

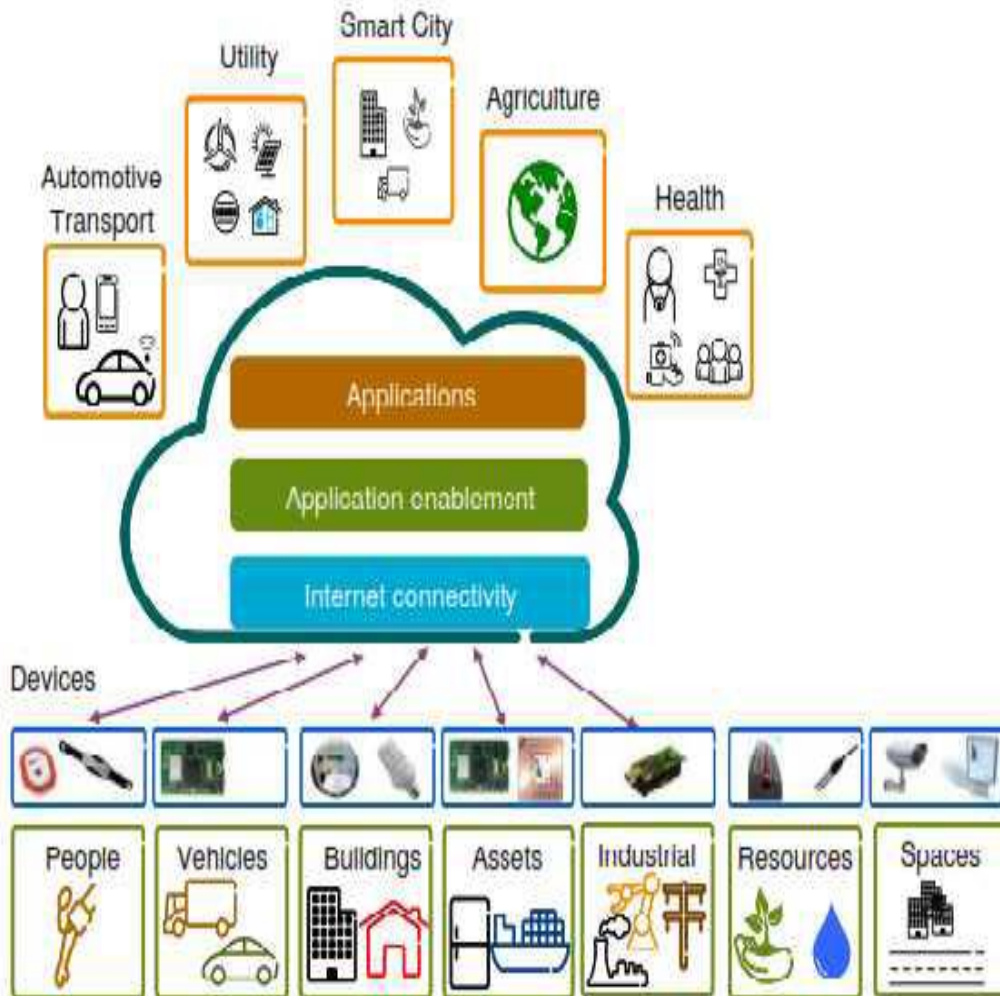
	<p>TELEMATICS Connected cars used for safety and security, services and infotainment.</p> <p>40M 2012 140M 2016</p> 	<p>METERING Meters to report consumption, mainly electricity.</p> <p>33M 2012 71M 2016</p> 	<p>REMOTE MONIT Sensors connected are tracked and monitored in real-time.</p> <p>25M 2012 49M 2016</p>
	<p>FLEET MANAGEMENT Vehicles can be managed and tracked through the path they go.</p> <p>15M 2012 26M 2016</p> 	<p>SECURITY Connectivity used for home and small business security alarms.</p> <p>14M 2012 37M 2016</p> 	<p>ATM / POINT OF SALE ATM and POS devices connected to a central secure environment.</p> <p>9M 2012 17M 2016</p>

Part II

Q3

With the diagram, discuss IoT and its emerging applications.

