the data they exchange, ensuring smooth operations across different platforms and environment

Without standardization, it would be impossible for billions of devices to coexist and function effectively in a single, global network, as they would not be able to "speak" the same language or understand each other data.

IOT Protocols :-

IOT is the connection of devices over the internet, where these smart devices communicate with each other, exchange data, perform some tasks without any human involvement. These devices are embedded with electronics, software, network and sensors which help in communication. Communicate between smart devices is very important in IOT as it enables these devices to gather, exchange data which contribute in success of that IOT product/ project.

1) M2M Protocol:-

Machine-to-Machine (M2M) communication also called M2M, is a more advanced form of the internet where many devices connect with each other.

M2M makes our gadgets work together smoothly, like an unseen director backstage at a play. These devices share info effortlessly

helping things run better in industries and cities.

M2M is a term for technology that lets machine talk to each other and do things without people helping them. This works with AI and machine learning, which help the machines communicate and make their own choices. At first, M2M was used in factories and industries to control machines from far away using things like SCADA and remote monitoring. Now, M2M is used in healthcare, business, insurance, and more. It's also the basis for IOT, where lots of devices connect and share information.

○ <u>Are IOT and M2M the Same?</u>

Although some use these terms interchangeably, M2M and IOT have distinct differences. Think of IOT as a bigger concept, while M2M is a part of it.

Often, machines communicate directly, either on their own or via M2M. The IOT, on the other hand, is a network of different systems that work together.

Moreover, M2M connects or interacts with devices directly, while IOT uses the internet to link them and establish a connection.

M2M helps manage processes, while IOT goes beyond that, enhancing businesses and user experiences.

M2M might help a vending machine alert someone that it's low on snacks. On the other hand, with IOT, the vending machine could even predict your favourite snacks and offer them to you. Remember, IOT expands on M2M, making it even more powerful.

○ <u>Features of M2M</u> :-

i) <u>Efficient Energy Use for Enhanced M2M</u> :-
The M2M system conserves energy, leading to improved performance in M2M applications.

ii) <u>Seamless Data Exchange in M2M</u> :-
Network operates utilize organized data packets to ensure smooth information sharing among machines in M2M communication.

iii) <u>Rapid Event Detection</u> :- Through monitoring, the system swiftly identifies events.

iv) <u>Flexible Data Timing</u> :- Data transfers can tolerate minor delays.

v) <u>Scheduled Information Sharing</u> :-
Data is transmitted or received at specific, predefined times.

vi) **Location-Based Device Notifications :-**
Devices receive alerts when entering specific areas.

vii) **Steady and Small-Scale Data Transfer :-**
The system maintains a consistent flow of small data packets.

o **How M2M Works ?**

M2M technology as a way for gadgets to interact or communicate with each other. They use special info sensors to share information about things like temp. or if they're working right. Then, they send these messages to a big network.

Unlike other ways of keeping an eye on gadgets from far away, M2M uses regular networks like Wi-Fi or cell signals. This makes it way more cost-effective.

M2M has three important parts: sensors (like tiny detectors), RFID (tag that tracks things), a communication channel for gadgets to communicate (like Wi-Fi or cell signals), and smart software that helps devices understand info and make choices. This software can also make choice devices do things independently based on the information they get.

We knew people used phones and radios to send info long ago. But now, we use the internet and better wireless devices to do the same things Even everyday things like heaters and meters can use this kind of computers.

The interesting fact here is it saves money. The interesting fact here is that it leads to cost savings. This is because, gadgets experience fewer breakdowns, resulting in reduced repair expenses. In addition, companies can explore new revenue streams by effectively maintaining their equipment And if something might go wrong, they can fix it before it gets bad. So, it's like gadgets helping each other and making life easier for us.

Best things about M2M :-

- Saves money by keeping gadgets in good shape and not having to fix them often.
- Helps businesses make more money by finding new ways to take care of their assets.
- Makes customer service better

Applications of M2M :-

1) **Utility Companies :-** M2M communications help the utility companies in harvesting energy products like oil, gas etc and in billing their customers. The remote sensors deployed in oil drilling sites collect regular data about the presence of oil at a particular field

and send that data to a remote computer. They are also capable of sending information about the flow rates, temperature, pressure, fuel levels etc. wirelessly to the remote comp.

2) **Traffic Control :-** Traffic control is another common area where the use of M2M communication can be seen. A traffic system collects data related to the speed and volume of the traffic with the help of various sensors and sends this information across the computers that control the devices such as signals and lights. The cameras installed on the traffic signals also collect data about the vehicles not following the traffic rules and send pictures to the software which then sends challan receipts to the defaulters.

3) **Telemedicine :-** Another common area of application of M2M communications is Telemedicine. Heart patients wear special devices which monitor their heart rate. This data is sent to the implanted device which sends back shocks to the patient for correcting any errant rhythms in the heart beat.

4) **Inventory Management :-** Products are tagged with RFID tags which send signals to the computers and alert the retailers in case of a theft attempt. These tags also help the retailers to keep a track of their goods which

are sold online in large quantities and have high chances of theft / shortage.

5) **Banking**: Banking is another common area to make use of M2M. With an increase in the smartphone market, people have started making mobile payments for their purchases. They can deposit money into the bank, transfer money to other accounts and can even withdraw at their convenience. The mobile system is connect to the bank's central system and updates the mobile transaction in the books as and whe they happen. On the other hand, Banks can monitor the cash available in the ATMs and also the technical issues they are facing.

Today, M2M communication involves a network of personal and industrial devices talking with each other and it continues to grow. The industry is estimated to grow to $2000 Million by 2022 and we believe M2M technology holds a bright future and the

Basis of	IOT	M2M
1) Abbreviation	Internet of Things.	Machine to Machine
2) Intelligence	Devices have objects that are responsible for decision making	Some degree of intelligence is observed in this.

③ Connection type used	The connection is via Network and using various communication types.	The connection is a point to point.
④ Communication protocol used	Internet protocols are used such as HTTP, FTP, and Telnet.	Traditional protocols and communication technology techniques are used.
⑤ Data Sharing	Data is shared between other applications that are used to improve the end-user experience.	Data is shared with only the communication parties.
⑥ Internet	Internet connection is required for communication.	Devices are not dependent on the Internet.
⑦ Type of Communication	It supports cloud communical	It supports point-to-point communication.
⑧ Computer System.	Involves the usage of both Hardware and Software.	Mostly hardware-based technology.
⑨ Scope.	A large number of devices yet scope is large.	Limited Scope for devices.

⑩ Business Type used	Business 2 Business (B2B) and Business 2 Consumer (B2C)	Business 2 Business (B2B)
⑪ Open API support	Supports Open API integrations.	There is no support for Open APIs.
⑫ It requires	Generic commodity devices	Specialized device colⁿ
⑬ Centric	Information and service centric.	Communication and device centric
⑭ Approach used	Horizontal enabler approach	Vertical system solution approach.
⑮ Components	Devices/sensors, connectivity, data processing, user interface.	Device, area networks, gateway, Application server.
⑯ Example	Smart wearables, Big Data and Cloud etc.	Sensors, Data and Informat etc.

WSN :- Wireless Sensor Network, is an infrastructure-less wireless network that is deployed in a large number of wireless sensors in an ad-hoc manner that is used to monitor the system, physical or environmental conditions.

Sensor nodes are used in WSN with the onboard processor that manages and monitors the environmental conditions.

Teacher's Signature........