

**Answer all the questions.**

1. What is the internet of things (IoT)? Explain its working mechanism with example? [2+8 marks]
2. What is the application of IoT in Environmental Monitoring? Provide simple work flow for Environment Monitoring system with example? [2+8 marks]
3. What are the different components of IoT? Write two most common IoT applications? [8+2 marks]
4. What are different types of sensors in IoT? What are the Difference between M2M and IoT? [4+6 marks]
5. What are the challenges or risks associated with IoT? [10 marks]

**-THE END-**

## MARKING SCHEME

1. What is the internet of things (IoT)?

### **Model Answer**

Internet of Things (IoT) is a network of physical objects or people called “things” that are embedded with software, electronics, network, and sensors that allow these objects to collect and exchange data. The goal of IoT is to extend to internet connectivity from standard devices like computer, mobile, tablet to relatively dumb devices like a toaster.

### **Marks Allocation**

Award 2 marks for definition. (2 marks)

Explain its working mechanism with example?

### **Model Answer**

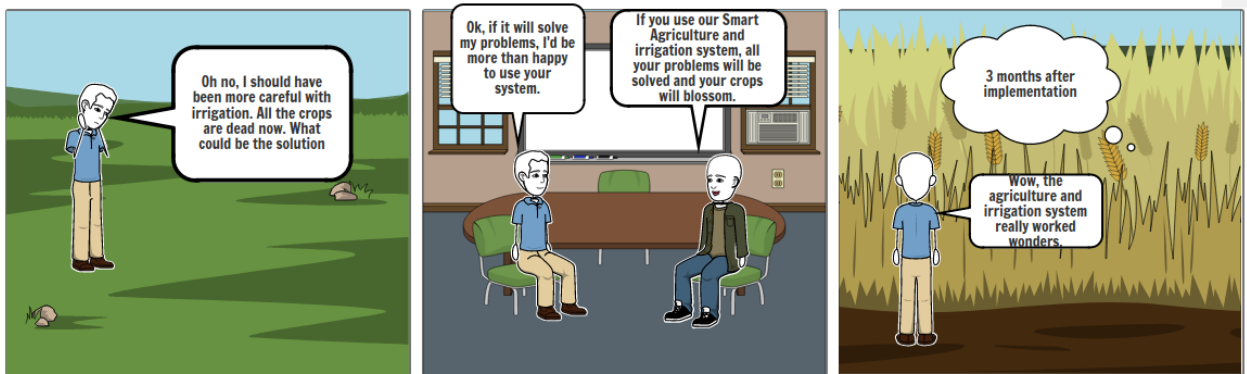
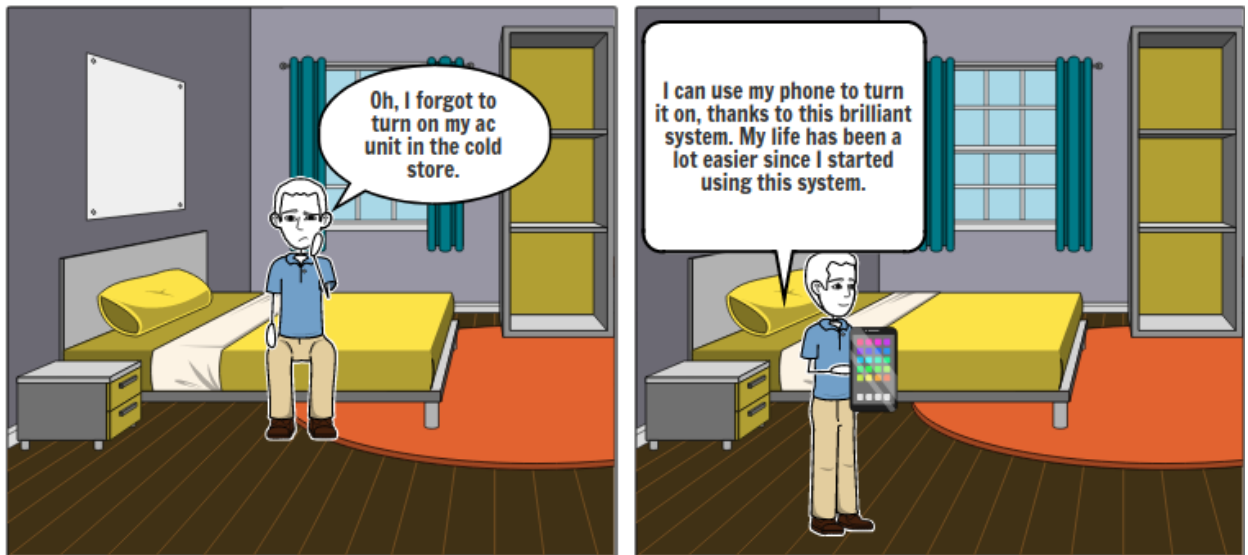
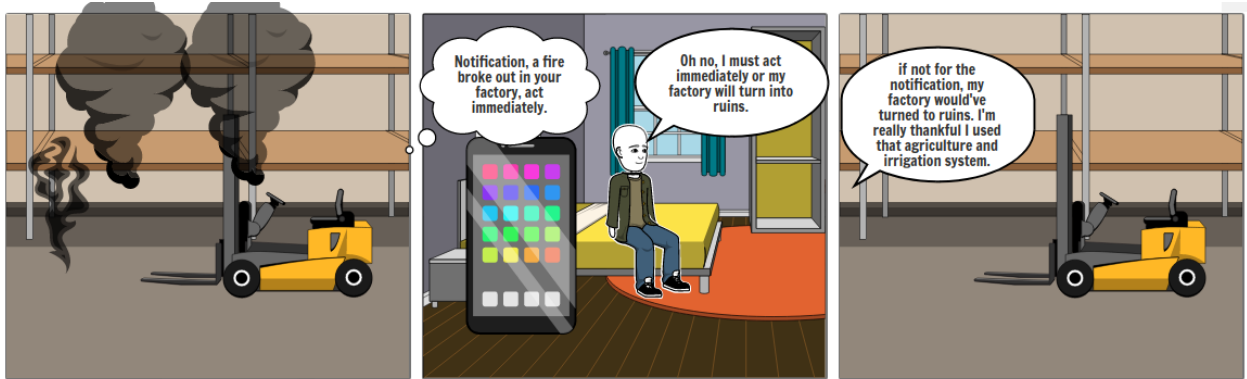
The internet of things, or IoT, is **a system of interrelated computing devices, mechanical and digital machines**, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

