Scheme Of Evaluation
Internal Assessment Test 1 – March 2019

Sub:	**INTERENT OF THINGS TECHNOLOGY**							**Code:**	15CS81
Date**:**	05/03/2019	Duration:	90mins	Max Marks:	50	**Sem:**	VIII	**Branch:**	ISE

Note: Answer Any Five Questions

Question #	**Description**	**Marks Distribution**		**Max Marks**
1	What is IoT and Digitization? **IoT** focuses on connecting “Things” such us objects and machines, to a computer network, such us the internet. IoT is a well understood term used across the industry as a whole **Digitization** can mean different things to different people but generally encompasses the connection of “ Things”. With the data key generate and the business insights that result. Digitization as defined in its simple format, is the conversion of information into a digital format. **IoT Example:** In a shoping mall where Wi-Fi location tracking has been deployed, the “Things” are the Wi-Fi devices. Wi-Fi location tracking is simply capability of knowing where a consumer is in a retail environment through his or her smart phone’s connection to the retailer’s Wi-Fi network **Digitization Example:** For Example the whole photography industry has been digitized. Every one has digital cameras these days , either standalone device or built into their mobile phones . Other examples: Video rental industry and transportation (OLA , Uber , Lyft., etc.,)	4M	10 M	10 M

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Explain the Evolutionary Phases of Internet.

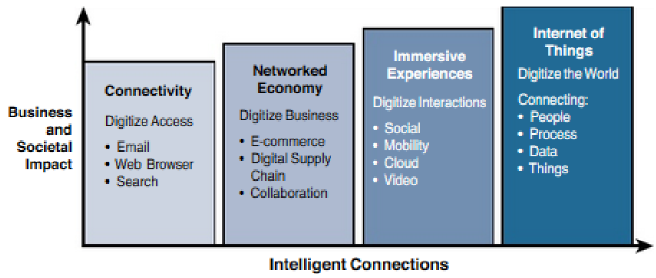

Figure 1-1 *Evolutionary Phases of the Internet*

Table 1-1 *Evolutionary Phases of the Internet*

<table>
<tr><th>Internet Phase</th><th>Definition</th></tr>
<tr><td>Connectivity
(Digitize access)</td><td>This phase connected people to email, web services, and search so that information is easily accessed.</td></tr>
<tr><td>Networked Economy
(Digitize business)</td><td>This phase enabled e-commerce and supply chain enhancements along with collaborative engagement to drive increased efficiency in business processes.</td></tr>
<tr><td>Immersive Experiences
(Digitize interactions)</td><td>This phase extended the Internet experience to encompass widespread video and social media while always being connected through mobility. More and more applications are moved into the cloud.</td></tr>
<tr><td>Internet of Things
(Digitize the world)</td><td>This phase is adding connectivity to objects and machines in the world around us to enable new services and experiences. It is connecting the unconnected.</td></tr>
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Discuss the benefits of IoT

And its impact in everyday life with IoT use cases

Projections on the potential impact of IoT are impressive. About 14 billion Or just 0.06%, of “things” are connected to the Internet Today. As per CISCO prediction in 2020 this number will reach 50 billion. UK government report speculates that this number will reach 100 billion.

What these number means is that IoT will fundamentally shift the way people and businesses interact with their surroundings.

Managing and monitoring smart objects using real-time connectivity enables a whole new level of data driven decision making.

Examples :

Connected Roadways,

Connected Factory

Smart Connected Cities and Buildings
</td>
<td>4M

6M</td>
<td>10 M</td>
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Smart Creatures