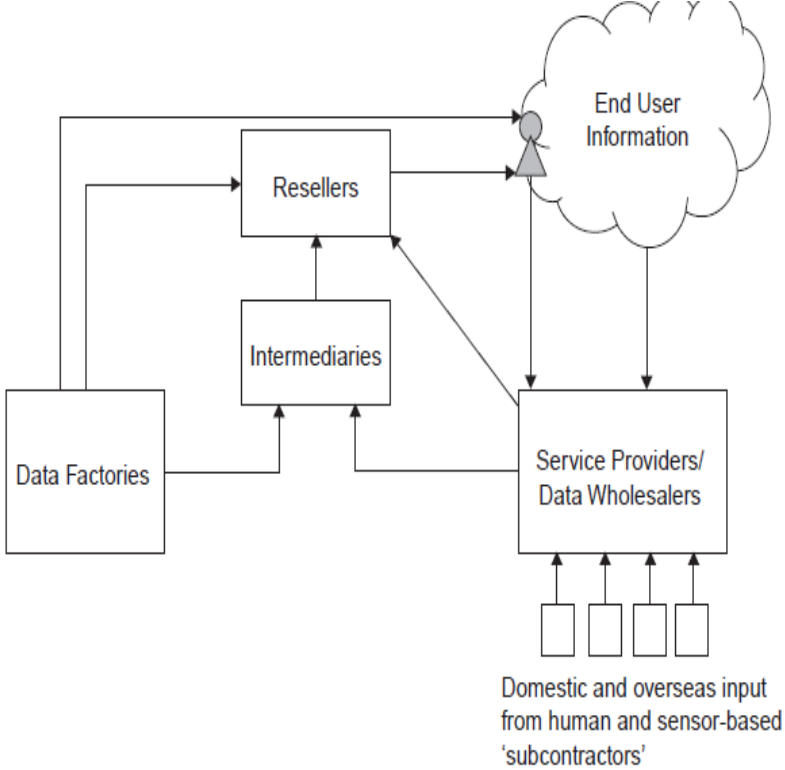
8

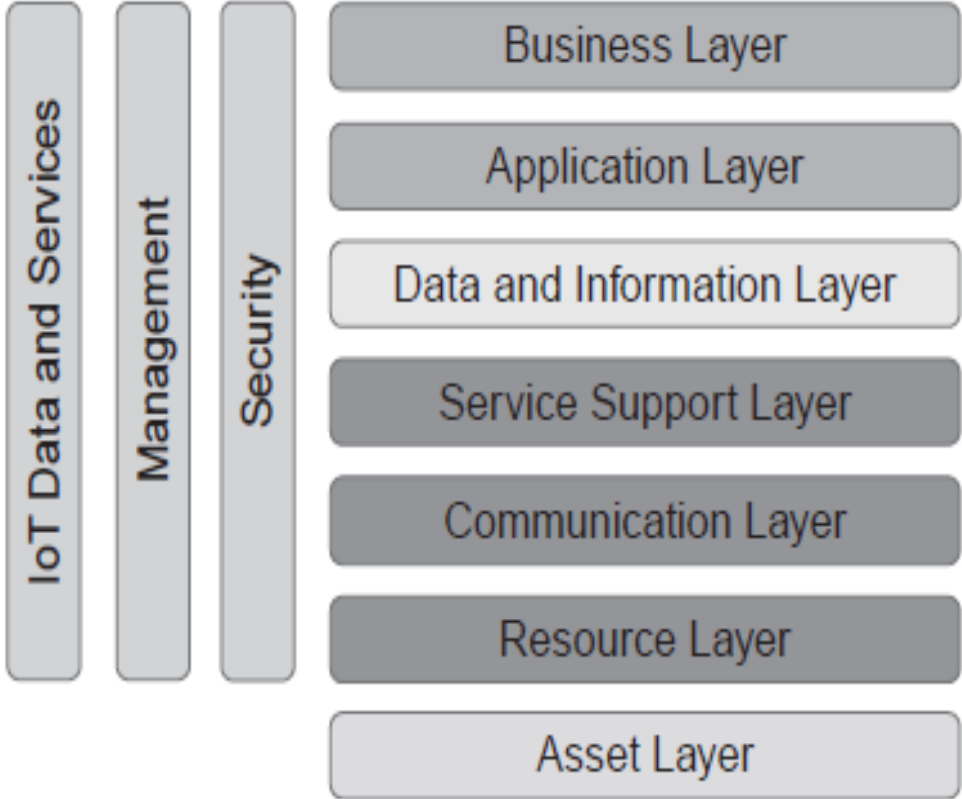


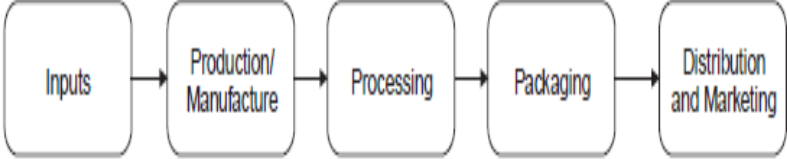
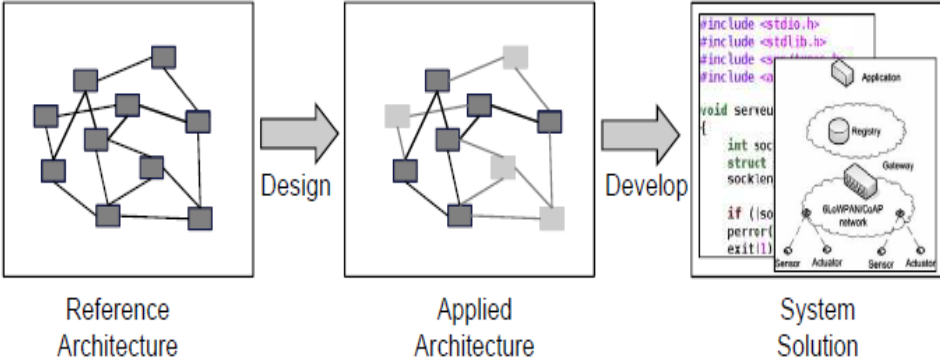
4

