

BIG DATA AND IOT
(CSEN 3236)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Real Time fast data is generated from
 - (a) Social media Networks
 - (b) Scientific Instruments and mobile Devices
 - (c) Sensor technology and Networks
 - (d) All the above.
- (ii) Valence in Big data corresponds to
 - (a) Dimension by data
 - (b) Connectedness
 - (c) Speed
 - (d) Complexity
- (iii) Apache Hadoop
 - (a) Open source software framework for Big Data
 - (b) Storage system of Hadoop for Big Data
 - (c) Programming Model for Big Data
 - (d) Map Reduce Summarizer for Big data
- (iv) HDFS is a
 - (a) Application
 - (b) Map Reduce
 - (c) Distributed file system that runs on clusters
 - (d) Non map reduce application
- (v) Major Phases of MapReduce are
 - (a) Mapping, Reducing,
 - (b) Shuffling, Sorting, Combining
 - (c) Mapping, Shuffling, Sorting, Reducing
 - (d) Both (a) and (b)
- (vi) HDMI is
 - (a) High definition multiplier interface
 - (b) High definition multimedia interface
 - (c) High difference media interface
 - (d) None of the above

- (vii) IPv4: Internet protocol version 4 identifies
 (a) Identifies the devices in the network using hierarchical addressing scheme, total 64 addresses.
 (b) 128 bit address scheme
 (c) Data transfer 250kb/s.
 (d) None of the above
- (viii) CoAP, MQTT, XMPP, DDS are
 (a) Application Layer Protocol (b) Presentation Layer Protocol
 (c) Session Layer Protocol (d) Data Link Layer Protocol
- (ix) Zookeeper provides services as
 (a) Maintaining and configuration of information
 (b) Naming and provide distributed synchronization
 (c) Both (a) and (b)
 (d) None of the above.
- (x) Full duplex communication between client and server takes place in
 (a) Stateless/ Stateful (b) Request Response
 (c) TCP connections (d) Web Sockets

Fill in the blanks with the correct word

- (xi) _____ refers to data that lacks any specific form or structure.
- (xii) Matrix Multiplication can be done by _____ of two Map Reduce operations.
- (xiii) Authentication, authorization and context integrity comes under _____ systems.
- (xiv) A RESTful web service is a web API implemented using ___ and ___ principles.
- (xv) IoT applications provide an interface that the users can use to control and monitor various aspects of _____.

Group - B

2. (a) Compare the role of different Distributed File Systems. [[C04](Analyse/HOCQ)]
 (b) How are large file system organizations dealt? [[C01](Remember/LOCQ)]
 (c) Explain the Map Reduce Paradigm. How can it be applied? [[C01](Apply/IOCQ)]
4 + 4 + 4 = 12
3. (a) Briefly explain the method to find relative frequency and cumulative relative frequency using numerical example. [[C03](Analyse/HOCQ)]
 (b) Compute the Mean using the Mapper class and Reducer Class. [[C03](Apply/IOCQ)]
6 + 6 = 12

Group - C

4. (a) Compare the role of relational algebra operations Selection and Projection. [[C01](Remember /LOCQ)]

- (b) Given a relation R, partition it's tuples according to their values. Analyse which aggregation methods are better and explain 2 of them. [[CO3](Analyse/HOCQ)]

- (c) Find the paths of length two in the Web using the relation Links in the Fig below.

From	To
url1	url2
url1	url3
url2	url3
url2	url4

Fig1: Relation Links having set of pairs of URL's

[[CO3](Apply/IOCQ)]

- (d) Explain grouping and aggregation by Map-Reduce where there is one grouping attribute and one aggregation, where Map will perform the grouping and Reduce does the aggregation.

[[CO1](Apply/IOCQ)]

$$3 + 3 + 3 + 3 = 12$$

5. (a) How are today's surveillance system controlling using the wireless Video Camera Networks ? [[CO4](Analyse/HOCQ)]

- (b) What is the purpose of Communication cost Model? [[CO5](Remember/LOCQ)]

- (c) Write a simple recursive algorithm to compute the path P(X,Y) from node X and Node Y in a directed graph. [[CO3](Apply/IOCQ)]

- (d) Think matrix as a relation M with row number column number and value. So $M(I,J,V)$ with tuples (i,j,m_{ij}) , $N(J,K,W)$ with tuples (j,k,n_{jk}) . Perform grouping and aggregation with Map and Reduce function. [[CO2](Apply/IOCQ)]

$$3 + 3 + 3 + 3 = 12$$

Group - D

6. (a) Explain an IoT system for Noise Monitoring. [[CO5](Analyse/HOCQ)]

- (b) Name few Home Automation used which are specific to IoT's. [[CO5,CO6](Remember/LOCQ)]

- (c) Describe in 2 lines applications of City automation that can be done under the Domain of IoT. [[CO5,CO6](Apply/IOCQ)]

$$4 + 4 + 4 = 12$$

7. (a) Compare data Plane and Control Plane of SDN. [[CO4](Analyse/HOCQ)]

- (b) Why SDN is important? [[CO4](Remember/LOCQ)]

- (c) Describe the three main component that make the SDN. [[CO4](Apply/IOCQ)]

$$4 + 4 + 4 = 12$$

Group - E

8. (a) What is the purpose of Web Service and Analysis component of IoT systems? [[CO6](Analyse/HOCQ)]

- (b) Draw the block diagram of IoT Level-6 for cloud based application used for prediction and visualization. [[CO6](Remember/IOCQ)]

$$6 + 6 = 12$$

9. (a) Explain the role of near field communication (NFC) help in smart payments. *[[CO6)(Analyse/HOCQ)]*
- (b) What are the parameters that characterize the basic functions of a computer network? *[[CO4)(Remember/LOCQ)]*
- (c) Describe how IoT system using RFID tags can help in inventory management. *[[CO5)(Apply/IOCQ)]*
- 4 + 4 + 4 = 12**
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Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	22.92	41.66	35.42