Oil and Gas

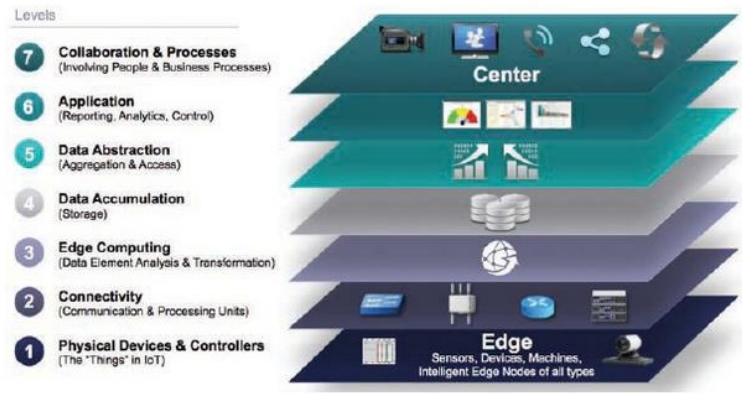
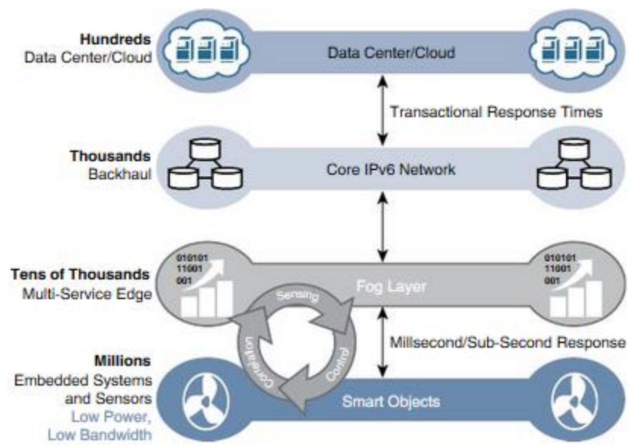
Mining

Figure 1-3 Google's Self-Driving Car

3	List the most significant challenges that IoT is currently facing.	10M	10 M	10 M

Table 1-4 *IoT Challenges*

Challenge	Description
Scale	While the scale of IT networks can be large, the scale of OT can be several orders of magnitude larger. For example, one large electrical utility in Asia recently began deploying IPv6-based smart meters on its electrical grid. While this utility company has tens of thousands of employees (which can be considered IP nodes in the network), the number of meters in the service area is tens of millions. This means the scale of the network the utility is managing has increased by more than 1,000-fold! Chapter 5, "IP as the IoT Network Layer," explores how new design approaches are being developed to scale IPv6 networks into the millions of devices.
Security	With more "things" becoming connected with other "things" and people, security is an increasingly complex issue for IoT. Your threat surface is now greatly expanded, and if a device gets hacked, its connectivity is a major concern. A compromised device can serve as a launching point to attack other devices and systems. IoT security is also pervasive across just about every facet of IoT. For more information on IoT security, see Chapter 8, "Securing IoT."
Privacy	As sensors become more prolific in our everyday lives, much of the data they gather will be specific to individuals and their activities. This data can range from health information to shopping patterns and transactions at a retail establishment. For businesses, this data has monetary value. Organizations are now discussing who owns this data and how individuals can control whether it is shared and with whom.
Big data and data analytics	IoT and its large number of sensors is going to trigger a deluge of data that must be handled. This data will provide critical information and insights if it can be processed in an efficient manner. The challenge, however, is evaluating massive amounts of data arriving from different sources in various forms and doing so in a timely manner. See Chapter 7 for more information on IoT and the challenges it faces from a big data perspective.
Interoperability	As with any other nascent technology, various protocols and architectures are jockeying for market share and standardization within IoT. Some of these protocols and architectures are based on proprietary elements, and others are open. Recent IoT standards are helping minimize this problem, but there are often various protocols and implementations available for IoT networks. The prominent protocols and architectures—especially open, standards-based implementations—are the subject of this book. For more information on IoT architectures, see Chapter 2, "IoT Network Architecture and Design." Chapter 4, "Connecting Smart Objects," Chapter 5, "IP as the IoT Network Layer," and Chapter 6, "Application Protocols for IoT," take a more in-depth look at the protocols that make up IoT.

4	Explain the IoT World Forum Standardized Architecture with suitable diagram  **Figure 2-2** *IoT Reference Model Published by the IoT World Forum*	10M	10 M	10 M
5	Explain in detail about IoT Data Management and Compute Stack with Fog Computing with a neat diagram  **Figure 2-15** *The IoT Data Management and Compute Stack with Fog Computing*	4M 6M	10 M	10 M

6 What are Sensors?

A **sensor** is a device that receives and responds to a signal.

2M

Explain in detail about the various types sensors

Table 3-1 *Sensor Types*

Sensor Types	Description	Examples
Position	A position sensor measures the position of an object; the position measurement can be either in absolute terms (absolute position sensor) or in relative terms (displacement sensor). Position sensors can be linear, angular, or multi-axis.	Potentiometer, inclinometer, proximity sensor
Occupancy and motion	Occupancy sensors detect the presence of people and animals in a surveillance area, while motion sensors detect movement of people and objects. The difference between the two is that occupancy sensors generate a signal even when a person is stationary, whereas motion sensors do not.	Electric eye, radar
Velocity and acceleration	Velocity (speed of motion) sensors may be linear or angular, indicating how fast an object moves along a straight line or how fast it rotates. Acceleration sensors measure changes in velocity.	Accelerometer, gyroscope
Force	Force sensors detect whether a physical force is applied and whether the magnitude of force is beyond a threshold.	Force gauge, viscometer, tactile sensor (touch sensor)
Pressure	Pressure sensors are related to force sensors, measuring force applied by liquids or gases. Pressure is measured in terms of force per unit area.	Barometer, Bourdon gauge, piezometer
Flow	Flow sensors detect the rate of fluid flow. They measure the volume (mass flow) or rate (flow velocity) of fluid that has passed through a system in a given period of time.	Anemometer, mass flow sensor, water meter

