



Siddaganga Institute of Technology

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belgaum, Approved by AICTE, New Delhi)

B.H. Road, Tumkur, 572103, Karnataka

Scheme and Solutions

Subject Code: RISE 36

Subject Title: **SENSORS & INTERNET OF THINGS**

I hereby certify that

- I don't have any blood relatives appearing for this paper.
- I have written down the scheme and solution myself.

Dr. RUDRAMURTHY M S

Signature of the Faculty

Name of the Faculty

Dr. JAYANNA H S

Signature of the Chairperson [BOE]

Name of the Chairperson [BOE]

2020-2021

Academic Year

√

Odd Even Summer

TEST -II (PAT -A)

√

BE B.Arch. MCA MBA M.Tech.

Degree

V & VI SEM

Semester

Total number of pages used

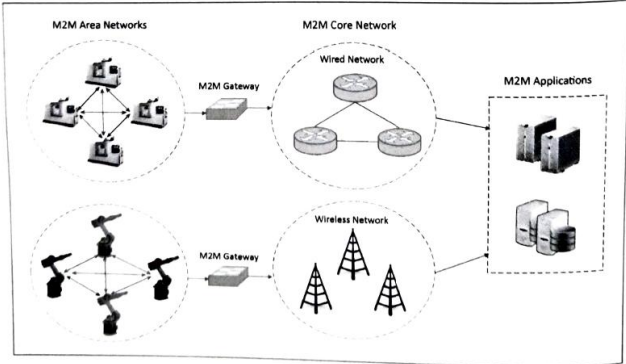
Q.No.	SCHEME AND SOLUTIONS	Marks
Q1.A	<p>Define M2M.</p> <p>Solution:</p> <p>Machine-to-Machine (M2M) refers to networking of machines (or devices) for the purpose of remote monitoring and control and data exchange. An M2M area network comprises of machines (or M2M nodes) which have embedded hardware modules for sensing, actuation and communication.</p>	4 M
Q1.B	<p>Discuss briefly the architecture of M2M.</p> <p>Solution:</p>  <p>The diagram illustrates the end-to-end architecture for M2M systems. It consists of three main components: M2M Area Networks, M2M Core Network, and M2M Applications. The M2M Area Networks are shown as two separate networks, each containing various M2M nodes (represented by icons of sensors and actuators). These networks are connected to the M2M Core Network via M2M Gateways. The M2M Core Network is divided into two parts: a Wired Network and a Wireless Network. The Wired Network consists of three interconnected routers, while the Wireless Network consists of three radio towers. Both the Wired and Wireless networks are connected to the M2M Applications, which are represented by server racks and a laptop.</p>	6 M

Figure shown above shows the end-to-end architecture for M2M systems comprising of M2M area networks, communication network and application domain. Various communication protocols can be used for M2M local area networks such as ZigBee, Bluetooth, ModBus, M-Bus, Wireless M-Bus, Power Line Communication (PLC), 6LoWPAN, IEEE 802.15.3, etc. These communication protocols provide connectivity between M2M nodes within an M2M area networks. The Communication network provides connectivity to remote M2M area networks. The communication network can use either proprietary or non IP based communication protocols, the communication network uses IP Based networks. Since non IP based protocols are used within M2M area networks, the M2M nodes within one network cannot communicate with nodes in an external network. To enable communication between remote M2M area networks, M2M gateways are used.

