CBCS SCHEME

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15CS81

Eighth Semester B.E. Degree Examination, July/August 2022
Internet of Things Technology

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Explain in detail the Genesis of IoT. **(08 Marks)**

b. Explain the different challenges of IoT. **(06 Marks)**

c. Define IT and OT. **(02 Marks)**

OR

2 a. Explain the expanded view of the simplified IoT architecture with a neat diagram. **(08 Marks)**

b. Explain IoT architectural drivers. **(08 Marks)**

Module-2

3 a. Define Sensors and Actuators. **(02 Marks)**

b. Explain various types of sensors with description and examples. **(06 Marks)**

c. Define WSNs. List the limitations of smart objects in WSNs and mention the need of communication protocols for WSNs. **(08 Marks)**

OR

4 a. Explain IEEE 802.15.4 (i) Physical layer and (ii) MAC layer, with diagrams. **(08 Marks)**

b. Explain LoRaWAN architecture and its MAC frame format. **(08 Marks)**

Module-3

5 a. Explain the key advantages of Internet Protocol. **(06 Marks)**

b. Explain 6LOWPAN header stacks, protocol header compression and fragmentation. **(10 Marks)**

OR

6 a. Design an IoT application involving IoT Data Broker for providing interoperability. **(08 Marks)**

b. Develop an IoT application framework which uses the temperature and pressure sensors in publish/subscribe module using MQTT. **(08 Marks)**

Module-4

7 a. Define:

(i) Structured versus unstructured data **(02 Marks)**

(ii) Data in motion versus data at rest **(02 Marks)**

(iii) IoT data analytics overview. **(04 Marks)**

b. Explain the Hadoop distributed file system with a neat diagram. **(08 Marks)**

OR

8 a. Explain the Purdue Model for control hierarchy. **(08 Marks)**

b. Explain the risk assessment framework for OCTAVE. **(08 Marks)**

Module-5

9 a. Explain the details of Arduino programming. List the advantages and its applications. **(10 Marks)**

b. Write a python program on Raspberry Pi to blink an LED. **(06 Marks)**

OR

10 a. Explain the smart city layered architecture with a neat diagram. **(08 Marks)**

b. Explain connected street lightning solution with architecture. **(08 Marks)**

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15CS82

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

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. With a diagram, explain the HDFS components. **(08 Marks)**

b. Briefly explain HDFS block replication, Name node high availability, Snap shots and Safe mode. **(08 Marks)**

OR

2 a. Discuss the general HDFS commands. **(08 Marks)**

b. Write a HDFS Java application example for reading, writing and deleting files from HDFS. **(08 Marks)**

Module-2

3 a. With block diagram, discuss the various frameworks that run under YARN. **(08 Marks)**

b. With diagram, explain the concept of Apache squoop **(08 Marks)**

OR

4 a. List the importance of Apache Flume, explain with weblog example. **(08 Marks)**

b. With respect to Oozie, describe the following i) DAG ii) Workflow definition. **(08 Marks)**

Module-3

5 a. List three business intelligence applications in the hospitality industry. **(08 Marks)**

b. What are the two Data warehousing development approaches? Compare and contrast DW and Data mining. **(08 Marks)**

OR

6 a. List and explain BI Applications. **(06 Marks)**

b. Explain BIDM cycle with respect to BI. **(06 Marks)**

c. What is a confusion matrix? **(04 Marks)**

Module-4

7 a. With example illustrate decision tree algorithm? Describe three criteria for choosing splitting variable. **(08 Marks)**

b. What is a regression model? What are the advantages and disadvantages? **(08 Marks)**

OR

8 a. Explain the design principles of an Artificial Neural Network. **(08 Marks)**

b. Using the data below, determine the number of clusters and the center points of those clusters.

Data Set

x	2	2	5	4	8	6	5	5	6	4
y	4	6	6	7	3	6	2	7	3	4

(08 Marks)

Module-5

9 a. Define Text mining. Discuss the issues of private security by considering case study of whatsapp. **(08 Marks)**

b. Compare and contrast Text mining and Data mining. **(08 Marks)**

OR

10 a. What are the three types of web mining? Explain privacy issues in web mining. **(08 Marks)**

b. Discuss Page Rank application with reference to social network analysis. **(08 Marks)**

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15CS834

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

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. What is Simulation? Explain with neat flow diagram the step involved in simulation study. **(08 Marks)**

b. Develop a simulation table for eight (8) customers in a grocery system with one check – out counter. Find the average waiting time of customer in Queue, idle time of server, and average service time. The Inter – Arrival Time (IAT) and Service Time (ST) are given in minutes :