Sensor Types	Description	Examples
Acoustic	Acoustic sensors measure sound levels and convert that information into digital or analog data signals.	Microphone, geophone, hydrophone
Humidity	Humidity sensors detect humidity (amount of water vapor) in the air or a mass. Humidity levels can be measured in various ways: absolute humidity, relative humidity, mass ratio, and so on.	Hygrometer, humistor, soil moisture sensor
Light	Light sensors detect the presence of light (visible or invisible).	Infrared sensor, photodetector, flame detector
Radiation	Radiation sensors detect radiation in the environment. Radiation can be sensed by scintillating or ionization detection.	Geiger-Müller counter, scintillator, neutron detector
Temperature	Temperature sensors measure the amount of heat or cold that is present in a system. They can be broadly of two types: contact and non-contact. Contact temperature sensors need to be in physical contact with the object being sensed. Non-contact sensors do not need physical contact, as they measure temperature through convection and radiation.	Thermometer, calorimeter, temperature gauge
Chemical	Chemical sensors measure the concentration of chemicals in a system. When subjected to a mix of chemicals, chemical sensors are typically selective for a target type of chemical (for example, a CO_2 sensor senses only carbon dioxide).	Breathalyzer, olfactometer, smoke detector
Biosensors	Biosensors detect various biological elements, such as organisms, tissues, cells, enzymes, antibodies, and nucleic acid.	Blood glucose biosensor, pulse oximetry, electrocardiograph

8M

10 M

10 M

7	What are Actuators? An **actuator** is a device that converts energy into motion. Therefore, it is a specific type of a transducer.	2M	10 M	10 M
	Explain in detail about the various types actuators ■ **Type of motion:** Actuators can be classified based on the type of motion they produce (for example, linear, rotary, one/two/three-axes). ■ **Power:** Actuators can be classified based on their power output (for example, high power, low power, micro power) ■ **Binary or continuous:** Actuators can be classified based on the number of stable-state outputs. ■ **Area of application:** Actuators can be classified based on the specific industry or vertical where they are used. ■ **Type of energy:** Actuators can be classified based on their energy type.	8M		
8	List the Characteristics and Trends in Smart Objects ■ **Size is decreasing:** As discussed earlier, in reference to MEMS, there is a clear trend of ever-decreasing size. Some smart objects are so small they are not even visible to the naked eye. This reduced size makes smart objects easier to embed in everyday objects. ■ **Power consumption is decreasing:** The different hardware components of a smart object continually consume less power. This is especially true for sensors, many of which are completely passive. Some battery-powered sensors last 10 or more years without battery replacement. ■ **Processing power is increasing:** Processors are continually getting more powerful and smaller. This is a key advancement for smart objects, as they become increasingly complex and connected. ■ **Communication capabilities are improving:** It's no big surprise that wireless speeds are continually increasing, but they are also increasing in range. IoT is driving the development of more and more specialized communication protocols covering a greater diversity of use cases and environments. ■ **Communication is being increasingly standardized:** There is a strong push in the industry to develop open standards for IoT communication protocols. In addition, there are more and more open source efforts to advance IoT.	10M	10 M	10 M

Table 3-2 *Actuator Classification by Energy Type*

Type	Examples
Mechanical actuators	Lever, screw jack, hand crank
Electrical actuators	Thyristor, biopolar transistor, diode
Electromechanical actuators	AC motor, DC motor, step motor

Type	Examples
Electromagnetic actuators	Electromagnet, linear solenoid
Hydraulic and pneumatic actuators	Hydraulic cylinder, pneumatic cylinder, piston, pressure control valves, air motors
Smart material actuators (includes thermal and magnetic actuators)	Shape memory alloy (SMA), ion exchange fluid, magnetorestrictive material, bimetallic strip, piezoelectric bimorph
Micro- and nanoactuators	Electrostatic motor, microvalve, comb drive