Example:

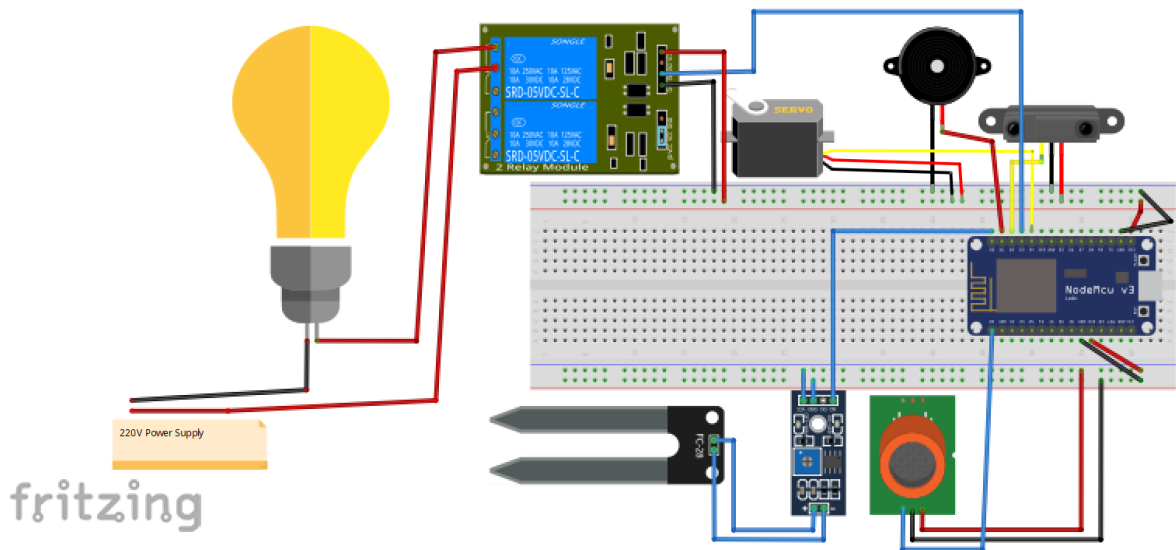
Title: **Smart Agriculture and irrigation system**

Smart Agriculture and irrigation system aims to provide smart irrigating and department solutions for the farmers. With the use of different IoT components it will provide aids to farmers. IR sensor will be used inside the store to prevent intruders of unauthorized access. Fire sensor to give alarm to the farmers when store will catch fire inside the store. Soil moisture will detect the degree of moisture in the soil and servo will rotate as per the instruction. NodeMCU will frequently update data generated by sensors and notification will be sent in the smartphones of the farmers through use of firebase.

How the system works:



Circuit Diagram:



Connection:

Flame sensor	NodeMCU
A0	A0
VCC	3V
GND	GND
IR	
o/p	D2
Moisture sensor	
A0	D0
Servo	
Yellow	D4
Buzzer	
+	D2
Relay	
In	D3

### **Marks Allocation**

Award 1 mark for example title. (1 marks)

Award 1 marks for each component (sensors or actuators) connected correctly in figure max 4 marks. (4 marks)

Award up to 3 marks for description of example.(3 marks)

2. What is the application of IoT in Environmental Monitoring?

**Model Answer**

The application of IoT in environmental monitoring is broad: environmental protection, extreme weather monitoring, water safety, endangered species protection, commercial farming and more. In these applications, sensors notice and live each variety of environmental amendment.