Q.No.	SCHEME AND SOLUTIONS	Marks
Q1.C	<p>Differentiate between M2M and IoT.</p> <p>Solution:</p> <p>Though both M2M and IoT involve networking of machines or devices, they differ in the underlying technologies, systems architectures and types of applications.</p> <p>Communication Protocols: M2M uses either proprietary or non-IP based communication protocols for communication within the M2M area networks. Commonly used M2M protocols include ZigBee, Bluetooth, ModBus, M-Bus, Wireless M-Bus, Power Line Communication (PLC), 6LoWPAN, IEEE 802.15.3, etc.</p> <p>The focus of communication in IoT is usually on the protocols above the network layer such as HTTP, CoAP, WebSockets, MQTT, XMPP, DDS, AMQP, etc.,</p> <p>Machines in M2M Vs Things in IoT:</p> <p>The “Things” in IoT refers to Physical objects that have unique identifiers and can sense and communicate with their external environment (and user application) or their internal physical states. The unique identifiers for the things in IoT are the IP addresses (or MAC addresses). Things have software components for accessing, processing, and storing sensor information, or controlling actuators connected. IoT systems can have heterogeneous things(*e.g., Home automation IoT system can include IoT devices of various types, fire alarms, door alarms, lightning control devices, etc.).</p> <p>M2M in contrast to IoT, typically have homogenous machine types within an M2M area network.</p> <p>Hardware Vs Software Emphasis:</p> <p>While the emphasis of M2M is more on hardware with embedded modules, the emphasis of IoT is more on software. IoT devices can run specialized software for sensor data collection, data analysis and Interfacing with the cloud through IP-based communication.</p> <p>Data collection and analysis:</p> <p>M2M data is collected in point solutions and often in on-premises storage infrastructure. In contrast to M2M, the data in IoT is collected in the cloud(can be public, private or hybrid cloud).</p>	6 M

Q.No.	SCHEME AND SOLUTIONS	Marks
Q2.A	<p>List the different steps of an IoT design Methodology.</p> <p>Solution:</p> <ol style="list-style-type: none"> 1. Purpose and Requirements Specification 2. Process Specification 3. Domain Model Specification 4. Information Model Specification 5. Service Specificatins 6. IoT Level Specification 7. Functional View Specification 8. Operational View Specification 9. Device and Component Integration 10. Application Development 	5 Marks
Q2.B)	<p>Propose a process specification diagram of an IoT system for home automation.</p> <p>Solution:</p>	6 Marks
Q2.C)	<p>Propose a Specification diagrammatically for IoT system for weather monitoring.</p> <p>Solution:</p> <p>Candidate is expected to apply the acquired knowledge to suggest a minimally workable process specification diagram for an IoT weather monitoring system that monitors pH, air velocity, wind speed, Humidity, Barometric pressure, air temperature etc.</p>	6 Marks

Q.No.	SCHEME AND SOLUTIONS	Marks
Q3.A)	<p>Discuss briefly the salient features of Python programming. Solution:</p> <p>Python is Interpreted: Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.</p> <p>Python is Interactive: You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.</p> <p>Python is Object-Oriented: Python supports Object-Oriented style or technique of programming that encapsulates code within objects.</p> <p>Python is a Beginner's Language: Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.</p>	5 M
Q3.B)	<p>Write a Python program to illustrate Tuple and Dictionary data type. Solution:</p> <p>Candidate is expected to initialize correctly Tuple and Dictionary data type in python.</p> <p>Candidate is expected to perform basic operations on Tuples and Dictionary such as insertion of an element or delete an element, combining two Tuples or Dictionary etc.</p>	6 M
Q3.C)	<p>Write a Python program to illustrate List data type. Solution:</p> <p>Candidate is expected to initialize the List data type.</p> <p>Candidate is expected to perform basic operations on List such as insertion of an element or delete an element, combining two lists and concatenation of two lists or reversal of two lists.</p>	6 M

Q.No.	SCHEME AND SOLUTIONS	Marks



Q.No.	SCHEME AND SOLUTIONS	Marks



Q.No.	SCHEME AND SOLUTIONS	Marks



Q.No.	SCHEME AND SOLUTIONS	Marks
Q5A	1.	10 Marks



Q.No.	SCHEME AND SOLUTIONS	Marks
Q5.B		10 Marks



Q.No.	SCHEME AND SOLUTIONS	Marks



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REMUNERATION BILL FOR SCHEME AND SOLUTIONS

Name :Dr. RUDRAMURTHY M S

Department :Information Science & Engineering

Siddaganga Institute of Technology, Tumkur – 572103

Sl. No.	Branch / Title of the Course	Semester	Subject with Code	Details of Remuneration Claimed	Total Amount Claimed [Rupees]
				Preparation of Scheme and Solution	₹ 500/-

Received Rupees [in words] *Five hundred only*

Signature of the Faculty

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Head of Account _____ Cheque No. _____ Date: _____

Rs. _____ (Rupees) _____

Verified that the work entrusted to the claimant has been carried out satisfactorily

«Number1»

Accounts Officer

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