Q4	a) Elucidate the Security Model and Access Control for Industrial usage in IOT. b) Describe participatory sensing used for city traffic densities management using IOT.	CO6, L2 CO5, L2	4

use case
misuse case
threat analysis
Pornography

vulnerability

Q5.	Compare and Contrast the DHT11/ DHT22 sensors with Arduino code to print temperature and humidity Readings.	CO5, L4	4
Q6.	Design and develop the Architectural view of RFIDs for a supply chain Application for container tracking system and Internet Connected Smart Home Services and Monitoring.	CO5, L6	8

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Guru Nanak Dev Engineering College, Ludhiana

Department of Information Technology

Program	B.Tech.(IT)	Semester	5
Subject Code	PCIT-111	Subject Title	Internet of Things
Mid Semester Examination (MSE) No.	1	Course Coordinator	Prof. Himani Sharma
Max. Marks	24	Time Duration	1 hour 30 minutes
Date Of MST		Roll Number	

Note: Attempt all questions

Q.No.	Question	COs, RBT Level	Marks
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Q2	Analyze the components required for the remote authentication system to open the door with the help of a program to simulate the opening of the door.	CO1, L4	2
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Q4	Elucidate the various domains and services capabilities in ETSI high level architecture for applications and services in the internet of ATM machine.	CO2, L2	4
Q5	Compare and Contrast the various wired and wireless communication mediums for Internet application and services. a) NFC b) BT LE c) Zigbee IP d) WI-fi.	CO2, L4	4
Q6	Design and develop the Architectural view of an M2M application for a car for traffic reports, control and monitoring.	CO2, L6	8

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[Total No. of Questions: 09]   [Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)
Semester: 5th
Name of Subject: Internet of Things
Subject Code: PCIT-111
Paper ID: 16442
Scientific calculator is Not Allowed

Max. Marks: 60

Time Allowed: 03 Hours

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A   [Marks: 02 each]

Q1.

a) Define IoT and its vision.

b) Illustrate the IoT conceptual framework.

c) Explain the technology behind IoT.

d) Discuss the LINUX significance in IoT deployment.

e) Write a program using python for reading data from a sensor (simulated as a random number generator) and sending it to an IoT platform (simulated as printing the data).

f) Discuss about Ardiuno/ Raspberry Pi with a neat sketch.

Part – B   [Marks: 04 each]

Q2. List the properties of constrained environments. Use examples of connected devices, such as streetlights, RFIDs, and ATMs with the Internet.

Q3. Distinguish among the various wired and wireless communication mediums with one another, in detail.

Q4. Explain about the privacy and vulnerabilities of IoT. What are the security requirements and threat analysis in IoT?

Q5. Analyse in detail the architectural components of IOT and M2M architecture.

P.T.O.

Q6. Discuss cloud deployment models. Monitor and evaluate the data collection, storage and computing with cloud computing.

Q7. In terms of web connectivity, justify the functionalities of the JSON Format, Tag Length Value Format, and MIME?

Part – C

[Marks: 12 each]

Q8. Differentiate between ETSI, ITU-T and Two Domain Models with reference to the functions and capabilities of each layer along-with real-time example demonstration.

OR

Explain the usage of cloud platforms for IoT applications and services with examples of Xively (Pachube/COSM) and Nimbits.

Q9. Elucidate sensor technology for sensing the real world using analog and digital sensors, and examples for sensing devices for IoT and M2M.

OR

Examine functions for source identity-management, identity-establishment, device messages access-control, message-integrity, message non-repudiation and availability in IoT applications and services.

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[Total No. of Questions: 09]　　　　　　　　[Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)　　　**EVENING**
Semester: 5th
Name of Subject: Internet of Things　　　**0 7 DEC 2023**
Subject Code: PCIT-111
Paper ID: 16442
Scientific calculator is Not Allowed

Max. Marks: 60

Time Allowed: 03 Hours

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

<center>Part – A</center>　　　　　　　　　　**[Marks: 02 each]**

Q1.

   a) Define IoT and its vision.

   b) Illustrate the IoT conceptual framework.

   c) Explain the technology behind IoT.

   d) Discuss the LINUX significance in IoT deployment.

   e) Write a program using python for reading data from a sensor (simulated as a random number generator) and sending it to an IoT platform (simulated as printing the data).

   f) Discuss about Ardiuno/ Raspberry Pi with a neat sketch.