IAT	3	2	6	4	4	5	8	
S.T	3	5	5	8	4	6	2	3

Assume first customer arrives at time t = 0. **(08 Marks)**

OR

2 a. What is system and system environment? Explain the major concept of Discrete Event simulation with example. **(08 Marks)**

b. Develop a simulation table for Dump truck system where six dump trucks are used to carry coal from the entrance of a small mine to the rail road. Each truck is loaded by one of two loaders. After loading truck immediately moves to the scale to be weighed. Loader and scale have first – come – first serve (FCFS) Queue. The travel time from loader to scale is negligible. After being weighed, a truck begins a travel time, afterwards unloads the coal and returns to the loader queue. It is assumed that five trucks are at the loader and one is at the scale at time t = 0. Carryout simulation process till the computation of two weighing from the scale. The activities of loading, weighing and travel time are given in the following table :

Loading time	10	5	5	10	15	10	19
Weighing time	12	12	12	16	12	16	
Travel time	60	100	40	40	80		

Calculate the i) Busy time of both the loaders and the scale
ii) Average loader and scale utilization. **(08 Marks)**

Module-2

3 a. Explain Poisson process and its properties with example. List out the assumption which are needed to fulfill the counting process $\{N(t), t \geq 0\}$, is said to be Poisson process with mean rate λ. **(10 Marks)**

b. Forty percent of the assembled ink-jet printers are rejected at the inspection station.
i) Find the probability that the first acceptable ink-jet printer is the third one inspected
ii) Find the probability that the third printer inspected is the second acceptable printer. **(06 Marks)**

OR

4 a. Explain with an example the characteristics of Queuing system? What does the format A/B/C/N/K represent? **(10 Marks)**

b. Suppose that the life of an industrial lamp is in thousands of hours, is exponentially distributed with failure rate $\lambda = 1/3$ (one failure every 3000hours, on the average). Find the probability that the lamp will last longer than its mean time o life. Also find the probability that the industrial lamp will last between 2000 and 3000hours. **(06 Marks)**

Module-3

5 a. What are pseudo random Numbers? Explain the important consideration for the selection of routines to generate random numbers. **(08 Marks)**

b. What are 3 ways of achieving maximum periods in random number generation? Generate a sequence of 5 random numbers with given seed 45, constant multiplier 21, increment 49 and modulus 40. **(08 Marks)**

OR

6 a. The sequence of random numbers 0.54, 0.73, 0.98, 0.11 and 0.68 has been generated. Use Kolmgorov – Smirnov Test with $\alpha = 0.05$ to determine if the hypothesis that the number are uniformly distributed on the interval [0,1] can be rejected Take $D_{0.05,5} = 0.565$. **(08 Marks)**

b. What are Acceptances – Rejection technique? Generate three Poisson random variants with mean $\alpha = 0.2$ and take random numbers as : $R_1 = 0.4357$, $R_2 = 0.4146$, $R_3 = 0.8353$, $R_4 = 0.9952$ and $R_5 = 0.8004$. **(08 Marks)**

Module-4

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

b. Records pertaining to the monthly number of job relted injuries at an underground coal mine were being studied by a federal agency. The values for the past 100 months were as follows:

Injuries per months	Frequency of occurrences
0	35
1	40
2	13
3	6
4	4
5	1
6	1

Apply the chi-square test these data to test the hypothesis that the underlying distribution is Poisson. Use the level of significance $\alpha = 0.05$ and $\chi^2_{0.05,2} = 5.99$. **(08 Marks)**

OR

8 a. List and explain the steps involved in selection of input models without data. **(08 Marks)**

b. Let X_1 represent the average lead time (in month) to deliver the industrial robots and X_2 represent the annual demand for industrial robots. The following data are available on demand and lead for last 10 years.

Lead time	6.5	4.3	6.9	6.0	6.9	6.9	5.8	7.3	4.5	6.3
Demand	103	83	116	97	112	104	106	109	92	96

Find the dependency between lead time and demand. **(08 Marks)**

Module-5

9 a. What are the different suggestions given in verification process? **(08 Marks)**

b. Explain in detail model building, verification and validation process through a diagram. **(08 Marks)**

OR

10 a. What is output analysis? Explain the types of simulation with respect to output analysis. **(08 Marks)**

b. Describe the three step approach by Naylor and Finger in the validation process. **(08 Marks)**

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