BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Computing Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, V Semester,

1st In-Sem. Examination

Course Code: ITN1504 **Time: 1 Hour**

Course Name: Internet of Things (IoT) **Max. Marks: 20**

Section – A

05X01 = 05 Marks

05 objective type questions, each question carries 01 mark.

1. The huge number of devices connected to the Internet of Things has to communicate automatically, not via humans. What is this called?
   A) Skynet B) Machine 2 Machine
   C) Bot 2 Bot D) Intercloud

2. Which of the following issues are considered in IoT?
   A) Security Issue B) Reliability Issue
   C) Standard Issue D) All issues

3. MQTT stands for _____
   A) MQ Telemetry Things B) MQ Telemetry Transport
   C) MQ Transport Telemetry D) MQ Transport Things

4. Which is the future application of IoT?
   A) QoS in communication B) Secure communication
   C) Multimedia communication D) Role of green IoT system

5. Voice recognition software and virtual assistant programs offer for _____ and _____
   A) Communication B) Entertainment
   C) Communication and Software D) Communication and Entertainment

Section – B

03X02 = 06 Marks

03 short answer type questions, each question carries 02 marks.

1. What is IoT? What devices are IoT?
2. What is the difference between industrial IoT and consumer IoT?
3. What is the future scope of IoT?

Section – C

03X03 = 09 Marks

03 essay type questions, each question carries 03 marks.

1. What are the different applications of IoT?
2. What kind of sensors are used in IoT? Explain.
3. What are the different layers of IoT protocols? List out IoT protocols.

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Answer key

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1. The huge number of devices connected to the Internet of Things has to communicate automatically, not via humans. What is this called?
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ANSWER: B

2. Which of the following issues are considered in IoT?
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ANSWER: D

3. MQTT stands for _____
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ANSWER: D

5. Voice recognition software and virtual assistant programs offer for _____ and _____
   A) Communication B) Entertainment
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ANSWER: D

Section – B

03X02 = 06 Marks

03 short answer type questions, each question carries 02 marks.

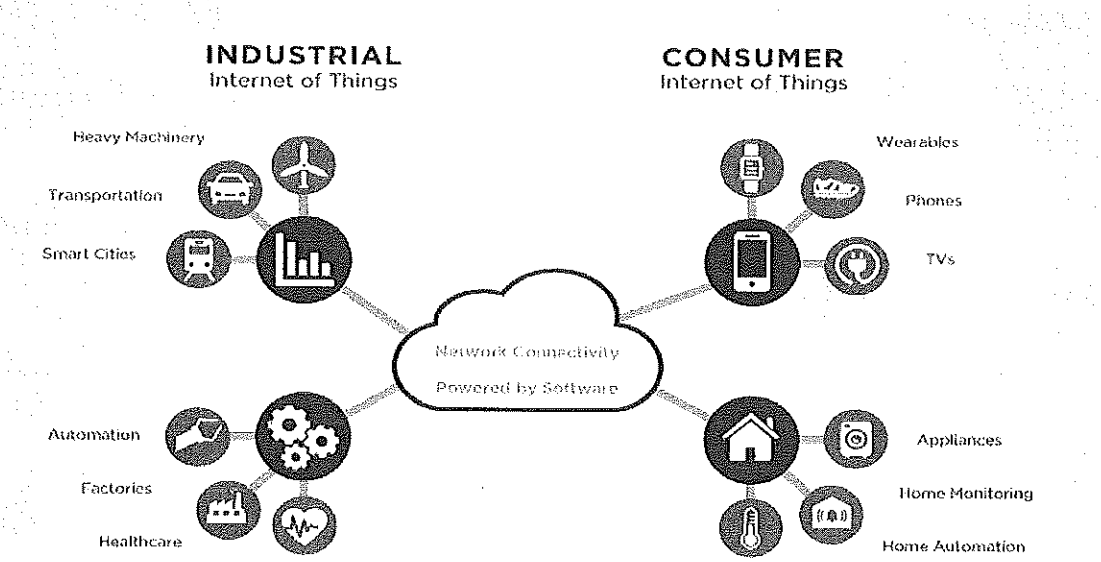
1. What is IoT? What devices are IoT?

