

# CBCS SCHEME

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17CS81

## Eighth Semester B.E. Degree Examination, July/August 2022 Internet of Things and Applications

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What is IOT? Explain evolutionary phases of the Internet. (08 Marks)  
b. What are the different challenges of IOT? (07 Marks)  
c. Explain the drivers behind new network architecture. (05 Marks)

OR

- 2 a. With a neat diagram, explain one M2M architecture of IOT. (08 Marks)  
b. Explain Core IOT functional stack. (07 Marks)  
c. Compare and contrast IT and OT. (05 Marks)

### Module-2

- 3 a. With a neat diagram, explain how actuators and sensors interact with Physical World. Classify actuators based on energy type. (10 Marks)  
b. Explain briefly the Wireless Sensor Network (WSN) and its Communication Protocols. (10 Marks)

OR

- 4 a. Briefly explain protocol stack utilization of IEEE 802.15.4. (10 Marks)  
b. Explain LoRaWAN standard and alliance MAC layer and security. (10 Marks)

### Module-3

- 5 a. Explain 6LoWPAN protocol header compression and fragmentation in detail. (10 Marks)  
b. Explain 6TiSCH architecture in detail. (10 Marks)

OR

- 6 a. Explain Tunneling legacy SCADA over IP networks and SCADA protocol translation with a neat diagram. (10 Marks)  
b. Explain MQTT framework and message format in detail. (10 Marks)

### Module-4

- 7 a. Explain the elements of Hadoop with a neat diagram. (10 Marks)  
b. Explain the core functions of edge analytics, with necessary diagram. (10 Marks)

OR

- 8 a. Explain the different components of FNF. (08 Marks)  
b. Describe Distributed Analytics Systems. (07 Marks)  
c. Describe Network Analytics. (05 Marks)

### Module-5

- 9 a. Explain the different pins/parts of Arduino UNO Board. (10 Marks)  
b. With a neat diagram, explain the Wireless Temperature Monitoring System with Raspberry Pi. (10 Marks)

OR

- 10 a. Write a Python program on Raspberry Pi to blink an LED. (10 Marks)  
b. Explain Smart City Security Architecture in detail. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

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17CS82

## Eighth Semester B.E. Degree Examination, July/August 2022 Big Data Analytics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Discuss the various system roles in an HDFS components or deployment. (10 Marks)  
b. Describe HDFS block replication with an example. (10 Marks)

OR

- 2 a. Briefly explain HDFS NameNode Federation, NFS gateway, Snapshots. (10 Marks)  
b. Write a program to Read and Write HDFS file using java. (10 Marks)

### Module-2

- 3 a. Discuss the usage of Apache Pig. (08 Marks)  
b. Explain Apache Sqoop to Acquire Relational data with an example. (08 Marks)  
c. Give the Apache Flume to acquire data streams. (04 Marks)

OR

- 4 a. Demonstrate the working of Hive with Hadoop. (08 Marks)  
b. Explain YARN application framework with an example. (08 Marks)  
c. Explain briefly how to manage Hadoop with Apache Ambari. (04 Marks)

### Module-3

- 5 a. List and explain any 3 areas of applications of Business Intelligence (BI). (10 Marks)  
b. Define Data Warehouse. Explain design consideration for data warehouse. (10 Marks)

OR

- 6 a. What is Data Mining? What are supervised and unsupervised learning techniques? (10 Marks)  
b. What is Data visualization? Explain how visualization tools are used. (10 Marks)

### Module-4

- 7 a. Using the Data given in Dataset as shown below, create a regression model to predict the Test2 from Test1 score. Then predict the score for the one who got a 46 in Test1. (10 Marks)

Test 1	59	52	44	51	42	42	41	45	27	63	54	44	50	47
Test 2	56	63	55	50	66	48	58	36	13	50	81	56	64	50

- b. Write the different steps involved in developing an artificial neural network. (10 Marks)

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OR

- 8 a. Construct a Decision tree that helps to make decision about approving the play of an outdoor game.

Outlook	Temp	Humidity	Windy	Play
Sunny	Hot	Normal	True	?

Outlook	Temp	Humidity	Windy	Play
Sunny	Hot	High	False	No
Sunny	Hot	High	True	No
Overcast	Hot	High	False	Yes
Rainy	Mild	High	False	Yes
Rainy	Cool	Normal	False	Yes
Rainy	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Sunny	Mild	High	False	No
Sunny	Cool	Normal	False	Yes
Rainy	Mild	Normal	False	Yes
Sunny	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Rainy	Mild	High	True	No

(10 Marks)

- b. Apply Apriori Algorithm for the following table, assume support count (minsup) = 2.

