

7 marks

Q.1 - How do the CISCO reference model & Oracle reference architecture correlate in an IoT architecture?

- ~~How~~ How do the blocks & components in IoT ~~IBM~~ IBM Conceptual framework & Oracle reference architecture correlate?

8 marks

- What should reference architecture cover in IoT general conceptual framework

- What are ~~three~~ architectural domain functionalities in M2M architecture?

- What are the open protocols, tools & frameworks generally used in M2M?

- Correlate four layer architecture view with seven level IoT architecture from CISCO.

Q.1.  
2nd - list the features of CISCO reference model  
- list the features of Oracle reference architecture  
- What does M2M mean

Assignment - 2 (Unit 3 & 4)

1. Draw a circuit for measuring variations in Capacitance with respect to an organic solvent Vapour Concentration using a microcontroller? Explain
2. What are the circuits for measuring variations in resistance with respect to temperature? Compare these & describe their application
3. List the different types of data which is generated at the devices - Explain
4. What does data validation mean? When does a data acquisition application consider data invalid? How can an application compensate for the missing or invalid data?
5. How does an application or service support software acquired data of industrial plant machines? Show diagrammatically the in-between physical cum data-link, adaptation; network, transport layers.
6. Explain Berkeley Data Analytics stack layer Software Components.



## 5 marks

1. What is MEMS? What are the physical entities which are sensed using an MEMS?
2. How are the voltage inputs to ADC & signal conditioning amplifier designed when using a sensor for temperature? How is the sensed temperature computed? Assume that the sensor measures temperature between  $-10^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$ .
3. What does data-acquisition mean? What are the benefits of data acquisition by an application after data aggregation, compaction or fusion & enrichment of data takes place from a number of devices?
4. What do you mean by data store? What are the different schemes for a data store?
5. What does spatial database mean? What are additional data fields that spatial data possess?
6. How are the analytics architecture layers used in automotive service centre for Internet of automotive components?
7. Explain Data Information Knowledge Wisdom pyramid.

1. How do you sense the things & identify product information using a barcode reader? What are the applications of IoTs when using barcode sensors?
2. What is QR Code? How do you use QR Code in the applications of IoTs?
3. How is industrial IoT used for predictive maintenance of machines in the industry?
4. Draw an architectural diagram of the processes in automotive IoT for predictive & preventive maintenance.
5. How is the web of things implemented?
6. How does a wireless sensor circuit differ from that of a sensor?
7. Draw the three-layer architecture of a wireless sensor node.
8. What are the features of SQL?
9. List the differences between time-series database system and RDBMS in construction & usages.
10. What do batch transactions, streaming transactions & real-time transactions processing mean?
11. List the advantages of descriptive analytics of ACVMs data.
12. How do predictive & prescriptive analytics differ?



- Q. 3
1. When do you use an analog sensor & a digital sensor?
  2. How is sound sensed & voice recognized?
  3. How is the motion of a moving object sensed?
  4. List the merits of participatory sensing.
  5. List the applications of industrial IoT.
  6. List the sensors needed in a Car for automotive IoT.
  7. How is a software serial library used?
  8. How is an RFID identified for IoT applications?
  9. List the design challenges of WSN security, Pos & Configuring of the nodes.

- Q. 4
10. What does server management mean?
  11. List the features of a data centre and the activities of a data centre manager.
  12. How does SQL differ from NOSQL?
  13. What does TSDB mean?
  15. List the uses of Analytics?
  16. What does OLAP mean?
  17. What is big data?
  18. How does big data differ from structured RDBMS analytics?

Q. Marks

1. Why is an IDE required for prototyping the embedded device platform?
2. What are the software components required for connecting sensors & actuators to the Internet?
3. Outline the benefits of using a SoC with a SD Card for embedded device prototyping.
4. What are the possible IoT applications of BeagleBone- X15 board?
5. What are the demerits of usages of Arduino for IoT embedded image devices development compared to Edison, RPi or BB?



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1. Write the similarities & dissimilarities in usages of Arduino boards with Intel Galileo boards.
2. Draw the architecture of Intel Galileo board and list the usages of each component on the Intel Galileo board.
3. Draw the architecture of Raspberry Pi 3 model B+ board using the features.
4. What are the additional benefits of using Raspberry Pi compared to Arduino for IoT embedded device development?
5. How does the library help in configuring Arduino for the Wi-Fi connectivity to Internet?
6. What are the roles of major components of IoT devices.

1. How is an Embedded-device platform hardware & Software selected for M2M/IoT applications?
2. What are merits in Arduino boards for the IoT, M2M and IIOT applications & Services.
3. What are features which makes Intel Edison board suitable for IoT, M2M & IIOT compared to Arduino?
4. How does Arduino Ethernet shield connect to the Internet? List the header files required from Arduino Ethernet library. When are the Ethernet client & server used?
5. List the functional programs in an IDE. Why is IDE an important tool for Embedded device component?



1. Compare the features of Intel Galileo, Raspberry and mbed boards for the IoT,

M2M & IIOT.

2. Describe uses of Raspberry & Beagle Bone Boards for IoT applications

3. How ~~do~~ do the sensors & actuators in the things connect securely to the Internet.

4. Write the IoT applications for Arduino, Intel Galileo, Raspberry Pi & Beagle Bone. List the features which are common.

5. Give examples of open source frameworks for IoT Implementation tools, web services, middleware & Cloud services for using embedded computing platforms.