Ans.: The Internet of Things (IoT) describes the network of physical objects "things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. The Internet of Things refers to electronics devices that collect some kind of data from sensors that are attached to it. The device is also connected to the internet so that it can send the data which collects from sensors to a larger, more powerful processor or server. Internet of Things (IoT) is a network of connected devices such as sensors, electronic equipment, cameras, and many more. They are programmed in such a way that IoT provides automation for the devices that are connected.

These days, if we have a look around our surrounding, then we can see that most of the devices are IoT based. So, we listed out all the popular IoT devices, which are addicted to nowadays.

1. First of all, Smart Home Automation, we check carefully, most of the houses are opting for Home Automation. As a security concern, and those who want an automatic and smart built home.
2. Voice Assistants, there is no home which doesn't have Amazon- Alexa or Google Echo in them
   home. People have started feeling these voice assistants as a part of life.
3. Smart Bands or Fitness Bands.
4. GPS Trackers
5. Smart Smoke Alarms
6. Smart Locks
7. Doorbell Camera's
8. Amazon Dash button
9. IoT based Security Systems

2. What is the difference between industrial IoT and consumer IoT?
Ans.: Consumer IoT
Basically, Consumer IoT solutions are focused on individual users or families through the use of wearables, smart home applications, and personal monitoring devices. A suitable example are smart voice assistants such as Amazon's Echo, Google's Home, and Apple's Home Pod; in other words, products that make our lives easier by performing tasks or services for us. The common connectivity used in this kind of solutions are Bluetooth, WiFi, and ZigBee. These technologies offer short-range communication, suitable for applications deployed in limited spaces such as houses, or small offices.
Industrial IoT
Unlike Consumer IoT, Industrial IoT targets existing automated industrial systems looking for dramatic improvements in productivity and efficiency. The most common sectors that come to mind could be large scale factories or manufacturing plants, but these are also known for monitoring utilities and expensive assets. Basically, we can say that we're entering a whole new era of IoT. The existing automated industrial systems inside factories tend to be older because the systems may have been installed more than a decade ago, therefore, integrating the information from these systems to support IoT could get more complicated than commercial IoT, due to the tasks that integrators have to do carry out, manage, and adapt to the existing infrastructure.



3. What is the future scope of IoT?
Ans.: Future scope of IoT
IoT has expanded its area of application in various sectors. The future scope of IoT in healthcare, automotive, and agriculture industries is very demanding.
Healthcare: IoT has proved to be one of the best tools for the healthcare industry. It helps provide advanced healthcare facilities to patients, doctors, and researchers. These facilities include smart diagnosis, wearable devices for tracking health, patient management, and many more. Furthermore, IoT devices have reduced unnecessary strain on the healthcare system.
Agriculture: One of the three basic human needs is food. To meet the rising demand for food, the industry has hence adopted technology to increase productivity. It includes the use of precision farming, agricultural drones, and smart farming applications. All these are built on top of the application of Internet of Things. Now, let us discuss how precision farming, smart farming applications, and agricultural drones help in increasing the productivity of the land.
Automotive Industry: In the 21st century, the application of IoT is revolutionizing the automotive industry. One of the major applications is the creation of self-driving cars that has changed the trends of the automotive industry. Various companies around the world are creating self-driving vehicles including Google, Tesla, Mercedes-Benz, Volvo, Audi, and many more. These self-driving cars use various technologies such as Data Science, Artificial Intelligence, Deep Learning, and IoT. IoT devices are programmed in such a way that they assist in creating an automated system for self-driving cars.
Jobs in IoT: As India is a developing country, it has a wide IoT scope. The future scope of IoT is very high for an IoT Developers. As we know that today every electronic device comes with an installed IoT system, there is a bright future scope of IoT.

Section – C

03X03 = 09 Marks

03 essay type questions, each question carries 03 marks.

