JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MID SEMESTER EXAMINATION-2015

B.Tech VIII Semester

COURSE CODE: 15B1WCI832   MAX. MARKS: 30

COURSE NAME: Internet of Things Architecture and Design

COURSE CREDITS: 03   MAX. TIME: 2 HRS

Note: All questions are compulsory. Vague Answers will credit to zero marks

Section A   (Marks: 6)

Justify the following statements with suitable examples, diagram and mathematical formulas

1. The Internet of Everything is the intelligent connection of people, process, data and things.
2. Some important considerations in the Internet of Everything include privacy, security, energy consumption and network congestion.
3. Fabrication and interface of IoT devices on the micro / nano scale are preferred.
4. What are the elements of the Internet of Thing?
5. What role does the network play in the Internet of Thing?
6. Why is the Internet of Thing happening now?

Section B   (Marks: 9)

1. Explain the following components required for machine to machine communication:
    a. Processing Element (Embedded Controller)
    b. Sensors
    c. Actuator
    d. Power Unit
    e. Communication Modules   [3]

2. Explain the following communication technologies in terms of data rate, range, and frequency involved in IoT:
    a. RFID   f. Cellular Network
    b. Bluetooth   g. Internet
    c. ZigBee
    d. WiFi
    e. RF Links   [3]

3. Draw and explain the schematic of IoT in open and closed loop for a process control industry with IP enabled components.
    a. Embedded Processor burned with control algorithm.
    b. Smart actuator
    c. Final control element
    d. Smart sensor   [3]

PTO.

Section C   (Marks: 15)

1. What is the role of sensors in machine to machine communication? Explain the following:
   a. Sensors
   b. Transducers
   c. Active transducers
   d. Passive transducers
   e. Primary transducers
   f. Secondary transducers
   g. Interfaced signal conditioning components with sensor
   h. Interfaced signal processing components with sensor   [5]

2. One of the key functions of the IoT framework is providing internet services based on the data initiated from Smart Things. In general, the IoT framework integrating the smart wireless sensing systems and their corresponding applications is depicted in Fig.1 . The full potential and most viable application of the IoT can be realized by the combination of ubiquitous smart sensing systems with a cloud infrastructure. The advantage of the IoT framework with cloud computing is that it is highly scalable and offers flexibility in isolating the logical structures and its associated costs. Sensing systems can link their communications network and transmit the sensing data using a storage cloud management mechanism. Efficient real-time data mining or artificial intelligence tools can be provided for extracting useful information and translating into a corresponding knowledge base.
   a. How will you handle the big issues like: Data protection, Security and capacity?
   b. What are the Cloud Computing Components?
   c. Draw and explain the Cloud Computing Models and Architectures.
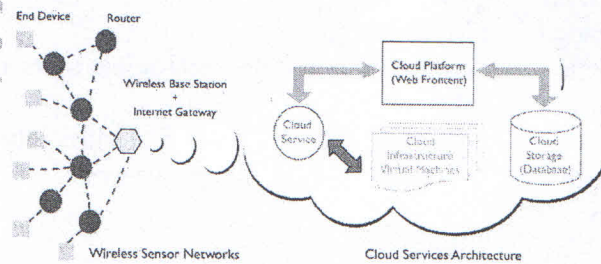   d. What are techniques to Communicate with the Cloud using Web Services.

Figure 1: Wireless Sensor Network integrated with cloud services for Internet of Things
                                                                                  [5]

3. What is the role of Development boards in designing IoT prototypes? Give a table of comparative study of following development boards:
   a. Intel Galileo
   b. Arduino UNO
   c. Raspberry Pi 2

                                                                                  [5]