<center>Part – B</center>　　　　　　　　　　**[Marks: 04 each]**

Q2. List the properties of constrained environments. Use examples of connected devices, such as streetlights, RFIDs, and ATMs with the Internet.

Q3. Distinguish among the various wired and wireless communication mediums with one another, in detail.

Q4. Explain about the privacy and vulnerabilities of IoT. What are the security requirements and threat analysis in IoT?

Q5. Analyse in detail the architectural components of IOT and M2M architecture.

<center>**Page 1 of 2**</center>

Q6. Discuss cloud deployment models. Monitor and evaluate the data collection, storage and computing with cloud computing.

Q7. In terms of web connectivity, justify the functionalities of the JSON Format, Tag Length Value Format, and MIME?

Part – C [Marks: 12 each]

Q8. Differentiate between ETSI, ITU-T and Two Domain Models with reference to the functions and capabilities of each layer along-with real-time example demonstration.

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Explain the usage of cloud platforms for IoT applications and services with examples of Xively (Pachube/COSM) and Nimbits.

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[Total No. of Questions: 09]   EVENING   [Total No. of Pages: 2]

Uni. Roll No. ....   02 JAN 2023

Program: B.Tech. IT (Batch 2018 onward)

Semester: 5/ (2018)

Name of Subject: Internet Of Things

Subject Code: PCIT-111

Paper ID: 16442

Time Allowed: 03 Hours   Max. Marks: 60

NOTE:

1) Parts A and B are compulsory

2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice

3) Any missing data may be assumed appropriately

Part – A   [Marks: 02 each]

Q1.

a) Define IoT and its vision.

b) Illustrate the IoT conceptual framework.

c) Explain the technology behind IoT.

d) Describe Logical design using python in detail.

e) Name the Need For sensors in IoT.

f) Justify how a linux Os is useful in IoT.

Part – B   [Marks: 04 each]

Q2. Distinguish among the various wired and wireless communication mediums with one another, in detail.

Q3. List the properties of constrained environments. Use examples of connected devices, such as streetlights, RFIDs, and ATMs with the Internet.

Q4. Elucidate sensor technology for sensing the real world using analog and digital sensors, and examples for sensing devices for IoT and M2M.

Page 1 of 2

Q5. Examine functions for source identity-management, identity establishment, device messages access-control, message-integrity, message non-repudiation and availability in IoT applications and services.

Q6. Explain the deployment and operational view, resources, services, virtual entities, users in an IoT system by considering a Parking lot example.

Q7. Explain the concepts involved in Raspberry Pi. Discuss in detail about Arduino with neat sketch.

Part – C   [Marks: 12 each]

Q8. Differentiate between ETSI, ITU-T and Two Domain Models with reference to the functions and capabilities of each layer along-with real-time example demonstration.

OR

a) Define clustering. Summarize the function of Action Prediction model. Identify the purpose of Data Preprocessing.

b) When the data is called as Week Type Data? What is meant by predictive analysis? List out the various phases of CRISP-DM model and explain each with diagram.

Q9. Explain the usage of cloud platforms for IoT applications and services with examples of Xively (Pachube/COSM) and Nimbits.

OR

a) State the function of Data Acquisition. Explain the function of Data Validation. Define Spatial Data.

b) Demonstrate Event-driven industrial IoT systems? List out the steps used in internet gateway device. Formulate the significant use of Raspberry Pi in Smart cities and Industrial appliances.

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Page 2 of 2

EVENING

[Total No. of Questions: 09]
Uni. Roll No. ....

0 3 JUN 2024

[Total No. of Pages: 2.]

