CBCS SCHEME

USN | | | | | | | | | | |

15CS81

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Internet of Things and Technology

Time: 3 hrs. Max. Marks: 80

Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define IoT and discuss the Genesis of IoT in detail. **(04 Marks)**
b. List out the difference between IT and OT networks and their various challenges. **(06 Marks)**
c. List out the most significant challenges and problems that IoT is currently facing. **(06 Marks)**

2 a. List and explain the defining characteristics of fog computing. **(06 Marks)**
b. Explain the IoT reference model published by the IoTWF. **(10 Marks)**

Module-2

3 a. Define sensor and its characteristics. **(06 Marks)**
b. List out the most useful classification scheme for the pragmatic application of sensors in a IoT network. **(10 Marks)**

4 a. Briefly describe about communication criteria. **(08 Marks)**
b. What are the main topologies used for IoT connecting devices? **(08 Marks)**

Module-3

5 a. What are the key advantages of the IP suite for the IoT? **(10 Marks)**
b. What are the points to be considered while comparing the transport of DLMS/COSEM over a cellular network versus an LLN deployment? **(06 Marks)**

6 a. Explain in detail COAP message format. **(08 Marks)**
b. Explain Message Queuing Telemetry Transport (MQTT). **(08 Marks)**

Module-4

7 a. What are the ways IoT data is categorized? Explain in detail. **(06 Marks)**
b. Discuss the following :
(i) Supervised learning
(ii) Unsupervised learning
(iii) Neural Networks. **(10 Marks)**

8 a. Explain any two Big data analytics tools and technologies. **(10 Marks)**
b. Explain Lambda Architecture in details. **(06 Marks)**

Module-5

9 a. What is Arduino? What are the advantages of Arduino? **(06 Marks)**

b. How to install arduino software for the windows PCs? **(10 Marks)**

10 a. Distinguish between Raspberry Pi and Arduino. **(04 Marks)**

b. Develop a python program which monitors a temperature of an engine using DS18B20 sensor and Raspberry Pi. **(12 Marks)**

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15CS82

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Big Data Analytics

Time: 3 hrs. Max. Marks: 80

Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What are the various systems roles in an HDFS development? Explain with a neat diagram. **(08 Marks)**

b. Explain with a neat diagram HDFS Block replication. **(08 Marks)**

2 a. Write the code for simple mapper script and simple reducer script. **(08 Marks)**

b. With a neat diagram explain Apache Hadoop parallel mapReduce data flow. **(08 Marks)**

Module-2

3 a. Explain the two-step Apache Sqoop data import and export method. **(08 Marks)**

b. With a neat diagram explain YARN Application frameworks. **(08 Marks)**

4 a. Explain the Apache Ambasi dashboard view of a Hadoop cluster. **(08 Marks)**

b. How Basic Hadoop YARN administration is carried out? Explain. **(08 Marks)**

Module-3

5 a. List any ten different Business Intelligence applications and explain them in brief. **(08 Marks)**

b. With a neat diagram explain Data warehousing architecture. **(08 Marks)**

6 a. How do you evaluate data mining results, explain with confusion matrix. **(08 Marks)**

b. Explain with a neat diagram different types of graphs. **(08 Marks)**

Module-4

7 a. Explain with a data set how to construct the decision tree. **(08 Marks)**

b. Using the data given in Dataset shown in Table Q7(b), create a regression model to predict the Test 2 from Test 1 score. Then predict the score for the one who got a 46 in Test 1.

Table Q7(b)

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

(08 Marks)

8 a. What are the different design principles of artificial neural network? Explain. **(08 Marks)**
b. Write the advantages and disadvantages of K-means algorithm. **(04 Marks)**
c. How association rules are represented? **(04 Marks)**

Module-5

9 a. Explain with a neat diagram text mining process. **(08 Marks)**
b. What are the advantages and disadvantages of Naïve-Baye's algorithm? **(04 Marks)**
c. Explain with a neat diagram SVM model. **(04 Marks)**

10 a. Explain with a neat diagram web usage mining architecture. **(08 Marks)**
b. List and explain the applications of social network analysis. **(08 Marks)**

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15CS834

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
System Modeling and Simulation

Time: 3 hrs. Max. Marks: 80

Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is simulation? Explain with flowchart, the steps involved in simulation study. **(08 Marks)**

b. A grocery store has only one checkout counter. Customer arrives at this checkout counter at random from 1 to 5 minutes apart with equal probability. The service time varies from 1 to 6 minutes with probability 0.30, 0.25, 0.05, 0.10, 0.10 and 0.20. Develop a simulation table for 10 customers and find the following:
(i) Average waiting time of customer
(ii) Average service time
(iii) Average time between arrivals
(iv) The probability that server being idle.
Use the following set of random numbers for arrivals 84, 10, 74, 53, 17, 79, 03, 87, 27. Random digit for service time 23, 35, 65, 81, 54, 03, 87, 27, 73, 70. **(08 Marks)**