**Marks Allocation**

Award 2 marks for correct definition. (2 marks)

Provide simple work flow for Environment Monitoring system with example

**Model Answer**

Take a reference from question-1

**Marks Allocation**

Award 1 mark for example title. (1 marks)

Award 1 marks for each component (sensors or actuators) connected correctly in figure max 4 marks. (4 marks)

Award up to 3 marks for description of example.(3 marks)

3. What are the different components of IoT?

**Model Answer**

IoT devices usually consist of four main components as follows:

- **Sensors:** A sensor or device is an important component for gathering live data from the surrounding environment. The nature of this data can vary. This could be as simple as your phone having a temperature sensor, GPS, an accelerometer, or as complex as a live video feature on a social media platform. Sensors make it possible for IoT devices to connect to the real world and environment.

- **Connectivity:** Upon collection, all data is sent to a cloud infrastructure. This could be done by connecting the sensors to the cloud using a variety of communication mediums such as mobile or satellite networks, Bluetooth, WI-FI, WAN, etc. Various IoT devices use different types of connectivity.
- **Data Processing:** Once the data has been collected, and has reached the cloud, it is the responsibility of the data processors to process it. Data processing software can enhance IoT devices in a wide range of ways, from adjusting the temperature of the air conditioner to recognizing faces on mobile phones.
- **User Interface:** An IoT device interacts with a user through a User Interface. A user interface is the visible, tangible component of an IoT system that can be accessed by users. It involves presenting the information in a way that is valuable to the end-user. A well-designed user interface will simplify the experience for users and encourage them to interact more. Information needs to be made accessible to end-users in some way, like sending them alerts via notification, email or text message.

### **Marks Allocation**

Award 1 mark each for any relevant component. 1 marks for each relevant explanation  
 ((1+1)=2\*4 = 8 marks)

Write two most common IoT applications

### **Model Answer**

- **Smart Homes:** Smart homes are one of the most practical applications of IoT. Though IoT is applied in smart homes at various levels, the best one combines intelligent systems and entertainment. Example: Set-top box that allows you to record shows from remote, an automatic lighting system, a smart lock, etc.
- **Connect Health:** Connected health systems allow for real-time monitoring and patient care. Patient data assists in better medical decisions. Also, IoT improves the power, precision, and availability of current devices.

### **Marks Allocation**

Award 1 mark each for any relevant applications.

(1+1= marks)

4. What are different types of sensors in IoT?

### Model Answer

The different types of sensor are:

- Temperature sensors
- Pressure sensor
- Motion detection sensors
- Gas sensor
- Proximity sensor
- IR sensors
- Smoke Sensor, etc.

### Marks Allocation

Award 1 mark for each correct answer. (4 \* 1 mark = 4 marks)

What are the Difference between M2M and IoT?

### Model Answer

IoT	M2M
It is a network of connected devices (via the Internet) that have the ability to collect, process, and transmit data automatically without human intervention.	It allows two or more machines to communicate directly and perform certain tasks without requiring human intervention.
In addition, IoT enables objects to interact with the internal and/or external environments, thereby influencing their decision-making.	The M2M model exhibits some degree of intelligence. Devices capture data and share it with other connected devices, forming an intelligent network.

IoT	M2M
It facilitates cloud-based communication.	End-to-end communication between devices/machines is supported.
In order to improve the end-user experience, data is shared between other applications.	Only parties communicating with each other have access to the data.
Internet access is usually required for devices to communicate and share data.	Devices don't usually require an Internet connection for communication.
Many machines are able to communicate over the internet.	The communication between machines is limited to one at a time.
Open API integrations are supported.	Open API integrations are not supported.
A number of Internet protocols are used, including HTTP, FTP, and Telnet.	Communication technologies and traditional protocols are used.

### **Marks Allocation**

Award 2 mark for each correct difference. (3 \* 2 mark = 6 marks)

5. What are the challenges or risks associated with IoT?

### **Model Answer**

- **Privacy:** Connected IoT devices are vulnerable to hacking. Many IoT devices collect and transmit personal data over an open network without encryption, making it easy for hackers to access. Hackers may also use cloud endpoints to attack servers.
- **Insufficient testing & Outdated product:** In a fast-paced market like IoT, many companies or manufacturers rush to start releasing their products and software without doing enough testing. Many of them don't provide timely updates as well. Unlike other devices such as smartphones, IoT devices are not updated, which can leave them vulnerable to data theft. Thus, IoT devices should be tested thoroughly and updated as soon as new vulnerabilities are identified in order to maintain security.



- **Lack of knowledge and awareness:** Despite being a growing technology, people do not know much about IoT. A major security threat associated with IoT is the user's lack of knowledge and awareness of its capabilities. This poses a threat to all users.
- **Network Connectivity:** Network connectivity can be challenging for many IoT devices. Particularly if such devices are widely dispersed, in remote locations, or if bandwidth is severely limited.
- **Reliability:** Given the highly distributed nature of IoT devices, it can be difficult to ensure the reliability of IoT systems. Various conditions can affect the components that make up an IoT system, such as natural disasters, disruptions in cloud services, power outages, and system failures

### **Marks Allocation**

Award 2 mark for each correct answer. (5 \* 2 mark = 10 marks)

**The End**