T <sub>ID</sub>	items
T <sub>1</sub>	I <sub>1</sub> , I <sub>2</sub> , I <sub>5</sub>
T <sub>2</sub>	I <sub>2</sub> , I <sub>4</sub>
T <sub>3</sub>	I <sub>2</sub> , I <sub>3</sub>
T <sub>4</sub>	I <sub>1</sub> , I <sub>2</sub> , I <sub>4</sub>
T <sub>5</sub>	I <sub>1</sub> , I <sub>3</sub>
T <sub>6</sub>	I <sub>2</sub> , I <sub>3</sub>

(10 Marks)

**Module-5**

- 9 a. List and explain different types of Text Mining applications. (10 Marks)  
 b. What is Naïve-Bayes technique? Explain its model. (10 Marks)

OR

- 10 a. What is SVM? With a neat diagram, explain support vector machine model. (10 Marks)  
 b. Define social network analysis? Explain different types of network topologies. (10 Marks)

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17CS834

## Eighth Semester B.E. Degree Examination, July/August 2022 System Modeling and Simulation

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. List any five circumstances, when the simulation is the appropriate and when it is not. (05 Marks)  
b. Write the advantages and disadvantages of simulation. (05 Marks)  
c. Explain with a flow chart the steps involved in simulation study. (10 Marks)

OR

- 2 a. Explain event-scheduling / Time advance algorithm with example. (10 Marks)  
b. Develop a manual simulation table for single server queuing system of a grocery shop for 6 customers and find, (i) Average waiting time of customer (ii) Idle time of server (iii) Average time customer spends in system. (iv) Probability wait customers arrive at shop randomly from 1 to 8 minutes and have equal probability. Service time varies from 1 to 6 minutes. The random digits for IAT and ST are 913, 727, 015, 948, 309 and 84, 10, 74, 53, 17, 79 respectively.

ST	1	2	3	4	5	6
P	0.10	0.20	0.30	0.25	0.10	0.05

(10 Marks)

### Module-2

- 3 a. Explain discrete distribution and continuous distribution with examples. (10 Marks)  
b. What is Poisson process? Mention the properties of Poisson process. (10 Marks)

OR

- 4 a. Explain the characteristics of a queuing system. (10 Marks)  
b. State and explain Kendal's notation for queuing system. (10 Marks)

### Module-3

- 5 a. Explain combined linear congruential method for random number generation. (10 Marks)  
b. The sequence of numbers 0.44, 0.81, 0.14, 0.05, 0.93 has been generated. Use the Kolmogorov-Smirnov test with  $\alpha = 0.05$  to determine if the hypothesis that the numbers are uniformly distributed on the interval (0, 1) can be rejected. Compare  $F(X)$  and  $S_n(X)$  on a graph (where  $D_\alpha = 0.565$ ) (10 Marks)

OR

- 6 a. Write a step by step procedure to generate random variate using inverse transform technique for exponential distribution. (10 Marks)  
b. Explain acceptance rejection technique. Generate 3 Poisson variate with mean = 0.2. Consider the random numbers 0.4357, 0.4146, 0.8353, 0.9952, 0.8004 (10 Marks)

**Module-4**

- 7 a. List the steps involved in the development of a useful model of Input data and also write the important suggestions to be noted while collecting the data. (10 Marks)
- b. Explain the different methods used to identifying the distribution with data. (10 Marks)

**OR**

- 8 a. Using goodness of fit test, test whether random numbers are uniformly distributed based on Poisson assumption with level of significance  $\alpha = 0.05$ ,  $\hat{\alpha} = 3.64$ . Sample data are

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Observed frequency	12	10	19	17	10	8	7	5	5	3	3	1

[where  $\chi_{0.05}^2$  11.1]

- b. Explain the types of simulation with respect to the output analysis. (10 Marks)

**Module-5**

- 9 a. Explain with neat diagram, model building, verification and validation. (10 Marks)
- b. Describe the three steps approach to validation by Naylor and Finger. (10 Marks)

**OR**

- 10 a. Explain output analysis for terminating and steady state simulation. (10 Marks)
- b. Explain optimization vice simulation. (10 Marks)

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