2 a. Explain the major concepts in discrete event simulation. Write the flowchart for arrival and departure events. **(08 Marks)**

b. Six dump trucks are used to have coal form the entrance of a mine to a rail road. Each truck is loaded by one of the two loaders. After loading, a truck immediately moves to the scale, to be weighted as soon as possible. Both the loaders and scale have first come first serve weighing time for trucks. Travel from loaders to scale is considered negligible. After being weighed, a truck begins travel time (during which time truck unloads) and then afterwards returns to loader queue. The activities of loading, weighing and travel time are given in the table.

Loading time	:	10	5	5	10	15	10	10
Weighing time	:	12	12	12	16	12	16	
Travel time	:	60	100	40	40	80		

End of simulation is completion of two weighing from the scale. Depict simulation table and estimate the loader and scale utilizations. **(08 Marks)**

Module-2

3 a. Explain the characteristics of queueing systems. List different queuing notations. **(08 Marks)**

b. Define discrete and continuous random variable. Explain the binomial and Poisson distribution. **(08 Marks)**

4 a. Explain the following continuous distributions:
(i) Uniform distribution
(ii) Exponential distributions **(08 Marks)**

b. Explain steady state parameters of M/G/1 queue. **(08 Marks)**

Module-3

5 a. What is the role of maximum density and maximum period in generating random numbers? With given seed 45, constant multiplier 21, increment 49 and modulus 40, generate a sequence of fire random numbers. **(08 Marks)**

b. The sequence of numbers 0.54, 0.73, 0.98, 0.11, 0.08 has been generated. Use Kolmogorov Simirnov 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. $D_{0.05} = 0.565$. **(08 Marks)**

OR

6 a. Explain the inverse transformation technique for exponential distribution. Show the corresponding graphical interpretation. Explain the acceptance rejection technique. **(08 Marks)**

b. Use the Chi-Square test with $\alpha = 0.05$ to test for whether the data shown are uniformly distributed. The test uses $n = 10$ intervals of equal length. $\chi^2_{0.05,9} = 16.9$.

0.41	0.52	0.73	0.99	0.02	0.47	0.30	0.17	0.82	0.56
0.05	0.45	0.31	0.78	0.05	0.79	0.71	0.23	0.19	0.82
0.93	0.65	0.37	0.39	0.42	0.99	0.90	0.25	0.89	0.87
0.44	0.12	0.21	0.46	0.67	0.83	0.76	0.79	0.64	0.70
0.81	0.94	0.74	0.22	0.74	0.96	0.99	0.77	0.67	0.56

(08 Marks)

Module-4

7 a. List the steps involved in development of a useful model of input data and explain. **(08 Marks)**

b. Explain how the method of histograms can be used to identify the shape of a distribution. With an example, also mention drawbacks of histogram and advantages of Q-Q plot. **(08 Marks)**

OR

8 a. Customers arriving at a busy bank counter in a 5 minutes period between 10 to 2 pm was recorded for days given below:

Arrival/period	0	1	2	3	4	5	6	7	8	9	10
Frequency	15	12	10	10	8	7	5	4	3	2	4

Use Chi-Square test to check whether the data follows Poisson distribution at 5% level of significance. $\chi^2_{0.05,4} = 9.49$. **(08 Marks)**

b. The time required for 30 different employs to compute and record the number of hours worked during week days given:

1.88	2.62	1.49	0.35	0.82	2.03	1.54	0.21	0.39	2.03	2.16	0.90	1.90
0.63	0.17	0.03	0.45	0.31	0.15	2.03	4.29	0.04	1.73	0.92	2.81	0.05
5.5	2.16	0.48	0.18									

Use the Chi-Square to test the hypothesis that these service times are exponentially distributed at 5% of level of significance. Let the number of intervals be K = 6 and critical value 9.49. **(08 Marks)**

Module-5

9 a. Explain the types of simulation with respect to output analysis. Give atleast two examples. **(08 Marks)**

b. Explain the concepts of point estimation and interval estimation. **(08 Marks)**

OR

10 a. Explain in detail about the model building, verifying and validation in the model building process through a diagram. **(08 Marks)**

b. Explain 3-steps approach to validation of simulation models by Naylor and Finger.