Program: B.Tech. (Batch 2018 onward)
Semester: 5th
Name of Subject: Internet of Things
Subject Code: PCIT-111
Paper ID: 16442
Scientific calculator is NotAllowed

Time Allowed: 03 Hours
NOTE:

Max. Marks: 60

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A
Q1.
[Marks: 02 each]

a) Compare and contrast Machine-to-Machine (M2M) communication with IoT.

b) Provide three real-world examples of IoT applications in different sectors.

c) Define the Tag Length Value (TLV) format.

d) Compare the features and capabilities of Xively and Nimbits.

e) Set up an IoT device (e.g., Raspberry Pi with sensors).

f) Develop a use and misuse case scenario for a smart home IoT system.

Part – B
[Marks: 04 each]

Q2. Define the Internet of Things (IoT) and explain its significance in today's technological landscape.

Q3. Give two examples of smart devices and explain how they connect to and interact within the IoT network.

Q4. Explain the Modified OSI Model as applied to IoT/M2M systems. How does it differ from the traditional OSI Model?

Q5. To interface PI Camera with Arduino/ Raspberry Pi and write a program to start the camera and to place the clicked pictures on the desktop.

Q6. Implement common WSN protocols like Zigbee, Bluetooth Low Energy (BLE), or IEEE 802.15.4.

Q7. Write a program to demonstrate Web of Things (WoT) Using RFIDs.

Q8. Identify and explain the main message communication protocols used for connected devices in IoT. Describe the role of the Media Access Control (MAC) layer in network communication. How does it differ from the IP layer?

OR

Differentiate between Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Provide real-world examples of each service model.

Q9. Develop an IoT system for monitoring environmental conditions (e.g., soil moisture, temperature, humidity) in agriculture.

OR

a) Develop a simulation where different parts of an application are deployed on public, private, and hybrid clouds.

b) Write a simple web application (e.g., a basic website or REST API).

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MORNING

[Total No. of Questions: 09]

2 7 FEB 2024

[Total No. of Pages: 2]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)
Semester: 5/ (2018)
Name of Subject: Internet of Things
Subject Code: PCIT-111
Paper ID: 16442

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A
[Marks: 02 each]

Q1.

a) List the major components of an IoT system. How do these components work together to achieve the goals of IoT?

b) Provide a simple overview of the architectural view of an IoT system. What are the main components involved in an IoT architecture?

c) List the layers involved in the Modified Open System Interconnection (OSI) Model for IoT/M2M Systems.

d) Define MIME Type in the context of web connectivity.

e) Present examples of how IoT is transforming various industries.

f) List two common vulnerabilities associated with IoT devices.

Part – B
[Marks: 04 each]

Q2. Compare and contrast wired and wireless communication technologies in the context of IoT/M2M Systems.

Q3. Differentiate between JSON and Tag Length Value (TLV) formats. In what scenarios would you prefer one over the other for web connectivity?

Q4. Name two common application layer protocols used on the internet. Explain the role of the Hypertext Transfer Protocol (HTTP) in the application layer.

Page 1 of 2

P.T.O.

Please check that this question paper contains 9 questions and 2 printed pages within first ten minutes.

Q5.   Share a brief summary of one real-world case study where IoT technology has been applied in Smart Homes.

Q6.   Explain the concept of "Everything as a Service" (XaaS) in cloud computing. Differentiate between Infrastructure as a Service (IaaS) and Software as a Service (SaaS) cloud service models.

Q7.   Compare Raspberry Pi and Arduino.

Part – C   [Marks: 12 each]

Q8.   Compare and contrast IPv4 and IPv6 protocols. Assess the limitations of IPv4 and how IPv6 addresses. Define Media Access Control (MAC) and explain its function in network communication. Provide an example of a scenario where MAC addresses are crucial for device communication.

OR

Explain how RFID technology is integrated into IoT systems. Provide a real-world application of RFID in an IoT context. Explore the concept of the Web of Things (WoT) applied to RFID technology. How does WoT enhance the accessibility and interaction of RFID-enabled devices on the web?

Q9.   List the different libraries used in Python. Write the following to create a code on Arduino/Raspberry Pi:

a) To turn ON/OFF LED for specific duration(LED/ Buzzer).

b) To print temperature and humidity readings (DHT11/ DHT22 sensor).

OR

Explore different cloud deployment models like public, private, and hybrid clouds. Discuss their advantages and use cases.

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Page 2 of 2