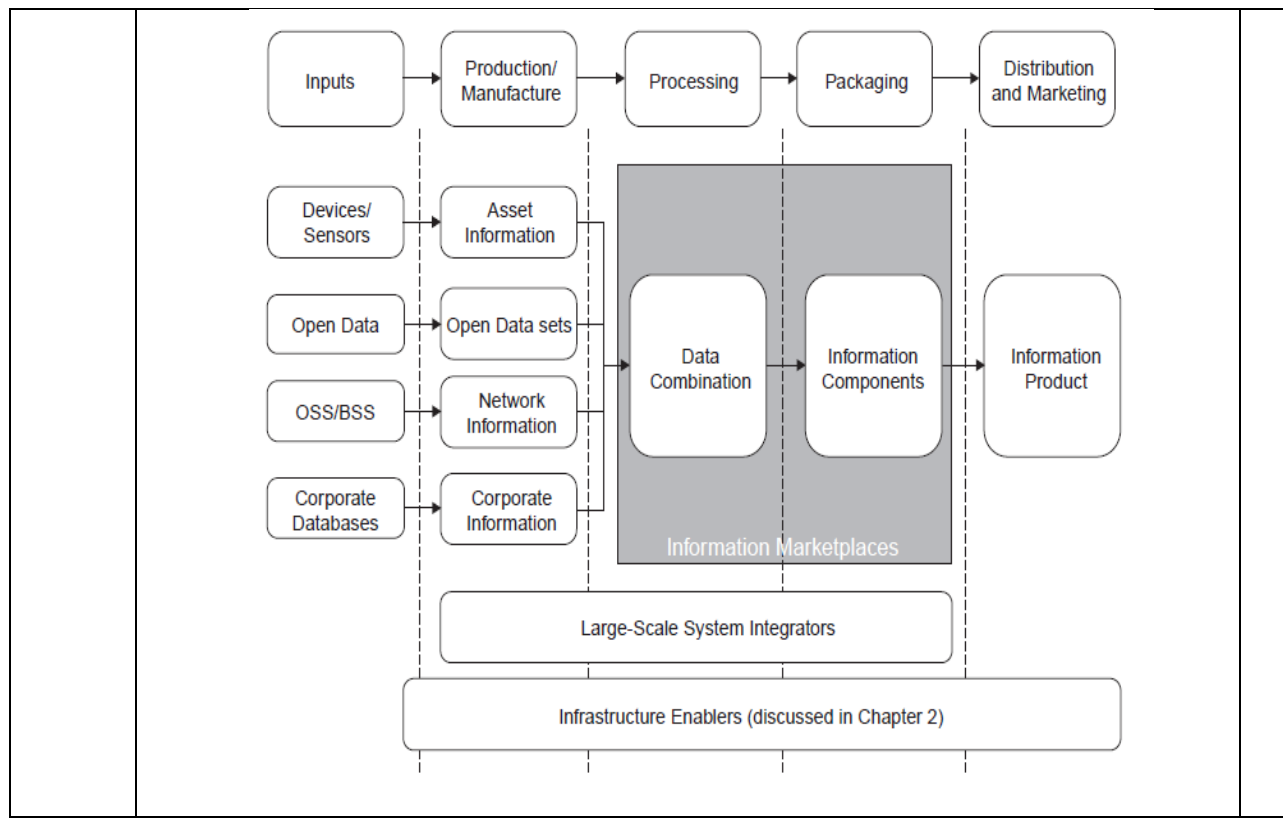
	<p>Emerging Applications of IOT</p> <p>Urban Agriculture:</p> <ul style="list-style-type: none"> • By using IoT technologies, urban agriculture could be highly optimized. • Sensors and actuators can monitor and control the plant environment and tailor the conditions according to the needs of the specific specimen. Water supply through a combination of rain collection and remote feeds can be combined on demand. <p>Robots:</p> <ul style="list-style-type: none"> • The process chain of the mine involving blasting, crushing, grinding, and ore processing will be highly automated and interconnected. <p>Food Safety:</p> <ul style="list-style-type: none"> • The main objective with is to ensure that the food supply is safe. • These objectives will have an impact across the entire food supply chain, from the farm to the table, and require a number of factors to integrate various parts of their businesses. 	4
OR		
Q4. a)	<p>a) Explain the role of game changers.</p> <p><u>Answer</u></p> <ul style="list-style-type: none"> • an event, idea, or procedure that effects a significant shift in the current way of doing or thinking about something. • The game changers come from a set of social, economic, and environmental shifts that create pressure to address issues and problems but also opportunities to reformulate the manner in which our world faces them. <div> <pre> graph LR GG([Global Gamechangers]) --> M[Megatrends] TS([Technology and Science]) --> M M --> REC([Required and Enabling Capabilities]) REC --> I[Implications] IT([IoT Technology]) --> I IB([IoT Business]) --> I </pre> </div> <p>Globally significant game changers</p> <ul style="list-style-type: none"> • Natural Resource Constraints. • Economic Shifts. • Changing Demographics. • Socioeconomic Expectations • Climate Change and Environment Impacts • Safety and Security 	5 1 2 2

	<ul style="list-style-type: none"> • Urbanization 	