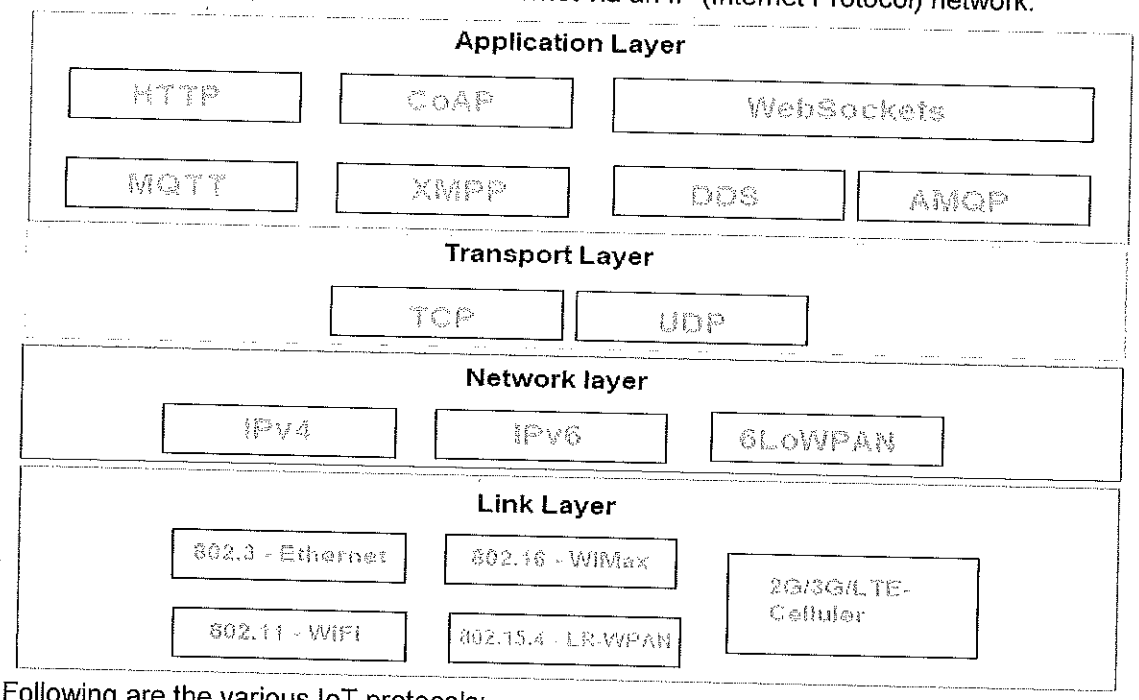
1. What are the different applications of IoT?
Ans.: IoT applications
IoT has many applications
Smart Home: Whenever we think of IoT systems, the most important and efficient application that stands out is the smart home, ranking the highest IoT application on all channels. The interesting thing is that the database of smart homes for IoT analytics includes 256 companies and start-ups. More companies are now actively involved in smart homes, as well as similar applications in the field.
Wearables: Just like smart homes, wearables remain a hot topic among potential IoT. Every year, consumers all across the globe await the release of the latest Apple smartwatch. Apart from this, there are plenty of other wearable devices that make our life easy such as the Sony Smart B Trainer, Look See bracelet, fitness band.
Smart City: Smart cities, like its name suggests, is a big innovation and spans a wide variety of use cases, from water distribution and traffic management to waste management and environmental monitoring. The reason why it is so popular is that it tries to remove the discomfort and problems of people who live in cities. IoT solutions offered in the smart city sector solve various city-related problems, comprising of traffic, reducing air and noise pollution, and helping to make cities safer.
Smart Grids: Smart grids are another area of IoT technology that stands out. A smart grid basically promises to extract information on the behaviors of consumers and electricity suppliers in an automated fashion to improve the efficiency, economics, and reliability of electricity distribution.
Industrial Internet: One way to think of the Industrial Internet is by looking at connected machines and devices in industries such as power generation, oil, gas, and healthcare. It also makes use of situations where unplanned downtime and system failures can result in life-threatening situations.
Connected Car; Connected car technology is a vast and an extensive network of multiple sensors, antennas, embedded software, and technologies that assist in communication to navigate in our complex world. It has the responsibility of making decisions with consistency, accuracy, and speed.

Connected Health (Digital Health/Telehealth/Telemedicine): IoT has various applications in healthcare, which are from remote monitoring equipment to advance and smart sensors to equipment integration. It has the potential to improve how physicians deliver care and also keep patients safe and healthy. Healthcare IoT can allow patients to spend more time interacting with their doctors, which can boost patient engagement and satisfaction. From personal fitness sensors to surgical robots, IoT in healthcare brings new tools updated with the latest technology in the ecosystem that helps in developing better healthcare.
Smart Retail: Retailers have started adopting IoT solutions and using IoT embedded systems across a number of applications that improve store operations, increasing purchases, reducing theft, enabling inventory management, and enhancing the consumer's shopping experience.
Smart Supply Chain: Supply chains have already been getting smarter for a couple of years. Offering solutions to problems like tracking of goods while they are on the road or in transit or helping suppliers exchange inventory information are some of the popular offerings.
Smart Farming: Smart farming has the potential to become an important application field, specifically in the agricultural-product exporting countries. The smart greenhouse is a revolution in agriculture, creating a self-regulating, microclimate suitable for plant growth through the use of sensors, actuators, and monitoring and control systems that optimize growth conditions and automate the growing process.

2. What kind of sensors are used in IoT? Explain.
Ans.: IoT Sensor
Sensors are devices that respond to inputs from the physical world and then take those inputs and display them, transmit them for additional processing, or use them in conjunction with artificial intelligence to make decisions or adjust operating conditions. As the IoT initiative expands, more and more sensors are going to be used to monitor and collect data for analysis and processing. Sensors are designed to respond to specific types of conditions in the physical world, and then generate a signal (usually electrical) that can represent the magnitude of the condition being monitored. Those conditions may be light, heat, sound, distance, pressure, or some other more specific situation, such as the presence or absence of a gas or liquid. The common IoT sensors that will be employed include:
Temperature sensors: Temperature sensors detect the temperature of the air or a physical object and concert that temperature level into an electrical signal that can be calibrated accurately reflect the measured temperature.
Pressure sensors: Pressure sensors measure the pressure or force per unit area applied to the sensor and can detect things such as atmospheric pressure, the pressure of a stored gas or liquid in a sealed system such as tank or pressure vessel, or the weight of an object.
Motion sensors: Motion sensors or detectors can sense the movement of a physical object by using any one of several technologies, including passive infrared (PIR), microwave detection, or ultrasonic, which uses sound to detect objects.
Level sensors: Level sensors translate the level of a liquid relative to a benchmark normal value into a signal. Fuel gauges display the level of fuel in a vehicle's tank, as an example, which provides a continuous level reading.
Image sensors: Image sensors function to capture images to be digitally stored for processing.
Proximity sensors: Proximity sensors can detect the presence or absence of objects that approach the sensor through a variety of different technology designs.
Water quality sensors: The importance of water to human beings on earth not only for drinking but as a key ingredient needed in many production processes dictates the need to be able to sense and measure parameters around water quality.
Chemical sensors: Chemical sensors are designed to detect the presence of specific chemical substances which may have inadvertently leaked from their containers into spaces that are occupied by personnel and are useful in controlling industrial process conditions.
Gas sensors: Related to chemical sensors, gas sensors are tuned to detect the presence of combustible, toxic, or flammable gas in the vicinity of the sensor.
Smoke sensors: Smoke sensors or detectors pick up the presence of smoke conditions which could be an indication of a fire typically using optical sensors (photoelectric detection) or ionization detection.

Infrared (IR) sensors: Infrared sensor technologies detect infrared radiation that is emitted by objects.
Acceleration sensors: While motion sensors detect movement of an object, acceleration sensors, or accelerometers as they are also known, detect the rate of change of velocity of an object.
Gyroscopic sensors: Gyroscopes or gyroscopic sensors are used to measure the rotation of an object and determine the rate of its movement called the angular velocity, using a 3-axis system.
Humidity sensors: Humidity sensors can detect the relative humidity of the air or other gas, which is a measure of the amount of water vapor contained in that gas.
Optical sensors: Optical sensors respond to light that is reflected off of an object and generate a corresponding electrical signal for use in detecting or measuring a condition.

3. What are the different layers of IoT protocols? List out IoT protocols.
Ans.: IoT communication protocols are modes of communication that protect and ensure optimum security to the data being exchanged between connected devices. The IoT devices are typically connected to the Internet via an IP (Internet Protocol) network.



Following are the various IoT protocols:

- AMQP (Advanced Message Queuing Protocol)
- MQTT (Message Queue Telemetry Transport)
- DDS (Data Distribution Service)
- HTTP (Hyper Text Transfer Protocol)
- LoRaWAN (Long Range Wide Area Network)
- Bluetooth
- ZigBee
- WiFi
- Constrained Application Protocol (CoAP)
- Advanced Message Queuing Protocol (AMQP)
- Machine-to-Machine (M2M) Communication Protocol
- Extensible Messaging and Presence Protocol (XMPP)
- Cellular technology