b)	<p>Explain the three reasons how M2M and IoT has up taken.</p> <p><u>Answer</u></p> <p>M2M solutions was for quite some time, Now entering a period of time where both M2M and IoT solutions will increase dramatically.</p> <p>The reasons for this are three-fold:</p> <ul style="list-style-type: none"> • An increased need for understanding the physical environment in its various forms. • The improvement of technology and improved networking capabilities. • Reduced costs of components and the ability to more cheaply collect and analyze the data they produce. 	3
	Part III	
Q 5	<p>Explain main design principles and needed capabilities of IoT.</p> <p><u>Answer</u></p> <ul style="list-style-type: none"> • Within existing work for deriving requirements and creating architectures or reference models for IoT and M2M, three primary sources can be identified. <ul style="list-style-type: none"> – SENSEI – IoT-A – The third being the result of a standardization activity driven by ETSI in their Technical Committee (TC) M2M (ETSI M2M TC 2013). • These sources have been selected, as they represent state-of-the-art in terms of creating more complete architectures for the IoT and M2M. <p>SENSEI</p> <ul style="list-style-type: none"> • SENSEI is an Integrated Project (IP) in the EU’s Seventh Framework Programme in Information and Communication Technology (ICT). • SENSEI plays a leading role within the current efforts to create an underlying architecture and services for the future Internet and to realize the vision of the RWI(Real World Internet) • The approach taken in SENSEI was to develop an architecture and technology building blocks that enable a “Real World integration in a future Internet.” <p>ETSI TC M2M</p> <ul style="list-style-type: none"> • The European Telecommunications Standards Institute (ETSI) in 2009 formed a Technical Committee (TC) on M2M topics aimed at producing a set of standards for communication among machines from an end to- end viewpoint. • The approach taken has been to analyze a set of M2M use cases, derive a set of M2M service requirements, and then to specify an architecture as well as a set of supporting system interfaces. <p>IoT-A</p> <ul style="list-style-type: none"> • The approach taken in IoT-A differs from the two approaches above in the sense that instead of defining a single architecture, a reference architecture is created, captured in what the IoT-A refers to as the Architectural Reference Model (ARM). 	8

	<ul style="list-style-type: none"> The vision of IoT-A is, via the ARM, to establish a means to achieve a high degree of interoperability between different IoT solutions at the different system 	
	OR	
<p>Q6</p>	<p>List and explain the fundamental roles of information-driven global value chain (I-GVC).</p> <ul style="list-style-type: none"> There are five fundamental roles within the I-GVC that companies and other actors are forming around <ol style="list-style-type: none"> Inputs Data Factories. Service Providers/Data Wholesalers. Intermediaries. Resellers. 	<p>8</p> <p>4</p> <p>4</p>
	Part IV	
<p>Q 7</p>	<p>Explain IoT architecture outline with a diagram.</p>	<p>8</p>

	 <p>Asset Layer</p> <ul style="list-style-type: none"> - lowest layer. - The assets of interest are the real-world objects and entities that are subject to being monitored and controlled. <p>Resource Layer</p> <ul style="list-style-type: none"> - provides the main functional capabilities of sensing, actuation, and embedded identities. - Sensors and actuators in various devices that may be smartphones or Wireless Sensor Actuator Networks (WSANs), M2M devices like smart meters, or other sensor/actuator nodes, deliver these functions. <p>Communication layer</p> <ul style="list-style-type: none"> - provide the means for connectivity between the resources on one end and the different computing instances that host and execute the service support and application logic on the other hand. It can use LAN or WAN. <p>Service Support Layer</p> <ul style="list-style-type: none"> - These support services can provide uniform handling of the underlying devices and networks, thus hiding complexities in the communications and resource layers. <p>Data and Information Layer</p> <ul style="list-style-type: none"> - capture knowledge and provide advanced control logic support . <p>Application Layer</p> <ul style="list-style-type: none"> -provides the specific IoT applications 	2
	OR	
Q 8. a)	<p>What is Global Value Chain?</p> <p><u>Global value chains</u></p> <p>Value chain describes the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond,</p>	4 2

	<p>including design, production, marketing, distribution, and support to the final consumer .</p> <ul style="list-style-type: none"> • A simplified value chain is illustrated in Figure. 	2
Part V		
<p>b)</p>	<p>Explain how Reference architecture and Applied architecture involve to provide system solution?</p> <ul style="list-style-type: none"> • “<u>Reference architecture</u>” relates to a generalized model that contains the richest set of elements and relations that are of relevance to the domain “Internet of Things”. • When looking at solving a particular problem or designing a target application, the reference architecture is to be used as an aid to design an <u>applied architecture</u>. • The applied architecture is then the blueprint used to develop the actual system solution . 	4 2 2
<p>Q 9.</p>	<p>Describe the steps involved in IoT Value chains.</p>	8



OR

Q 10

Write short notes on

- a) Trends in information and communication technologies.
- b) General technology and scientific trends

8

Trends in information and communication technologies

- sensors, actuators, and tags function as the digital interfaces
- Embedded processing
- Instant access to the Internet
- Software Architectures
- Service Oriented Approach (SOA)
- Open APIs
- Cloud Computing
- Big Data
- Decision support

4

General technology and scientific trends

- Material Science
- Complex and Advanced Machinery
- Energy Production and Storage

4